



# OFFICIAL CONFERENCE PROCEEDINGS

The 4th Paris Conference on Education (PCE2025)

June 10-14, 2025 | Paris, France, and Online

ISSN: 2758-0962

Organised by the International Academic Forum (IAFOR) in partnership with the IAFOR Research Centre at the Osaka School of International Public Policy (OSIPP) at Osaka University, Japan, and IAFOR's Global Partners.

iafor







“To Open Minds, To Educate Intelligence, To Inform Decisions”

The International Academic Forum provides new perspectives to the thought-leaders and decision-makers of today and tomorrow by offering constructive environments for dialogue and interchange at the intersections of nation, culture, and discipline. Headquartered in Nagoya, Japan, and registered as a Non-Profit Organization (一般社団法人), IAFOR is an independent think tank committed to the deeper understanding of contemporary geo-political transformation, particularly in the Asia Pacific Region.

INTERNATIONAL

INTERCULTURAL

INTERDISCIPLINARY

**iafor**







# International Academic Board

Professor Anne Boddington, IAFOR & Middlesex University, United Kingdom (IAB Chair)  
Dr Joseph Haldane, IAFOR & Osaka University, Japan, & University College London, United Kingdom  
Professor Jun Arima, IAFOR & University of Tokyo, Japan  
Professor Virgil Hawkins, IAFOR Research Centre & Osaka University, Japan  
Mr Lowell Sheppard, IAFOR & Never Too Late Academy, Japan

Dr Susana Barreto, University of Porto, Portugal  
Professor Grant Black, Chuo University, Japan  
Dr Evangelia Chrysikou, Bartlett School of Sustainable Construction, University College London, United Kingdom  
Professor Donald E. Hall, Binghamton University, United States  
Professor Brendan Howe, Ewha Womans University, South Korea & The Asian Political and International Studies Association (APISA)  
Dr James W. McNally, University of Michigan, United States & NACDA Program on Aging

## PCE/PCAH2025 Conference Programme Committee

Dr Dan Baker, Independent Consultant, France  
Professor Grant Black, Chuo University, Japan  
Professor Georges Depeyrot, French National Center for Scientific Research (CNRS), France  
Dr Joseph Haldane, IAFOR & Osaka University, Japan & University College London, United Kingdom  
Professor Ljiljana Marković, European Center for Peace and Development (ECPD), Serbia







# The Paris Conference on Education 2025

## Official Conference Proceedings

ISSN: 2758-0962

Executive Editor:  
Joseph Haldane, PhD

IAFOR Publications Manager:  
Nick Potts

IAFOR Publications Coordinator:  
Mark Kenneth S. Camiling

Editorial Assistants:  
Sachiko Sakamoto  
Suzue Abe  
Yuika Sakaguchi

Date Published: August 22, 2025

Published by The International Academic Forum on the IAFOR Research Archive  
URL: <https://papers.iafor.org/>

© The International Academic Forum 2025  
The International Academic Forum (IAFOR)  
Sakae 1-16-26 2F  
Naka Ward, Nagoya, Aichi  
Japan 460-0008  
[iafor.org](http://iafor.org)



## Table of Contents

**Miniature *Ogoh-Ogoh* Making Project by Junior High School Students in Tourism Areas as an Implementation of *Tri Hita Karana***

Putu Wia Rosita Dewi

I Made Candiasa

I Wayan Artanayasa

I Nyoman Jampel

Gst. Ayu Mahayukti

Gusti Putu Arya Arimbawa

pp. 1 - 9

**Key Themes in Digitizing Cultural Heritage: An Analysis of Core Competencies, Topics, and Methods in Digital Humanities Higher Education Offers**

Katrin Fritsche

Sander Münster

pp. 11 - 30

**Educational Pathways in Marketing Programs for Undergraduate Students: Embedding Assessment Design to Address Threshold Concepts and Bridge the Gap Between Academia and Industry**

Sepideh Samadi

pp. 31 - 37

**Pronunciation Difficulties Among EFL Learners:**

**The Case of Undergraduate Students at Mascara University**

Asmaa Kaddour-Trea

pp. 39 - 55

**Tactile Processing and Fine Motor Skills in Developmental Coordination Disorder and Autism Spectrum Disorders**

Bartosz Bagrowski

Bartosz Grobelny

Ewa Mojs

pp. 57 - 65

**AI-Powered Situated Learning: Challenges and Opportunities in the New Mexican School**

Juan Manuel Tapia Diaz

pp. 67 - 77

**Development of a Mobile Application for Assessing Multiple Intelligences in Primary School Students**

Suthawan Harnkajornsuk

Khwanying Sriprasertpap

pp. 79 - 89

**Evaluating Assessment Practices in a Language Teaching Sequence: The Role of Policy and Continuous Review in Enhancing Formative Assessment**

Imad Nasr

pp. 91 - 104



- A Study of Problems, Needs and Guidelines for Helping Children With Cochlear Implantation in Inclusive Schools**  
 Chanida Mitranun  
 Maliwan Tammaesaeng  
 Pradabsri Pintuto pp. 105 - 115
- Developing a WARA in Upper Elementary School Students With Reading Difficulties**  
 Cheerapat Sirirak  
 Chanida Mitranun  
 Kanokporn Vibulpatanavong  
 Purin Nititummanusorn pp. 117 - 129
- Globalization and English Language Education: Comparative Study on Critical Success and Failure Factors of EFL in El Salvador and South Korea**  
 Jullianny Bayarone Batres González pp. 131 - 147
- The Challenges in Catering the Needs of Students With Autism Spectrum Disorder in Indonesian Schools**  
 Najwa Said pp. 149 - 161
- Developing an Instructional Package Entitled “My Emotions” to Promote Emotional Perception in Students With Autism**  
 Aporn Saardaium pp. 163 - 171
- Storytelling in Higher Education: A Strategy to Understand Bullying and Cyberbullying**  
 Glenis Bibiana Alvarez Quiroz  
 Julio José Rangel Vellojín  
 Miguel Ángel Palomino Hawasly pp. 173 - 181
- Factors Affecting Routine to Research (R2R) Production of Supporting Staff: Case Study of Mahidol University International College**  
 Sasithon Panyanak pp. 183 - 197
- Designing AI-Driven Storytelling to Enhance Language Skills in Early Childhood Education: A Research Framework**  
 Konstantina Tastsis  
 Panagiotis Karamalis pp. 199 - 213
- University Planning and Knowledge Management: Connections of Possible Strategies for Institutionalized Integration**  
 Edileusa Medeiros Bezerra  
 Ana Maria Ferreira Menezes pp. 215 - 231

**Evaluation of the Impact of the Youth Brigades of Water Culture  
on the Students of ENMSL: A Retrospective Towards 2025**

Juana Beatriz Ortiz-Cienega  
Monica Mondelo-Villasenor  
Bertha Mondelo-Villasenor

pp. 233 - 239

**An AI-Inspired Approach to Student Performance Assessment**

Vladimir Shapiro

pp. 241 - 256

**Breaking Barriers: Experiences of Women Leaders in Guyana's  
Education Sector**

Soula Kyriakou  
Frank Naboulsi  
Zina Kyriakou  
Jimmy Naipaul

pp. 257 - 274

**Investigating the Impact of Rosetta Stone (A Computer-Assisted  
Language Learning Software) on Students' Proficiency in English  
Language: A Quasi-experimental Study**

Mohamed Benaissa  
Youness Attou

pp. 275 - 286

**The Role of Assistive Technologies in Forming an Inclusive Culture  
of Higher Education Institutions in Kazakhstan**

Maral Zhanarstanova  
Anar Uyzbayeva  
Ainur Abdina  
Aituar Kospakov

pp. 287 - 294

**Advancing Aerospace and Automotive Engineering Education:  
The Role of Reflective Writing in Developing Critical Thinking Skills**

Nafiaa Bouanani

pp. 295 - 308

**Harnessing AI for Oral English Proficiency Enhancement  
in Non-native Tertiary Teachers**

Y.T. Chow

pp. 309 - 321

**Gamification in a Bottom-Up Approach to Teaching Engineering:  
Case Studies in DSP, Entrepreneurship, and Biomedical  
Instrumentation**

B. Hema Kumar  
M. Florance Mary  
S. Snehalathaa

pp. 323 - 335

**Construction and Validation of Virtual Assessment Standard  
Indicator Scale for Universities**

E. Adenike Emeke  
Joshua O. Adeleke  
J. Gbenga Adewale  
Taiwo Omorinola Oladipo-Abodunwa  
Olutayo T. Omole  
Israel A. Olasunkanmi  
Hannah B. Ogunrinde  
John A. Omosekeji  
Samuel O. Sodeke

pp. 337 - 351

**Haruki Murakami's Novels as a Predictive Text and a Data-Driven  
Approach of *Hikikomori* Effects on Tertiary-Level Students  
From South India**

Sowndharya T R  
Abirami Kanagarajan  
P Suganthi

pp. 353 - 367

**The Impact of Online Games on Vocabulary Acquisition:  
Primary School Teachers' Perspectives**

Gwanza Basilashvili

pp. 369 - 383

**Pedagogical Model MP\_CompDocHibrid: A Focus on Building  
Teaching Competencies for Hybrid Instruction  
in Initial Teacher Training**

Giovanna Gabriela da Rosa Suárez  
Patricia Alejandra Behar  
Ketia Kellen Araújo da Silva

pp. 385 - 392

**Inclusive Cultural Games as a Medium for Socio-Emotional  
Development in Early Childhood Learners With Disabilities**

Sifiso E. Ncube  
Sikhangele Mceelwa  
Isaac Hlatshwayo

pp. 393 - 407

**Experiencing REFLACT: A Workshop Practicing What It Proposes  
From Theory to Embodied Teaching-Learning Experiences  
in Complex Contexts**

Astrid Dobmeier  
Veronika Sweet

pp. 409 - 416

**The Educational Environment for Generation Z Students' Sustainable  
Learning in Higher Education: Challenges in the Italian Context**

Barbara Barabaschi  
Roberta Virtuani

pp. 417 - 432

**Distance Education as a Tool for Transformation in Adult Life**

Maria de Fátima Goulão

pp. 433 - 442



**Enhancing Performance in Academic Tasks: Challenges and Opportunities in University Students' Use of ChatGPT**

Esther Argelagós  
Blanca Campos  
Èlia Casanovas  
Aina Caritg

pp. 443 - 455

**Internet and ChatGPT as Learning Tools in University Environments**

Esther Argelagós  
Noël Ruscalleda  
Nerea Almendros  
Jordi Hernansáez  
Nizar Belkhyr

pp. 457 - 466

**Enhancing Primary Education Through Interactive Teaching and Learning Aids in Rural Uttarakhand, India**

Khushboo Bharti

pp. 467 - 473

**The Use of AI-Powered Platforms in the Bachelor Thesis Writing Process: Benefits and Limitations**

Nato Pachuashvili

pp. 475 - 489

**Procrastination Among University Students in Singapore: Its Relationships With Time Management and Emotional Regulation**

Mo Chen  
Jia Min Chung  
Jeong Won Mun

pp. 491 - 504

**The Impact of Trauma on Children's Mental Health and School Performance: A Case Study of the Beirut Blast**

Rayyane Shukr

pp. 505 - 523

**Contribution of Teachers' Self-Efficacy to Inclusive Education Practices in Schools**

Kiran Chalise

pp. 525 - 540

**Voices of Value: A Sociopragmatic Analysis of Discourse Patterns in Student Evaluations of Teaching**

Yasmine Soheim

pp. 541 - 551

**Civil Associations on Digital Platforms: Convergence Between Academic Knowledge and Society's Demands**

Jane Sara Freitas Lopes  
Ana Maria Ferreira Menezes

pp. 553 - 568

**Elevating Postgrad Learning: A New Chatbot Instructional Model**

Ivy Chia  
June Tay  
Ma Nang Laik

pp. 569 - 579

**Curricular Structure From Educational Policy in Colombia: The Case of the Doctorate in Administration at the University of Cartagena**

Maria Eugenia Navas Rios  
Emperatriz Londoño Aldana  
Daniel Ruiz Navas

pp. 581 - 592

**Ways of Removing Social Exclusion of Young Adults With Autism Spectrum Disorder: Educational and Workplace Behaviour Pathways**

Farmakopoulou I  
Papanikolaou A  
Martinou M. M  
Giannakopoulos G

pp. 593 - 605

**Strategies and Outcomes of AI Adoption of Health Record Management Systems in Teaching Hospitals in Nigeria**

Richard Olalekan Arogunjo  
Adeoye Augustine Bamgbose

pp. 607 - 622

**A Methodology for Curriculum Design in General High School in México**

Alma Andrea Orozco Fierro  
Oscar Mendoza Ruiz

pp. 623 - 635

**Interactive Course for Power Plant Compliance Tests With Grid Connection Requirements**

Lidija M. Korunović  
Vojkan Kostić  
Tomislav Baškarad  
Igor Kuzle

pp. 637 - 648

**Empowering Minds: Science Lessons Fostering Peace, Gender Equity, and Well-being**

María Magdalena Montserrat Contreras Turrubiarres  
Jorge Amaro Reyes

pp. 649 - 654

**Interconnected and Sustainable Education in Local Communities and Korean Governments: A Case Study for Addressing Educational Inequalities and Creating Inclusive**

Seri Yoon

pp. 655 - 670

**An Educational Ethnographic Study of Recognition Struggles in an Indigenous Key Elementary School in Taiwan**

Yi Yin Chen  
Changsoo Hur

pp. 671 - 686

**Teachers' Perceptions of Integrated STEM Learning Management in Compulsory Education**

Punyapat Chanpet  
Kanphitcha Kodkanon

pp. 687 - 699

<b>Developing Leadership Through Improvisation: Insights From the MBA Classroom</b> Marco Aponte-Moreno	pp. 701 - 706
<b>Test Item Bias Analysis Using Differential Item Functioning (DIF): A Mantel-Haenszel Chi-Square Statistics Approach</b> Arlene Nisperos Mendoza	pp. 707 - 724
<b>Conceptual Aspects to Support the Implementation of Digital Transformation in Higher Education Governance</b> Nadine Baumann Christian Schachtner	pp. 725 - 738
<b>Monologue in <i>Polyglot, How I Learn Languages</i> by Kató Lomb: Still a Viable Language Learning Strategy?</b> Osaruese Oghogho Osawaru	pp. 739 - 748
<b>SDGs in Cross-School Outdoor Learning: Water Resource Exploration via Cycling</b> Cheng Hung Weng Wen Liang Chang	pp. 749 - 762
<b><i>O Desterrado</i> by António Soares dos Reis Exploratory Workshop With Secondary-Level Art Students</b> Ana Lúcia Teixeira da Silva Emílio Remelhe Júlio Dolbeth	pp. 763 - 773
<b>Enhancing Critical Reading Skills Through Digital Tools: A Study on Business English Students</b> Hanh Nguyen Thi Hien	pp. 775 - 788
<b>Teachers' Instructional Design Skills, Students' Perception, and Mathematics Achievement</b> Olutayo Toyin Omole Babatunde Kasim Oladele	pp. 789 - 801
<b>Bridging AI Literacy, the AI Act, and Academia: An Interdisciplinary Approach to Embedding AI Literacy in Teaching Academic Writing</b> Chrysanthi Melanou	pp. 803 - 812
<b><i>Slow Torture, Magic Books</i> or Potentially Worth Further Exploring: Mapping Young Students' Thoughts About Reading and Creative Alternatives</b> Anna Martín Bylund Linnéa Stenliden Mattias Arvola	pp. 813 - 828

<b>Levels of Authenticity of Word Problems in Turkish Mathematics Textbooks</b> Ali Sabri Ipek	pp. 829 - 836
<b>Integrating AI Into Accounting Education: Innovations, Ethical Considerations, and Pedagogical Shifts</b> Nadia Sbei Trabelsi	pp. 837 - 842
<b>AI Collaboration for Programming Education Beyond Computer Science</b> Lauren Miller Felix Egger Aneesha Bakharia	pp. 843 - 851
<b>University Extension in Science Education: Historical Perspectives and Global Impact</b> Emmanueli Francine de Castro Moraes Reginaldo Alberto Meloni	pp. 853 - 866
<b>Mapping Addictive Behaviors and Preventive Activities Among Students From Masaryk University: Preliminary Results</b> Petr Kachlík Karel Červenka Věra Vojtová Dana Zámečnicková Petra Dvořáčková Hana Moravčíková Monika Nejezchlebová Petra Pírková Michaela Plšková Kateřina Richterová Pavel Sochor Veronika Antel Jitka Šťastná Ondřej Ling Soňa Papšová	pp. 867 - 874
<b>Towards a Policy for Bilingual Education Among Minority Language Communities in Africa: A Discussion of Pedagogical Advantages and Political Challenges</b> Maciej Nowakowski	pp. 875 - 892
<b>Pioneering Approach to Reforming Public Library Services: Exploring New Ways to Exploit the Results of the SHIFT Project</b> Ioana Cornelia Cristina Crihană	pp. 893 - 898
<b>Students Perspective on the Use of AI for Their Studies: An “Open University” Viewpoint</b> Nareerut Seerasarn Serval A. Miller	pp. 899 - 908

**The Dynamics of Physics Student Enrollment: A Comparative Study  
of Albanian and European Universities Over the Last 20 Years**

Klotilda Nikaj

Ervis Gega

Miranda Guzina

Margarita Ifti

pp. 909 - 916

**Enhancing Cultural Learning Through Innovative Technology:  
A VR Application for Museum Keris Nusantara**

Dias Aziz Pramudita

Anis Khoerun Nisa

Hardika Dwi Hermawan

pp. 917 - 928

**Effect of School-Based Virtual Program on Career Transition Self-  
Esteem of Nigerian Students With ADHD**

Vera Victor-Aigbodion

Chiedu Eseadi

pp. 929 - 950

**The Relationship Between Giftedness and Depression:  
A Systematic Review**

Felipe Rodrigues Martins

Vinicius Nunes Henrique Silva

pp. 951 - 964





## **Miniature *Ogoh-Ogoh* Making Project by Junior High School Students in Tourism Areas as an Implementation of *Tri Hita Karana***

Putu Wia Rosita Dewi, Ganesha University of Education, Indonesia  
I Made Candiasa, Ganesha University of Education, Indonesia  
I Wayan Artanayasa, Ganesha University of Education, Indonesia  
I Nyoman Jampel, Ganesha University of Education, Indonesia  
Gst. Ayu Mahayukti, Ganesha University of Education, Indonesia  
Gusti Putu Arya Arimbawa, Ganesha University of Education, Indonesia

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

The *Ogoh-Ogoh* making project is an annual routine activity organized by junior high school students as one of an implementation of silent day (*Nyepi*) activities. Bali is the only island that celebrates *Nyepi* by closing access to transportation, telecommunications, and population mobility. This gives space to nature and humans to rest and reflect on the world. In the implementation of *Nyepi*, it is identical to the *Ogoh-Ogoh* parade. The *Ogoh-Ogoh* parade involves not only Hindus, but also Muslims, Buddhists, and Christians. *Nyepi* celebration is related to the local wisdom of the Balinese people called *Tri Hita Karana*. *Tri Hita Karana* is a spiritual concept that refers to the three causes of happiness. Happiness will be achieved if we maintain good relationships with God (Parhyangan), humans (Pawongan), and the environment (Palemahan). The purpose of this study is to describe and analyze the implementation and values contained in the teachings of *Tri Hita Karana* in the *Ogoh-Ogoh* making project in one of the Junior High School in the tourism area. This research used qualitative method. The results of this research are as follows: 1) Conception of Parhyangan is before and after starting the project, students are directed to pray to God according to their respective religions. 2) The conception of Pawongan is the creation of mutual cooperation between students in one group. 3) The conception of Palemahan is the education of students to use used goods in the formation of *Ogoh-Ogoh* as an attitude to protect the environment.

*Keywords:* silent day (*Nyepi*), *Tri Hita Karana*, *Ogoh-Ogoh*

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Bali is a world-famous tourist destination. Bali offers natural beauty, cultural diversity, and unique traditions that make Bali an icon of tourism in Indonesia. The friendly Balinese people and high tolerance for differences make Bali a safe and comfortable destination visited by domestic and foreign tourists (Picard, 2008). Bali provides a variety of travel needs. Travelers can seek tranquility with meditation or seek a lively atmosphere in the midst of a large crowd in Bali. Nature tourism, culinary tourism, art tourism, religious tourism, and various types of tourism can be chosen when visiting Bali (Arismayanti et al., 2022). Beaches, seas, mountains, cities, countryside, even spiritual places are in Bali. Cultural and religious festival celebrations are also continuously held throughout the year. This makes Bali a never-ending destination of choice as a tourist paradise (Wiranatha & Suryawardani, 2016).

One of the most famous traditions in Bali is the *Nyepi* celebration. *Nyepi* is celebrated every year in March to celebrate the new year of the Balinese *Saka* calendar. *Nyepi* internationally known as “Silence Day” is a day when all activities in Bali stop. People do *Catur Brata Penyepeian* (4 prohibitions that are done in *Nyepi* Day). Balinese people do *Amati Geni* (not lighting fires), *Amati Karya* (not doing activities), *Amati Lelungan* (not traveling and staying at home), and *Amati Lelanguan* (not doing entertainment that is fun) (Arsawati et al., 2018). This makes Bali the only island that celebrates *Nyepi* by closing access to transportation, telecommunications, and population mobility. This gives nature and humans the space to rest and reflect on the world. Nature gets the space to rest for a while and also humans are given the space and opportunity to rest from the harsh world while reflecting and meditating on things that have happened as self-improvement. This is a moment for humans to gather with family at home or hometown while enjoying nature and a calm environment with fresh air free from pollution fumes and the tedium of life (Budiwanti, 2021).

The *Nyepi* celebration is related to the local wisdom of the Balinese people called *Tri Hita Karana*. *Tri Hita Karana* is a local wisdom that refers to the three causes of happiness. Happiness will be achieved if we maintain good relationships with God (*Parhyangan*), fellow humans (*Pawongan*), and the environment (*Palemahan*). Balinese people believe that the balance and harmony of life can be achieved by implementing the local wisdom of *Tri Hita Karana* (Qodim, 2023). *Tri Hita Karana* is universal and can be accepted by people from various backgrounds (Suminto & Kustiyanti, 2023). This is in line with the diversity of the people who live and work in Bali. Tourism in Bali has an impact on the number of people who come to Bali. They come to Bali to travel or stay for a certain period of time to work. This diversity and tolerance makes Bali more colorful.

In the celebration of *Nyepi*, it is identical to the *Ogoh-Ogoh* parade. The *Ogoh-Ogoh* parade is a three-dimensional work of art in the form of a movable or danceable statue, usually made in a large size. *Ogoh-Ogoh* is a mass art product, which is included in popular culture at this time (Anggreni, 2023). *Ogoh-Ogoh* is depicted in negative figures which are then paraded around the village and then burned at the end of the activity as a symbol of the destruction of negativity. The *Ogoh-Ogoh* is depicted in negative figures which are then paraded around the village and then burned at the end of the activity as a symbol of the destruction of negativity. The *Ogoh-Ogoh* parade involves not only Hindus, but also Muslims, Buddhists, and Christians. The *Ogoh-Ogoh* parade is a highly anticipated performance by Balinese citizens including tourists visiting the island. parade involves not only Hindus, but also Muslims, Buddhists, and Christians. The *Ogoh-Ogoh* parade is a highly anticipated performance by Balinese citizens including tourists visiting the island (Wijanarka et al., 2023). The creative

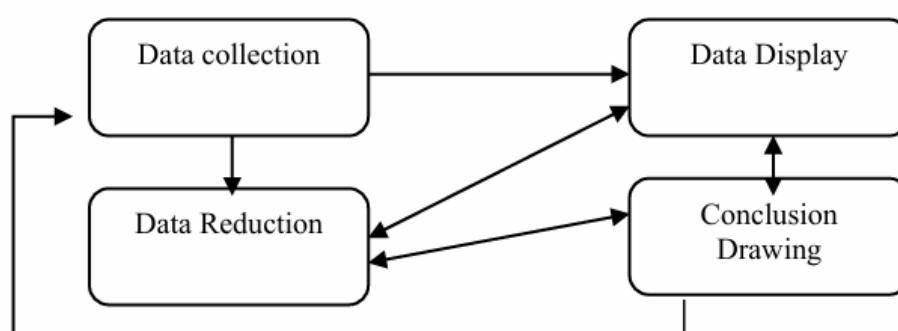
and diverse forms of *Ogoh-Ogoh* and the lively parade make the *Ogoh-Ogoh* parade watched by many people. *Ogoh-Ogoh* parades are held in every traditional village in Bali. Moreover, *Ogoh-Ogoh* celebrations have also been organized at the school level as a Pancasila Student Profile Strengthening Project (Proyek Penguatan Profil Pelajar Pancasila/P5 Project).

P5 project is a project-based co-curricular activity designed to strengthen efforts to achieve competence and character in accordance with the *Pancasila* learner profile which is compiled based on graduation competency standards. P5 activities are carried out flexibly in terms of content, activities and implementation time. P5 is designed separately from intracurricular (Rizky Satria et al., 2022). P5 project is a project-based co-curricular activity designed to strengthen efforts to achieve competence and character in accordance with the *Pancasila* learner profile which is compiled based on graduation competency standards. P5 activities are carried out flexibly in terms of content, activities and implementation time. P5 is designed separately from intracurricular (Priandani et al., 2023). In the learning process, students can investigate, evaluate, interpret and synthesize. The advantages of project-based learning models are very important and beneficial for students, but project-based learning models are rarely used by teachers because they require sufficient preparation and take a long time to implement (Berhita et al., 2020).

## Method

This research is designed to examine the social phenomenon of society, namely examining the project of making miniature *Ogoh-Ogoh* in schools in a tourism environment as an implementation of *Tri Hita Karana*, using a phenomenological approach that aims to find the meaning or meaning of experiences that exist in life. To sharpen the analysis in this research, a number of theories are used, namely religious theory and social theory. The location of the research conducted was at SMPN 4 Kuta Utara. In this study the data used is descriptive qualitative data. The data collection techniques used consist of three, namely participatory observation, structured interviews with principals, educators, and students who participate in The *Ogoh-Ogoh* parade and documents related to this research. The results of observations, interviews, and documentation data formulated in descriptive form are then processed with several stages, including three data analysis techniques, namely: (1) data reduction, (2) data display and (3) data verification. For data validity checking techniques in this case researchers use triangulation techniques and reference materials. Then the presentation of data in this study is described in the form of words or presented in a narrative described according to the data in the field.

**Figure 1**  
*Component of Data Analysis*



## Results and Discussion

### *Ogoh-Ogoh* Miniature Making Project as Implementation in *Tri Hita Karana*

The project of making *Ogoh-Ogoh* miniature as an implementation of *Tri Hita Karana*, is 1) *Parhyangan* is a harmonious relationship between humans and God, 2) *Pawongan* is a harmonious relationship between humans and fellow humans. 3) *Palemahan* is a harmonious relationship between humans and the surrounding environment including the universe (Wirawan, 2011). The miniature project shown in Figure 2.

**Figure 2**

*Ogoh-Ogoh* Miniature Making Project by Students



The conception of *Parhyangan* is implemented in students who always pray in starting and ending activities. Praying has a meaning as a form of gratitude to God for being smooth in the process of making *Ogoh-Ogoh* and as a form of request for protection so that during the *Ogoh-Ogoh* parade nothing bad happens. The hope is that students will get used to praying to God according to their respective beliefs and religions both in the family environment, school environment, and community environment.

The conception of *Pawongan*, namely the concept of harmonization between fellow humans, its implementation in the *Ogoh-Ogoh* parade tradition can be seen during the *Ogoh-Ogoh* parade, where in the parade not only Hindu students are involved as *Ogoh-Ogoh* makers and paradeers, but there are also students from other religions. *Ogoh-Ogoh* parade in Bali has been integrated as a tradition that can be done and enjoyed by all religions. Learners are taught to work together in the creation of ideas and themes for the *Ogoh-Ogoh*, collection of tools and materials, division of tasks in making and parading. This makes the formation of cooperation between students and reduces the attitude of individualism between students that is rampant today due to excessive use of gadgets. The output of this project is that students become able and easy to get along with each other and form an attitude of mutual cooperation, mutual assistance, and tolerance for existing differences.

The conception of *Palemahan* implemented in the making of *Ogoh-Ogoh* miniatures, which is carried out by SMPN 4 Kuta Utara students, is that the materials used are used materials in the form of used goods that can be recycled. Students must think about what used or waste materials can be used in making *Ogoh-Ogoh* miniatures. This aims to educate students to be aware of the importance of waste management and the concept of recycling as a form of



concern for the environment. Seeing the existence of waste due to the use of disposable goods makes a big problem for the environment. Waste that becomes a problem will be converted into something useful while saving the budget in making the *Ogoh-Ogoh* project.

### **Values Contained in the Making of Miniature *Ogoh-Ogoh* as an Implementation of *Tri Hita Karana***

The values contained in the project of making *Ogoh-Ogoh* miniatures as an implementation of *Tri Hita Karana*, including religious (theological) values, namely obedience and adherence to the teachings of the religion they adhere to, which are expressed in the form of religious ritual actions, gratitude to God, and steadfastness in facing trials. Efforts to find the meaning of life by getting closer to God through actions as a form of offering to Him, appreciating differences as God's will, showing trustworthy behavior, and having the ability to control themselves and live independently. The word religion comes from the root word "religare" which means to bind, religion is the human spiritual tendency to relate to the all-encompassing universe of values, the ultimate meaning and essence of everything (Rohilah, 2010). In this study, researchers found the religious value of believing in the existence of God believed by students by praying before and after doing an activity.

The second is humanist value. A sense of community that is shown in the form of helping each other, respecting each other, having empathy and concern for others, being able to work together openly and being able to establish conducive communication with others. Recognizing the equality of human dignity and degree, respecting each other's rights and obligations, respecting differences of opinion, and recognizing the competence and achievements of everyone for common progress (Fatimah et al., 2023). This value shows the extent to which an individual's relationship with other individuals is established as a member of the community, social value is very evident in community activities in the form of mutual cooperation, participating in deliberation activities, unity, togetherness and loyalty and others (Bela et al., 2023).

In this study, researchers found the humanist value of the emergence of mutual respect between students with each other despite different religions and beliefs. Having a sense of responsibility and togetherness, we can see this from how to help each other and work together when making *Ogoh-Ogoh* from planning, collecting tools and materials, making together until the project is completed, these things are done by students regardless of gender, religion, race, and ethnicity in order to achieve common goals all work together enthusiastically sincere, sincere and care for others. This is what is expected to be maintained and applied to the current generation.

The next value is ecological value. Viewing humans as part of nature, not the ruler of nature, utilizing natural resources sparingly and wisely, and carrying out activities to preserve the natural environment. Humans are not born to be the rulers of nature, but to coexist as partners; even to be part of nature (Dantes et al., 2020). If humans dare to destroy nature, it is human society that will suffer. In this context, humans must not violate the mandate that God has given them to maintain and preserve nature. In order to live in harmony with the natural environment, humans must understand environmental ethics. Environmental ethics not only talks about human behavior towards nature, but also about the relationship between all life in the universe, namely between humans and humans who have an impact on nature and between humans and other living things or with nature as a whole (Kerap, 2010).

In this study, the researcher found ecological values in which students are educated to love, protect, and care for the environment. Small actions such as not using single-use plastics, using used goods, carrying out recycling processes, and management and processing of unused goods are the focus in this *Ogoh-Ogoh* miniature making project. Students began to work hard to find appropriate waste for this project. Education and implementation together make students closer to the environment. By loving, protecting, and caring for the environment, it will save nature from destruction and provide a decent environment for future generations.

In the latter context, the value contained is the value of art. The value of art is a combination of thought, craftsmanship involving physical skills and the end result manifested in form or movement. Art is a process, broadly speaking this process can start with an idea or thought, a work of art can be produced at the beginning with an idea that is the background of the work so that it has artistic value (Wood, 2021). In this study, researchers found that the value of art is found in the process of making *Ogoh-Ogoh* miniature projects by students. In making *Ogoh-Ogoh*, technique is needed in making and having a high artistic spirit. By having an artistic spirit, students can express ideas and creativity according to the desired imagination. *Ogoh-Ogoh* makers need perseverance and patience in the making process to match the theme. Cooperation between each other is needed in order to create works of art that not only look good to the eye but are also able to give an impression and meaning to everyone who observes the work of art (Anggreni, 2023). The result of the unification of the values contained in this project is shown in the parade in Figure 3.

**Figure 3**

*Ogoh-Ogoh Miniature Project Parade*



## Conclusion

The project of making *Ogoh-Ogoh* miniatures by junior high school students in the tourism area as an implementation in *Tri Hita Karana*, including the conception of *Parhyangan* is implemented when before and after carrying out activities they are taught to always pray according to their respective religions and beliefs as a form of maintaining a relationship with God in order to be given smoothness in carrying out the project. The conception of *Pawongan*, namely the concept of harmonization between fellow humans, is implemented where in the *Ogoh-Ogoh* making project not only Hindu students do it but also students of other religions as a form of tolerance and togetherness. This project is expected to foster an attitude of mutual cooperation between students in teamwork. This can reduce the attitude of individualism in the midst of the rampant use of gadgets among students. The conception of

*Palemahan* is implemented when students are educated in using waste or used goods in the creativity of making *Ogoh-Ogoh* miniatures.

The values contained in the project of making *Ogoh-Ogoh* miniatures as an implementation in *Tri Hita Karana* are, religious (theological) values, religious values believe in the existence of God by all religious people by continuing to pray daily in starting and ending activities. Humanist value is having a sense of togetherness which is shown in the form of helping each other, respecting each other, having empathy and concern for others, being able to work together with the team and being able to establish conducive communication with others. This can be seen from students who respect each other even though they have different religions and beliefs. Having a sense of responsibility and togetherness, we can see this from how to help each other and work together when making *Ogoh-Ogoh* from planning, collecting tools and materials, making together until the project is completed, these things are done by students without regard to gender, religion, race, and ethnicity in order to achieve common goals.

Ecological values view humans as part of nature, not the ruler of nature, utilizing natural resources sparingly and wisely, and carrying out activities to preserve the natural environment. Humans are not born to be the rulers of nature, but to coexist as partners; even become part of nature. The ecological value in the research is that students are educated to love, protect, and care for the environment. Small actions such as not using single-use plastics, using used goods, recycling, and management and processing of unused goods are the focus of this *Ogoh-Ogoh* miniature making project. By loving, protecting, and caring for the environment, it will save nature from destruction and provide a decent environment for future generations. Finally, the value of art is found in the process of making the *Ogoh-Ogoh* miniature project by students. In making *Ogoh-Ogoh*, technique is needed in making and having a high artistic spirit. By having an artistic spirit, students can express ideas and creativity according to the desired imagination.

### **Recommendations**

The limitation of this research is the scope of scope of the study, which is limited to junior high school students. Thus, recommendations for further research are future research is to expand the scope so that it can be generalized. In addition, this research can be used as a recommendation for further research related to similar subjects and variables.

### **Acknowledgements**

The author would like to express deepest gratitude to The Indonesian Education Scholarships (Beasiswa Pendidikan Indonesia), The Center for Higher Education Funding Assessment (Pusat Pelayanan Pembiayaan Pendidikan Tinggi), and The Indonesian Endowment Fund for Education (Lembaga Pengelola Dana Pendidikan) for funding this conference. In addition, we would also like to thank Ganesha University of Education and all supervisors who facilitated, provided knowledge and guidance in this research and SMPN 4 Kuta Utara for giving permission to conduct research.

## References

- Anggreni, N. L. E. Y. (2023). Komunikasi Ritual Pawai Ogoh-Ogoh Sebagai Implementasi Dalam Tri Hita Karana [Communication of the Ogoh-Ogoh Parade Ritual as an Implementation of Tri Hita Karana]. *Widya Sandhi*, 14(1), 1–10.
- Arismayanti, N. K., Suwena, I. K., & Sendra, I. M. (2022). Tourist Satisfaction Patterns and Index for Travel Companions While Traveling in Bali. *E-Journal of Tourism*, 9(2), 218. <https://doi.org/10.24922/eot.v9i2.92111>
- Arsawati, N. N. J., Sri Rahayu Gorda, A. A. A. N., & Antari, P. E. D. (2018). The philosophical meaning of *Nyepi* celebration in Bali from the context of maintaining natural sustainability and social harmony. *International Journal of Civil Engineering and Technology*, 9(8), 1250–1254.
- Bela, N., Noor, M., & Hariyadi, A. (2023). *Analysis of Social Values and Religious Values in the Novel Buya Hamka by A. Fuadi*. 2(4), 47–57. <https://doi.org/10.53797/iccmjssh.v2i4.7.2023>
- Berhиту, M., Rehena, J. F., & Tuaputty, H. (2020). The Effect of Project-Based Learning (PjBL) Models on Improving Students' Understanding of Concepts, Retention, and Social Attitudes. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, 10(2), 143–152. <https://doi.org/10.30998/formatif.v10i2.5947>
- Budiwanti, E. (2021). Religion and Public Sphere: Revisiting Balinese Religious Tradition in the Island of Thousand Mosques. *Religion, Culture, and State Journal*, 1(1), 1–21.
- Dantes, N. (2020). Panduan Implementasi Nilai-nilai Tri Hita Karana dalam Berkehidupan Kampus [Guide to Implementing Tri Hita Karana Values in Campus Life]. *Singaraja: LPPPM Undiksha*.
- Fatimah, S., Kushandajani, K., Fitriyah, F., & Adnan, M. (2023). Gotong Royong Culture as an Alternative to Political Funding in Local Election. *Journal of Governance and Public Policy*, 10(1), PRESS. <https://doi.org/10.18196/jgpp.v10i1.16816>
- Keraf, A. S. (2010). *Etika Lingkungan Hidup* [Environmental Ethics]. Penerbit Buku Kompas.
- Picard, M. (2008). Balinese identity as tourist attraction: From 'cultural tourism' (pariwisata budaya) to 'Bali erect' (ajeg Bali). *Tourist Studies*, 8(2), 155–173. <https://doi.org/10.1177/1468797608099246>
- Priandani, I., Kusmiatun, A., Efendi, A., & Prihadi, P. (2023). *The Implementation of The Pancasila Student Profile Strengthening Project (P5) in Sekolah Penggerak in The Border Area of North Kalimantan*. <https://doi.org/10.4108/eai.17-12-2022.2335217>
- Qodim, H. (2023). Nature Harmony and Local Wisdom: Exploring Tri Hita Karana and Traditional Ecological Knowledge of the Bali Aga Community in Environmental Protection. *Religious: Jurnal Studi Agama-Agama Dan Lintas Budaya*, 7(1), 1–10. <https://doi.org/10.15575/rjsalb.v7i1.24250>

- Rizky Satria, P. A., Sekar, W. K., & Harjatanaya, T. Y. (2022). Projek Penguatan Profil Pelajar Pancasila [Pancasila Student Profile Strengthening Project]. *Projek Penguatan Profil Pelajar Pancasila*, 138.
- Rohilah, E. (2010). Nilai-Nilai Islam dalam Sumber Daya Manusia [Islamic Values in Human Resources]. *Seminar Manajemen Sumber Daya Manusia. Bandung*.
- Suminto, S., & Kustiyanti, D. (2023). The Concept of Tri Hita Karana in Kakawin Siwaratrikalpa as a Means to Interpret Life. *Lekesan: Interdisciplinary Journal of Asia Pacific Arts*, 6(1), 62–71. <https://doi.org/10.31091/lekesan.v6i1.2445>
- Wijanarka, T., Yanuartha, R., & Hergianasari, P. (2023). *Nyepi as Local Wisdom for The World's Sustainable Development*.
- Wiranatha, A. S., & Suryawardani, I. G. A. O. (2016). Satisfaction of Foreign Tourists on Cultural Tourism in Bali. In *International Tourism Conference: Promoting Cultural and Heritage Tourism* (pp. 370–384). <https://doi.org/10.24922/eot.v9i2.92111>
- Wirawan, I. (2011). Tri Hita Karana: kajian teologi, sosiologi dan ekologi menurut Veda [Tri Hita Karana: study of theology, sociology and ecology according to the Vedas]. (*No Title*).
- Wood, C. S. (2021). *A history of art history*. Princeton University Press.

**Contact emails:** wiarositadewi@gmail.com  
wia@student.undiksha.ac.id



## **Key Themes in Digitizing Cultural Heritage: An Analysis of Core Competencies, Topics, and Methods in Digital Humanities Higher Education Offers**

Katrin Fritsche, Friedrich Schiller University Jena, Germany  
Sander Münster, Friedrich Schiller University Jena, Germany

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This article, that is part of the Horizon Europe-funded project DIGICHer, provides insights into structures, offerings, and content dedicated to digitization and humanities topics within study programs at the European level. Structures in the broad field of university-based Digital Humanities (DH) training are defined before competence-theoretical and curricular components based on current literature research are examined in detail. A descriptive analysis of the DH study program descriptions from studyportals.com shows that at the European level, it is mainly Master's programs (followed by Bachelor's and PhD programs) that are dedicated to DH in higher education. The quantitative evaluation of key terms from the course descriptions shows that different thematic focuses exist at the various study program levels, ranging from more basic-oriented competencies to organizational and method-oriented aspects to research-oriented topics. Finally, a recent survey of experts in the field of cultural heritage and Digital Humanities shows current and desired content and topics of DH training and reveals related needs that include technical-infrastructure, financial, personnel, time and cooperative aspects. The contribution concludes with the derivation of thematic and organizational focal points of the given and potentially possible design of DH study courses and programs at the European level as well as a proposal for a further research design to investigate the precise curricular differentiation of specific DH study offers.

*Keywords:* educational research, higher education, digitizing culture, digital humanities, cultural heritage

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The digitization of cultural heritage offers opportunities for its preservation, maintenance and promotion, but also brings challenges (Siliutina et al., 2024). One challenge is the adequate imparting skills for planning, initiating, implementing and critically monitoring digitization processes in all their facets. Educational formats with a focus on digitization in connection with cultural heritage fundamentally offer the opportunity to reach potential actors and target groups who are interested in digitization in the cultural sector and thus to advance them through theoretical and practical units.

Educational programs are structured activities that support learning and development at different levels within a specific educational context (UNESCO Institute for Statistics, 2012). They vary greatly in scope, duration and focus and target different age groups, academic levels and learning objectives, such as formal offerings (such as accredited degree programs or certification courses) and informal offerings (such as community workshops or online courses).

Since the spectrum is broad and there are no uniform terms for degree programs that explicitly deal with digitization in the context of cultural heritage, and the spectrum of digitization methods in the field of cultural heritage is also diverse, ranging from digital archiving techniques to presentation technologies (Markopoulos et al., 2019), this article focuses on Digital Humanities (DH) as the object of study. Within DH, the focus is on the preservation of culture, cultural heritage itself, digitization strategies, data, and digital approaches and concepts (Terras, 2006). Digital Humanities (DH) therefore offers a meta-level framework that integrates humanities and computational approaches. In a sense, DH form the bridge between institutions and researchers in this data-driven context (Terras, 2006).

A study of the study programs in the field of DH, an analysis of the curricula, their content or existing needs in relation to the educational offer in the field of DH can not only show the current state of the educational offer but also identify the needs necessary for the development of a sustainable educational system. This analysis has been carried out within the DIGICHer<sup>1</sup> project and will be discussed below.

## Methodology

This article begins by looking at the competency-oriented and curricular structures of educational programs related to digitality. This is followed by a literature review that focuses on curricular aspects in the field of DH training, that identifies content, currently predominant topics and organizational strategies in this area (sections curricula and literature review).

Building on this, an investigation of study and graduate programs in Europe is carried out. For this purpose, study programs with the designation Digital Humanities in the field of humanities were filtered and extracted on the platforms (Studyportals, 2007-2024) Bachelorportal, Masterportal and PhDportal (Bachelorsportal, 2007-2024; Mastersportal, 2007-2024; PhDportal, 2007-2024). They were further analyzed descriptively in terms of content (section DH course descriptions and their contents).

---

<sup>1</sup> DIGICHer = Digitization of cultural heritage of minority communities for equity and renewed engagement; Funding number: 101132481



An online survey aimed at experts in the field of Digital Humanities and digital heritage provides insights into opinions on the educational landscape (section results of the survey).

In addition to descriptive statistical methods (absolute and relative frequencies), Natural Language Processing (NLP) approaches were also used to evaluate the data. The statistical software R and the text analysis tool Voyant (Sinclair & Rockwell, 2024) as well as approaches of summary qualitative content analysis (Mayring & Fenzl, 2019) were used for this purpose.

### **Competency-Related and Curricular Aspects of DH Study Programs**

The educational offer in the field of DH includes university degree programs, continuing education courses, certifications, internships, research projects and workshops as well as self-learning materials and online resources (ADHO, n.d.; CORDIS, 2024; European Summer University in Digital Humanities, n.d.; HarvardX, 2024). While these formats differ in structure and content, they generally aim to provide a combination of theoretical and practical skills and to integrate aspects of cultural heritage, computer science and information science (e.g. “Digital Heritage” (University of Amsterdam, 2024), “Digital Humanities” (Linnaeus University, 2024), “Digital Curation” (University of Michigan, 2024) and related fields such as cultural management or studies (Goldsmiths University of London, 2024; Rome University of Fine Arts, n.d.). All of them, in different ways, highlight core competencies required to digitization in, for and of cultural heritage.

### **Competence Frameworks**

Competency frameworks are important tools for improving educational effectiveness. These frameworks outline specific competencies required for performance in educational or professional contexts, provide clear objectives, categorize skills and define competency levels (IAEA, n.d.). They promote lifelong learning by facilitating knowledge implementation, assessment and alignment of education with professional needs (UNESCO-UNEVOC, n.d.).

In higher education, competency frameworks bridge the gap between academic and industry standards and promote career preparation and interdisciplinary integration (Erickson, 2018). They address technical (hard), behavioral (soft) and industry-specific skills and shift the educational focus from knowledge transfer to active learning and application (Bacigalupo, 2022).

On a European level frameworks related to digitization include the European LifeComp framework (Sala et al., 2020), the European Digital Competence Framework (DigComp) (Ferrari, 2013; Vuorikari et al., 2016, 2022), the DigCompEdu framework (Punie & Redecker, 2017) and, at a global level, for example, the DLGF (UNESCO, 2018) of UNESCO or, with a more general view of digitization infrastructures in higher education, the Building Digital Capabilities Framework (Jisc, n.d.-a) or the Framework for Digital Transformation (McGill, 2023). Together with resources such as the AI Maturity Toolkit (Jisc, n.d.-b) or the Digital Literacy Curriculum (Microsoft, 2022) from Microsoft, these frameworks diffuse into concrete recommendations for action for actors in the education sector.

In addition, frameworks such as the Partnership for 21st Century Learning (P21) (Battelle for Kids, 2019) and 21st Century Children (OECD, 2022) of the OECD address cross-cutting skills and are primarily aimed at learners and future opportunities and challenges in their lives and working environments.

Although competency frameworks are not legally binding, their flexible application allows adaptation to different contexts, user groups and educational phases (Jisc, n.d.-a; Jisc, n.d.-b). Competency frameworks are central to modern education as they can adapt curricula to evolving needs and promote relevant skills for the digital age.

## **Curricula**

A curriculum is a structured framework that includes learning objectives, content, teaching strategies, and assessment methods designed to achieve specific educational outcomes (Adela & Valentin, 2020). Curricula are typically adapted to different educational contexts, training programs, and learner demographics (e.g., Haring, 1970). It is an iterative process that determines how learning and progress are assessed (Nicholls & Nicholls, 2018).

In disciplines such as Digital Humanities curricula are not standardized but evolve through interdisciplinary approaches that combine digital tools with cultural heritage (Burdick et al., 2012; Cobb & Golub, 2022; Warwick et al., 2012). Curricula include material-related content (e.g. texts, images), subject-specific content (e.g. archaeoinformatics, digital curation), and interdisciplinary topics (Sahle, 2013).

They often emphasize practical skills such as digitization, data mining, and critically assessing the impact of digital innovations on cultural heritage (Cobb & Golub, 2022). Sahle's DH Reference Curriculum (2013) highlights the specialized connection of the humanities with computer science.

DH programs at the European level are usually more extensive than North American programs, which are more specialized or focus on practical application (Mahony et al., n.d.).

DH curricula include the teaching of both theoretical and practical skills and a reflective engagement with technologies in relation to culture. This also means that they are very flexible to integrate emerging digital tools, methodologies, or interdisciplinary approaches.

## **Literature Review on Curricular Aspects and Its Central Results**

On April 10, 2024, a literature search was conducted in the Web of Science database (Clarivate, 2024) to identify publications that focus on Digital Humanities and curricular aspects (search terms: digital AND humanities AND curriculum; period from 2015; English language). The search resulted in 53 publications. (Publications that contained terms such as “undergraduate”, “vocational training”, “special schools” or “non-European countries” in the title were excluded. Publications without free access, from uncertain sources or with non-clickable links were also excluded.)

Regarding the organization and structure of DH offerings, Cobb and Golub (2022) found that most DH programs are at Master's level, a fact that is also confirmed by Sahle (2013) and Mahony et al. (n.d.) is found. Walsh et al. (2021) confirmed this and found that DH is usually

offered as a minor or additional qualification in Bachelor's degree programs, reflecting the evolving identity of the field (Walsh et al., 2021).

On a content level, Onet (2021) emphasizes the increased need to integrate cultural heritage as a topic in DH curricula in order to connect social, political and cultural contexts within education.

Regarding the topics addressed within DH curricula, Sula and Berger (2023) identify topics such as big data, text analysis, data visualization, programming and sociopolitical theories in their analysis. Interdisciplinary research methods are also relevant (Mahony et al., n.d.). Even though technical elements are increasingly reflected in DH curricula, Gleason (2020) argues for maintaining critical evaluation when integrating them into the humanities. Walsh et al. (2021) call for clearer distinctions between Digital Humanities and information sciences. In contrast, Yao and Xiao (2022) explicitly suggest that academic librarians could build a kind of bridge to Digital Humanities and improve collaboration.

Sula and Berger (2023) emphasize the importance of collaboration between teachers, students and professionals to ensure that DH curricula correspond to real-world professional roles. Cobb and Golub (2022) point out that emerging roles such as project managers and data specialists are creating new opportunities for DH graduates. Collaboration with cultural heritage institutions is crucial for early practice experience. Bajec (2019) also suggests using innovative tools such as augmented reality and games to make DH teaching even more relevant and practical.

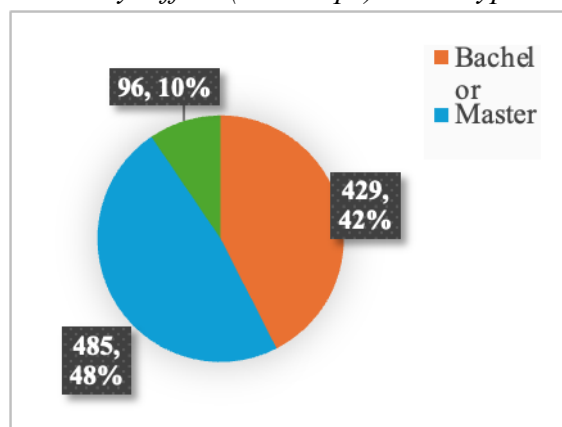
In terms of preparing for the future job market, Sula and Berger (2023) identify essential skills for DH graduates in problem-solving, assessment and methodological competence.

The publications examined also point out challenges. Cobb and Golub (2022) identify inconsistencies in the terminology for DH courses, which makes comparisons of acquired skills of learners difficult. Clement and Carter (2017) point to a (still) inadequate integration of digital methods into humanities theories in the context of DH training and recommend a stronger theoretical foundation overall.

### **DH Course Descriptions and Their Contents**

The international platform studyportals (Studyportals, 2007-2024) aggregates worldwide offers at various educational and degree levels as well as information about them. Studyportals cooperates with more than 3,750 universities and is supported by the European Commission and educational stakeholders (e.g. DAAD, British Council). The platform allows filtering by Bachelor's, Master's and PhD offers (Bachelorsportal, 2007-2024; Mastersportal, 2007-2024; PhDportal, 2007-2024). Accordingly, data for an analysis on DH offers were retrieved here in May 2024 (limited to offers from the European (continental) area, in the domain Humanities). They were analyzed descriptively in terms of their degree, location and duration of study. In addition, the course descriptions were examined using content analysis methods (frequent terms).

DH programs are predominantly offered at the Master's level, with almost 50% (48%) of offerings in this category. Bachelor's programs (42%) often combine DH with other subjects, while PhD programs (10%), though less common, are notably present in the Anglo-Saxon world, with 96 available.

**Figure 1***DH Study Offers (in Europe) on studyportals.com*

The UK leads in DH offerings, accounting for 75% of Bachelor's degree offerings, 41% of Master's degree offerings and 67% of PhD degree offerings. This indicates a significant concentration of DH programs in the region. All program-levels include online learning offerings, which can improve accessibility to degree offerings in general, but also highlights the increasing role of online learning in this field.

The analysis of course descriptions for Digital Humanities (DH) by Studyportals (Studyportals, 2007–2024) examined Bachelor's, Master's and PhD programs to identify key terms in them.

Course descriptions at the Bachelor's level (Figure 2) emphasize basic skills and practical applications. Terms such as “busi” (business) and “program” appeared 164 times each, emphasizing the integration of business, management and programming skills. “Studi” (study) appeared 150 times, emphasizing the academic nature of the programs. Bachelor's programs combine business and technology with basic research skills and prepare students, in addition to basic research skills, for professional and technological roles in the DH.

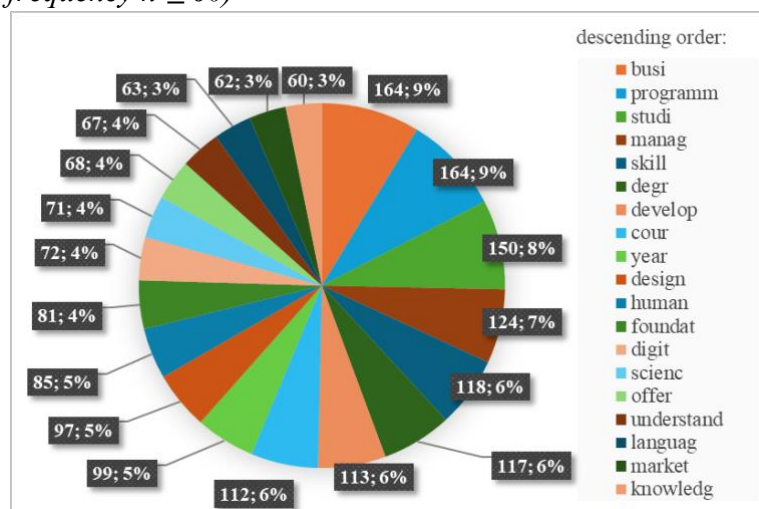
In the case of Master's degree programs (Figure 3), the focus in the course descriptions seems to be more on advanced technical and digital skills. Here, too, the focus is on business, programs and studies. However, “digit” (with a value of 205) could indicate a stronger emphasis on digital skills and digitization. In addition to basic skills, Master's degree programs therefore integrate technical, scientific and technological aspects in connection with media, culture and languages.

PhD programs (Figure 4), on the other hand, prioritize research and specialization, especially in the fields of art, literature, and history, reflecting an interdisciplinary and research-oriented approach (which is due to the abundance of humanities departments).

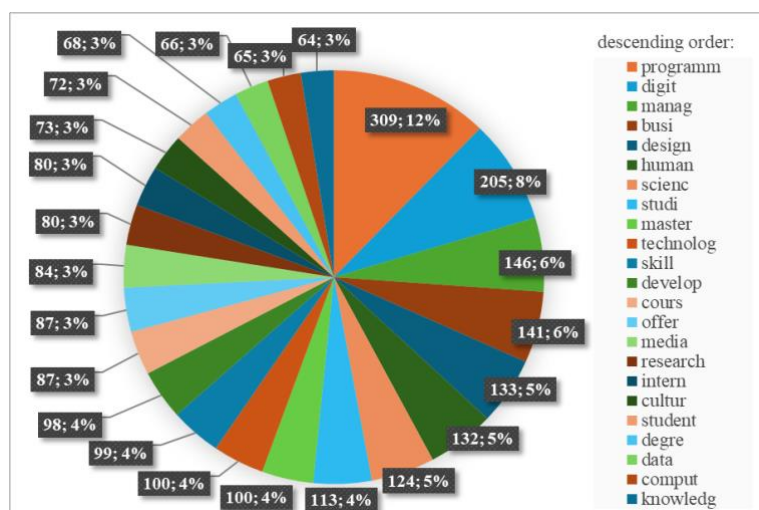
This distribution shows that each academic level focuses on different topics, from basic management and research skills to advanced digital competencies and interdisciplinary research skills at the PhD level. This also reflects the complexity of working in the Digital Humanities field.

**Figure 2**

*Frequent Occurring Terms (Stemmed) in the Bachelor Program Descriptions (absolute frequency  $n \geq 60$ )<sup>2</sup>*

**Figure 3**

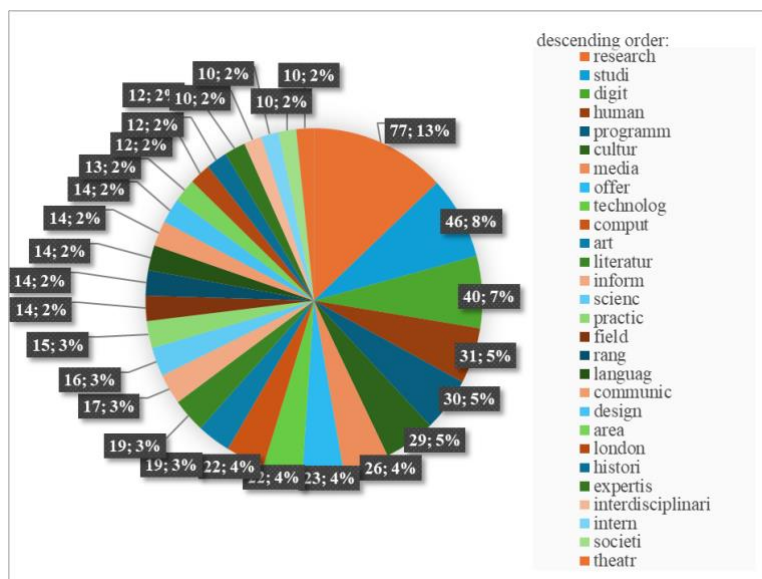
*Frequent Occurring Terms (Stemmed) in the Master Program Descriptions (absolute frequency  $n \geq 60$ )*



<sup>2</sup> The terms in the graphic have been pre-processed (stemmed) due to the preprocessing steps in the quantitative analysis. Stemming makes it impossible to subsequently recreate the actual word of the original description (for example, programm can stand for programming or for program).

**Figure 4**

*Frequent Occurring Terms (Stemmed) in the PhD Program Descriptions (absolute frequency  $n \geq 10$ )*



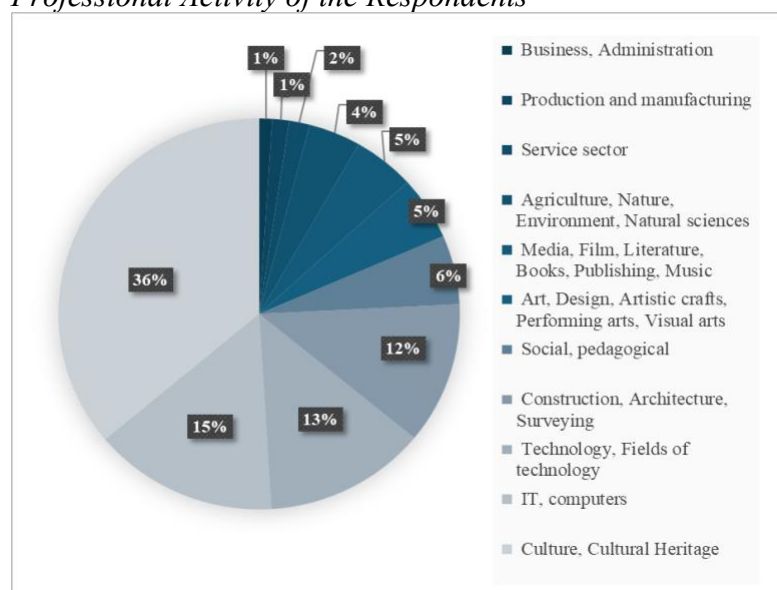
### **Results of the Survey of Experts From the Field of Digital Cultural Heritage and Digital Humanities on Topics and Content of Training and Continuing Education Formats**

In addition to reviewing existing research on Digital Humanities education and available training formats, a survey was conducted with experts in cultural heritage and digitization. Contacts were collected over several years (Münster, 2019) through publications at conferences and journals on the subject. These contacts were validated and supplemented with additional experts identified in the earlier reviews.

The online survey, based on Münster (2019), ran from June 4 to July 2, 2024. It was distributed via EU Survey (European Union, 1995-2024). A total of 4,268 invitations were sent, with 277 responses (276 usable).

First, respondents were asked to categorize their current professional, academic or practical activity. Using a partially standardized format based on the EU's CulturEU funding guideline (European Commission, 2021), respondents could select several options, which were assigned to the corresponding categories as follows. The number of people in each discipline varies considerably, but the majority of respondents come from the areas of culture and technology.

**Figure 5**  
*Professional Activity of the Respondents<sup>3</sup>*



One question focused on digitization and the use of digital technologies in the field of cultural heritage and assessed the use of digital methods by respondents. It can therefore provide information on a spectrum of used and possible digital methods in the field of cultural heritage.

Responses were preprocessed and cleaned, and frequent terms were visualized in a word cloud (Figure 6), with frequently mentioned terms displayed in larger font (created using Voyant [Sinclair & Rockwell, 2024]). “Digital” was the most frequently used term, indicating the central role of digital technologies. Other prominent terms such as “data,” “processing,” “3D,” “reality,” “virtual,” “publishing,” and “GIS” (geographic data analysis and visualization) underline the focus on related data management, 3D technologies, virtual environments and worlds, and the importance of geographic data in the field of cultural heritage. The word cloud also highlights concepts such as “scanning,” “capturing,” “lasers,” “infrastructures,” “heritage,” “analysis,” and various technologies and methods that are relevant from the respondents’ perspective. “Data” and “processing” indicate a strong presence of data-related processes and procedures. Overall, the focus is on digital technologies and methods, particularly with regard to the processing, management and presentation of data with reach for the cultural and scientific fields.

<sup>3</sup> Additional answers that could not be grouped: Geography, Education / Education in Cultural Heritage, Landscape architecture / Architectural and cultural landscape conservation, Photogrammetry / Laser scan / Advanced recording technologies, Digital preservation and conservation / Conservation science, Research / Academic science, Language, Cross-disciplinary activities, Digital heritage, Remote sensing / Aerial survey for archaeology / airborne and space remote sensing, Economy / economic enhancement, Anthropology, Archaeology / Landscape archaeology / Experimental archaeology, Archives/ Archival studies / digital archiving, Game design / Game development / Video games / Serious games, Tourism / Urban studies, Information science, GIS / GNSS / Space technologies, Computer vision / Immersive technologies / Augmented reality, Data science, 3D reconstruction, Space habitat design, Humanities / Digital Humanities, Library science, Motion capture / Character animation, Math / Physics / Development of digital tools for archaeological research, Museums / Museum education and learning / Museum and visitor studies, Inclusive Design

### Figure 6

*Mentioned Digital Methods by the Respondents (occurrences  $n \geq 4$ )*

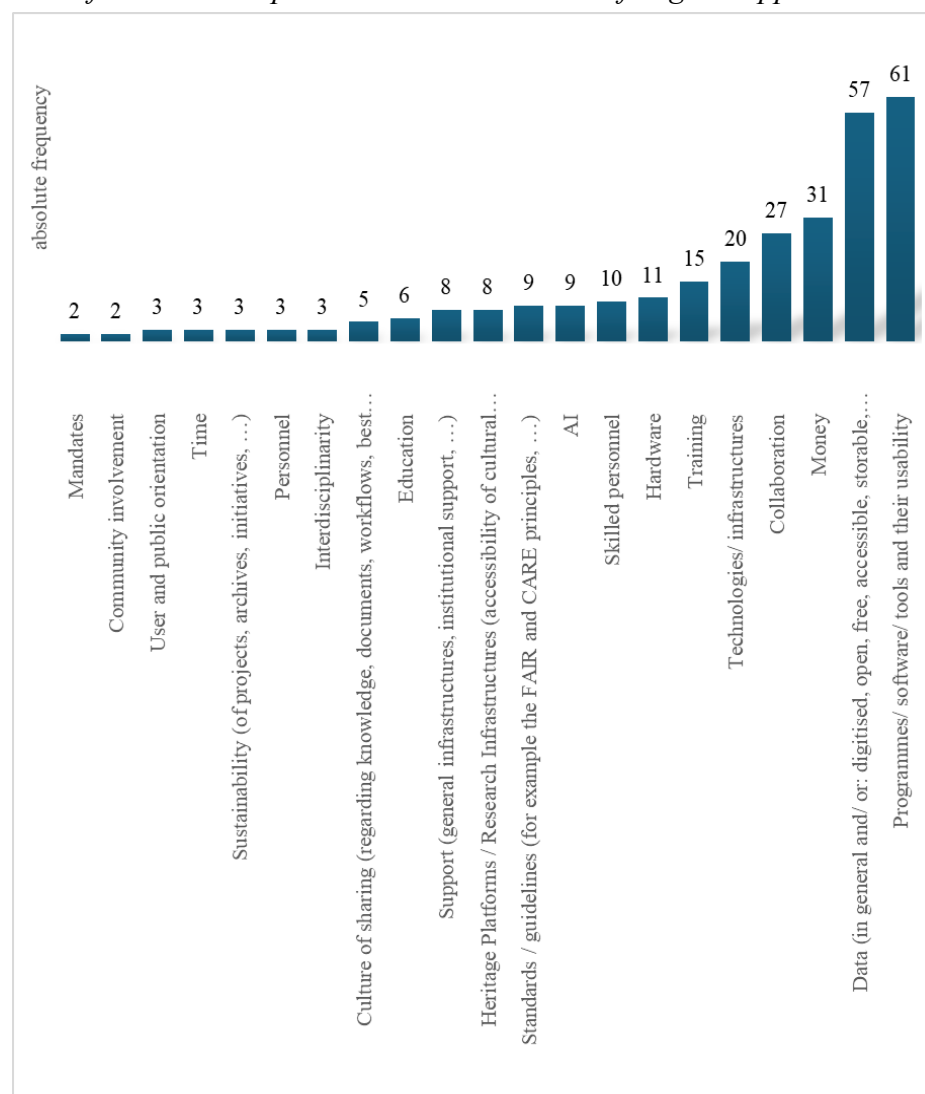


The survey also asked participants to assess the development perspectives for digital opportunities in their field. The qualitative question was analyzed in summary and the results categorized (after Mayring & Fenzl, 2019).

Figure 7 shows that from the respondents' perspective, there is a diverse and comprehensive need for improvement measures. The main focuses are on the need for information technology components and technological resources, better research and human resources, more collaborative and participatory approaches, strategies and infrastructures for human capital development, better developed cultural knowledge infrastructures, expanded use of AI, better policies (e.g. on the use of technologies), more support (at different levels) and sustainability aspects. In addition, respondents emphasize the importance of “cultural heritage platforms or research infrastructures” that promote collaboration and innovation. Training and education tailored to the sector are essential to ensure that staff can use digital tools effectively. In summary, respondents emphasize that successful digitalization approaches depend on a combination of technological tools, financial resources, qualified personnel and effective training to ensure sustainable and efficient results.



**Figure 7**  
*Needs for the Development and Establishment of Digital Opportunities* <sup>4</sup>



In addition, further statements were made by respondents that could not be assigned to these categories (data security (legal) framework, digital policy and digital rights, digital publishing, digitization process, documentation system for heritage conservation, ethical standards, free accessibility and awareness, free resources, knowledge of responsibilities in the Culture/EU sector, public relations, (more) publications, reducing bureaucracy, values of digital concepts, web technologies, assistance to diagnose structural problems, awareness for minor heritage/ low techs, awareness for the possibilities of digitization in culture sector).

When asked about their wishes and needs regarding training opportunities and training offers, respondents provided examples that were then categorized into nine thematic areas (again according to Mayring & Fenzl [2019]) (Table 1). Ideally, knowledge transfer in relation to DH and the digitalization of cultural heritage takes place through qualified trainers with practical experience, through inclusive teaching methods, project-based learning and with up-to-date materials. In addition, secure, standardized data storage, open access to data and

<sup>4</sup> Truncated values in the diagram: Culture of sharing (regarding knowledge, documents, workflows, best practices, ...); Data (in general and/ or: digitized, open, free, accessible, storable, standardized, and/ or specialized, consistent, not biased)

flexible IT infrastructures should be guaranteed. The importance of free and open-source software was also highlighted by respondents.

**Table 1**

*Categories With Indicators Built Concerning the Design of Educational Offers*

Category	Indicators
Where content should be conveyed	
	Digital formats, MOOCs, Education platforms, Specific courses or projects, University offerings, Academic programs (graduate and postgraduate), Web-based materials, Hackathons, Game jams, ..., via resources generally available and accessible to all
Other formats	
	Training, Workshops, Best practices and representative projects, Research projects in general, Web-based materials, EU funded initiatives (UNESCO, ICOM), Scientific journals, Initiatives, Conferences, Summer schools, Digital offers for school classes
How the content should be conveyed	
	Good teachers (practitioners or those working on projects themselves), Inclusive teaching and learning methods, Project based learning, Practical work (programming, database design, analysis tools, ...), Maintaining currency of materials
Digital and data-referred aspects (needs and necessities)	
	Data repositories, Expertise databases, Open data/ Access to digital repositories, Finding a standardization for data and data types that is recognized in the scientific community (data quality, ...), Finding better and unified standards for data (e.g. OA models of places), Digital practices should be fully based on the use of free software
Technologies (needed for educational offers)	
	Special technologies (e.g. for monitoring), Software free licenses for educational purposes (e.g. for data modelling), Scientific documentation (e.g. for virtual reconstructions)

Two other categories (Table 2) focus on professionalization and social engagement. Respondents would like more specialized projects to help researchers develop their skills and make them integrable in both research and teaching. Respondents also suggested more collaborative formats, such as secondments to other institutions to broaden the range of skills of researchers. The importance of involving citizens and volunteers in educational formats and associated with this, increased promotion of public participation in science and culture was also emphasized. Crowdsourcing was suggested as a tool for gathering interests and needs.

**Table 2***Additional Categories Referring to Educational Offers*

Category	Indicators
Professionalization	Specific projects for university researchers, Secondments, More integrated community capacity-building processes, More integrated community capacity-building processes, Collaborative platforms, Community engagement, Standards and existing groups maintaining these standards
Including citizens/ volunteers/ the audience in educational formats	Special and focused volunteer activities, Diverse formats for citizen and community engagement, Diverse formats for audience engagement, Crowdsourcing

Respondents also suggested several topics for educational formats (Table 3).

**Table 3***Examples of Potential Course Topics*

Project management (skills)
Awareness (e.g., in CH (Cultural Heritage) knowledge and digitization strategies; technologies)
Technical specialization (e.g. Architectural survey)
Thematic specialization (e.g. Digitization and AI)
More general topics such as: <ul style="list-style-type: none"> <li>- Digital literacy training</li> <li>- Tools and their application guidelines</li> </ul>
More specific and practical-oriented topics such as: <ul style="list-style-type: none"> <li>- Virtual and augmented reality for cultural preservation of intangible and tangible heritage</li> <li>- Implementation of game tools in cultural heritage digital formats</li> </ul>

Respondents were also asked about their preferences regarding topics and formats for training and continuing education. This qualitative data was processed using the analysis tool Voyant (Sinclair & Rockwell, 2024) and visualized as a word cloud to highlight the most frequently mentioned terms (Figure 8).

### Figure 8

*Mentioned Topics ( $n \geq 3$ ) of Desired Courses or Further Training Offers by the Respondents<sup>5</sup>*



Main topics include digitization and data-related processes (e.g. digital, data, databases). Topics related to cultural heritage, especially those linked to specific cultural areas, also play an important role for respondents. 3D technologies emerge as a main area where respondents would like to see training formats. The focus on cultural aspects suggests that educational formats (on methods or theories) should be tailored to cultural data and digitized materials, rather than simply adopting scenarios from other areas. There is a general interest in “courses” and “training”, which also underlines the importance of professional development on the part of respondents. Management skills, especially in the project and cultural organization context, are also mentioned, which also underlines the social component related to the application and implementation of digitally based practices. Overall, there seems to be a diverse need for topics for training programs to enable potential learners to receive the appropriate training or further development of these skills.

The study conducted has several limitations. Regarding the study portals platforms, no conclusions can be drawn about their course collection practices or the representativeness of the offers. The course descriptions analyzed are based on the word frequencies of key terms in the course descriptions associated with the offers. For a more comprehensive assessment a deeper analysis would be necessary, for example using module catalogs and exploration methods (e.g. cluster analysis). The survey conducted was based on a contact list created in Münster (2019). Although 10% of the list was manually checked, a full update was not possible due to time constraints. The survey is not representative, and future research should aim to expand this work in a more comprehensive and representative context. The sample size of 276 respondents is relatively small, which limits the generalizability of the results. The respondents came mainly from Europe and here predominantly from Italy, which may lead to regional biases. Furthermore, the focus on experts in the digitization of cultural heritage may not capture the field of Digital Humanities. The cross-sectional nature of the study therefore only provides a snapshot and does not allow for representative conclusions.

<sup>5</sup> GIS are geoinformation systems for the collection, processing, organization, analysis and presentation of spatial data, mostly digitally based.

## **Derivation of Possible Criteria for DH Study Programs and Draft of a Possible Further Research Design**

The results of the research can lead to the derivation of design criteria for DH education in higher education.

DH programs should combine technical skills with humanities research and offer an interdisciplinary curriculum that combines both technical and humanities theories.

They should be adaptable to different learning styles and needs and use flexible formats such as digital tools, interactive scenarios or hybrid learning to improve accessibility and engagement.

One focus can be project-based learning, which effectively involves local and international experts, minority groups and cultural institutions and offers students real application scenarios. Universities should also actively cooperate with external organizations to this end.

Programs should cover all academic levels, from Bachelor's to doctoral programs (and also part-time or qualifying), and ensure a coherent (comparable) standard.

Overall, DH education should produce professionals with both technical and cultural expertise, which requires programs that focus on creating specialized professional profiles.

Lifelong learning opportunities can ensure that professionals can adapt to evolving technological and cultural developments.

These implications suggest a flexible, interdisciplinary and practical approach to DH education, emphasizing accessibility, collaboration and real-world applications.

A research design, that provides a structured approach to assessing and improving the course offerings, could begin with the continuous and ongoing collection and analysis of data from educational programs, including course descriptions, student feedback and surveys. Needs and trends can thus be tracked in a data-centric manner. To do this, it should first be determined which data sources (course content, student opinions, ...) need to be collected as part of this.

A clear research strategy that combines qualitative and quantitative approaches to evaluation can ensure that the investigation is carried out in a rule-based manner. For example, methods of trend identification and pattern recognition can be used in the design of educational offerings or structuring content analysis of surveys.

As soon as results are generated and processed, they should also be shared with the stakeholders (educational institutions, politics, cultural institutions, teachers, learners). Further feedback can be collected in this phase (e.g. by discussing the results in focus groups). Such an iterative feedback loop can allow for continuous exploration of educational offerings in the field based on new evidence and changing needs. In addition, collaboration between stakeholders can foster the engagement of external partners such as cultural institutions, technology developers and policy makers to jointly develop educational strategies and incorporate the knowledge gained into DH training.

## Conclusion

This analysis has highlighted topics at the interface between Digital Humanities and the digitization of cultural heritage in higher education. They highlight the growing importance of interdisciplinary curricula integrating technical and humanities competencies, the need for flexible and practical learning opportunities and the demand for collaboration with external partners (e.g. minority groups and cultural institutions). The findings indicate a strong need for specialized training in digital methods (such as data management, 3D technologies, AI) and emphasize the need for continuous professional development through lifelong learning.

In terms of education design, the results suggest a flexible, project-based and accessible approach to DH education. DH study programs should bridge the gap between technology and humanities and promote the development of new professional profiles that combine IT expertise with cultural applications. In addition, engaging with minority cultures and incorporating community-oriented methods will be of key importance for the development of DH education to ensure that it remains inclusive and relevant to different global contexts.

By continuously collecting and analyzing educational data, stakeholders can refine DH programs, incorporate stakeholder feedback, and adapt to technological and cultural changes. A dynamic approach can help create robust and sustainable frameworks for DH education and incorporate the elements of the ever-evolving landscape of cultural heritage digitization.

## Acknowledgements

The DIGICHer project has received funding from the European Union's research and innovation program Horizon Europe under the grant agreement No. 101132481. This document reflects only the author's view, and the Commission is not responsible for any use that may be made of the information it contains.

## References

- Adela, B. & Valentin, B. (2020). Teacher Attitudes Towards the School Integration of Students With Special Educational Needs. In V. Trif (Ed.), *Analyzing Paradigms Used in Education and Educational Psychology* (pp. 170–188). IGI Global Scientific Publishing. <https://doi.org/10.4018/978-1-7998-1427-6.ch008>
- ADHO. (n.d.). Conference. <https://adho.org/conference/>
- Bachelorsportal. (2007-2024). Bachelor study program offers. <https://www.bachelorsportal.com/>
- Bacigalupo, M. (2022). Competence frameworks as orienteering tools. *RiiTE Revista Interuniversitar-ia de Investigación en Tecnología Educativa*, 12, 20–33.
- Bajec, J. F. (2019). The Interpretation and Utilization of Cultural Heritage and Its Values by Young People in Slovenia. Is Heritage Really Boring and Uninteresting? *Etnološka tribina*, 49(42), 173–193. <https://doi.org/10.15378/1848-9540.2019.42.07>
- Battelle for Kids. (2019). Framework for 21st Century Learning. [https://www.battelleforkids.org/wp-content/uploads/2023/11/P21\\_Framework\\_Brief.pdf](https://www.battelleforkids.org/wp-content/uploads/2023/11/P21_Framework_Brief.pdf)
- Burdick, A., Drucker, J., Lunenfeld, P., Presner, T., & Schnap, J. (2012). *Digital Humanities*. MIT Press.
- Clarivate. (2024). Web of Science. <https://www.webofscience.com/>
- Clement, T. E. & Carter, T. (2017). Connecting Theory and Practice in Digital Humanities Information Work. *Journal of the Association for Information Science and Technology*, 68(6), 1385–1396.
- Cobb, P., & Golub, K. (2022). Digital humanities degrees and supplemental credentials in Information Schools (iSchools). In: *Education for Information*, 38(1), 67–92. <https://doi.org/10.3233/EFI-200452>
- CORDIS. (2024). DNA4Science: Citizen-science data collection for ethical data re-use. <https://cordis.europa.eu/project/id/957566>
- Erickson, K. (2018). Understanding Competencies and Competency Frameworks: A Deeper Dive. <https://www.shifitq.com/blog/competency-frameworks>
- European Commission. (2021). The CulturEU funding guide. EU Funding Opportunities for the Cultural and Creative Sectors 2021-2027. Publications Office of the European Union.
- European Union. (1995-2024). EU survey. <https://ec.europa.eu/eusurvey/>
- European Summer University in Digital Humanities. (n.d.). Landing Page. <https://esu.fdhf.info/>

- Ferrari, A. (2013). DIGCOMP: A framework for developing and understanding digital competence in Europe. Y. Punie and B. N. Brečko. (Eds.). Publication office of the European Union. <https://doi.org/10.2788/52966>
- Gleason, D. W. (2020). The humanities meet STEM: Five approaches for humanists. *Arts and Humanities in Higher Education*, 19(2), 186–206.
- Goldsmiths University of London. (2024). MA Cultural Studies. <https://www.gold.ac.uk/pg/ma-cultural-studies/>
- Haring, N. G. (1970). The New Curriculum Design in Special Education. *Educational Technology*, 10(5), 24–31.
- HarvardX. (2024). HarvardX: Introduction to Digital Humanities. <https://www.edx.org/learn/humanities/harvard-university-introduction-to-digital-humanities>
- IAEA. (n.d.). The Competency Framework. A guide for IAEA managers and staff. <https://www.iaea.org/sites/default/files/18/03/competency-framework.pdf>
- Jisc. (n.d.-a). Building digital capability. <https://www.jisc.ac.uk/building-digital-capability>
- Jisc. (n.d.-b). AI maturity toolkit for tertiary education. <https://www.jisc.ac.uk/ai-maturity-toolkit-for-tertiary-education>
- Linnaeus University. (2024). Digital Humanities, Master Programme. <https://lnu.se/en/programme/digital-humanities-master-programme/distance-international-autumn/>
- Mahony, S., Fu, Y., & Liu, B. (n.d.). Digital Humanities Curriculum Development: an iSchools Approach. <https://discovery.ucl.ac.uk/id/eprint/10155472/2/DH-CurriculumDesign.pdf>
- Markopoulos, E., Markopoulos, P., Luimula, M., Almufti, Y. & Romano, C. (2019). Digital Cultural Strategies Within the Context of Digital Humanities Economics. In: *Advances in Human Factors in Wearable Technologies and Game Design*. Proceedings of the AHFE 2019 International Conference on Human Factors and Wearable Technologies, and the AHFE International Conference on Game Design and Virtual Environments, July 24-28, 2019, Washington D.C., USA. Pp.283–295.
- Mastersportal. (2007-2024). Master study program offers. <https://www.mastersportal.com/>
- Mayring, P., & Fenzl, T. (2019). Qualitative Inhaltsanalyse. [Qualitative Content Analysis.] In: N. Baur, J. Blasius (Eds.). *Handbuch Methoden der empirischen Sozialforschung*. [Handbook of Methods of Empirical Social Research.] Wiesbaden: Springer VS. [https://doi.org/10.1007/978-3-658-21308-4\\_42](https://doi.org/10.1007/978-3-658-21308-4_42)
- McGill, L. (2023). Framework für digital transformation in higher education. <https://repository.jisc.ac.uk/9056/1/framework-for-digital-transformation-in-higher-education.pdf>



- Microsoft. (2022). Discover digital literacy courses and resources.  
<https://www.microsoft.com/en-us/digital-literacy>
- Münster, S. (2019). Digital Heritage as a Scholarly Field. Topics, Researchers, and Perspectives from a Bibliometric Point of View. *Journal on Computing and Cultural Heritage*, 12(3), Article 22, 1–27. <https://doi.org/10.1145/3310012>
- Nicholls, A., & Nicholls, S. H. (2018). Developing a Curriculum: A Practical Guide. (n.p.): Taylor & Francis.
- OECD. (2022). The 21st century children. <https://web-archive.oecd.org/2022-05-05/555861-21st-Century-Children-Project-Overview.pdf>
- Onet, M.-G. C. (2021). Towards a Transdisciplinary Systemic Approach to National Heritage-Based Learning. Curricular Insights into the Romanian Art Education Reform in the Glocal Transformative Age. *Educatia*, 21(20), Article 14. <https://doi.org/10.24193/ed21.2021.20.14>
- PhDportal. (2007-2024). Phd program offers. <https://www.phdportal.com/>
- Punie, Y., & Redecker, C. (2017). European Framework for the Digital Competence of Educators: DigCompEdu, EUR 28775 EN, Publications Office of the European Union, Luxembourg. <https://doi.org/10.2760/178382>
- Rome University of Fine Arts. (n.d.). Art curating and management Master. [Online] Available: [https://corsi.unirufa.it/lp/art-curating-and-management/?utm\\_source=google&utm\\_medium=cpc&utm\\_campaign=17365994547&utm\\_content=134537120302&utm\\_term=master%20cultural%20management&gad\\_source=1&gclid=EAIaIQobChMI3NSVnvjVhgMVp1tBAh20fQ5VEAAYAAEgJbiPD\\_BwE](https://corsi.unirufa.it/lp/art-curating-and-management/?utm_source=google&utm_medium=cpc&utm_campaign=17365994547&utm_content=134537120302&utm_term=master%20cultural%20management&gad_source=1&gclid=EAIaIQobChMI3NSVnvjVhgMVp1tBAh20fQ5VEAAYAAEgJbiPD_BwE)
- Sahle, P. (2013). DH studieren! Auf dem Weg zu einem Kern- und Referenzcurriculum der Digital Humanities. [Study DH! Towards a core and reference curriculum for Digital Humanities.] Göttingen, Document and Publication-server of the Georg-August University. DARIAH Working Papers 1. <http://webdoc.sub.gwdg.de/pub/mon/dariah-de/dwp-2013-1.pdf>
- Sala, A., Punie, Y., Garkov, V., & Cabrera Giraldez, M. (2020). LifeComp: The European Framework for Personal, Social and Learning to Learn Key Competence. Luxembourg: Publications Office of the European Union.
- Siliutina, I., Tytar, O., Barbash, M., Petrenko, N., & Yepyk, L. (2024). Cultural preservation and digital heritage: challenges and opportunities. *Revista Amazonia Investiga*, 14, 262–273. <https://doi.org/10.34069/AI/2024.75.03.22>
- Sinclair, S., & Rockwell, G. (2024). Voyant Tools. <https://voyant-tools.org/>
- Studyportals. (2007-2024). Study program research. <https://studyportals.com/students/>

- Sula, C. A. & Berger, C. (2023). Training Information Professionals in the Digital Humanities: An Analysis of DH Courses in LIS Education. *College & Research Libraries*, 84/5, 802–823.
- Terras, M. (2006). Disciplined: Using Educational Studies to Analyse ‘Humanities Computing. *Literary and Linguistic Computing*, 21(2), 229–46.  
<https://doi.org/10.1093/lc/fql022>
- UNESCO. (2018). DLGF. A Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2 Quebec: UNESCO Institute for Statistics, Ref: UIS/2018/ICT/IP51.
- UNESCO Institute for Statistics. (2012). International Standard Classification of Education ISCED 2011. [Online] Available:  
<https://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf>
- UNESCO-UNEVOC. (n.d.). Digital competence frameworks for teachers, learners and citizens. <https://unevoc.unesco.org/home/Digital+Competence+Frameworks>
- University of Amsterdam. (2024). Digital Humanities. <https://ahm.uva.nl/content/research-groups/heritage-and-digital-culture/digital-heritage.html?cb>
- University of Michigan. (2024). Libraries, Archives, and Knowledge Environments in Society (LAKES). <https://www.si.umich.edu/programs/master-science-information/curriculum/libraries-archives-and-knowledge-environments>
- Vuorikari, R., Kluzer, S., & Punie, Y. (2022). DigComp 2.2: The Digital Competence Framework for Citizens-With new examples of knowledge, skills and attitudes (Vol. UR 31006 EN). Publications Office of the European Union.
- Vuorikari, R., Punie, Y., Carretero, S., & Van Den Brande, G. (2016). DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: the Conceptual Reference Model. EUR 27948 EN. Luxembourg: Publications Office of the European Union.
- Walsh, J. A., Cobb, P.J., de Fremery, W., Golub, K., Keah, H., Kim, J., Kiplang'at, J., Liu, Y-H., Mahony, S., Oh, S.G., Sula, C.A., Underwood, T. & Wang, X. (2021). Digital humanities in the iSchool. *Journal of the Association for Information Science and Technology*, 2022, 73, 188–203. <https://doi.org/10.1002/asi.24535>
- Warwick, C., Terras, M., & Nyhan, J. (2012). Introduction. In C. Warwick, M. Terras and J. Nyhan (Eds.), *Digital Humanities in Practice*. Facet Publishing. xiii-xix.
- Yao, W., & Xiao, P. (2022). What contributes to a qualified digital humanities librarian and ideal digital humanities pedagogy? An exploratory qualitative study. *The Journal of Academic Librarianship*, 48(2022), 102524.

**Contact email:** [katrin.fritsche@uni-jena.de](mailto:katrin.fritsche@uni-jena.de)

## **Educational Pathways in Marketing Programs for Undergraduate Students: Embedding Assessment Design to Address Threshold Concepts and Bridge the Gap Between Academia and Industry**

Sepideh Samadi, Heriot Watt University, United Kingdom

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

The increasing demand for industry-ready graduates has underscored the need for assessment strategies that not only evaluate academic knowledge but also cultivate practical competencies. This action research study investigates how integrating Experiential Learning Theory (Kolb, 1984) with Threshold Concepts can enhance assessment design in undergraduate marketing programs. Threshold concepts—transformative yet often troublesome ideas essential to disciplinary mastery—are explored through the lens of experiential learning, which emphasizes the cyclical process of concrete experience, reflective observation, abstract conceptualization, and active experimentation. The study focuses on Year 2 undergraduate marketing students at a British-system university in the UAE, employing a qualitative methodology to examine the impact of tailored, real-world assessment tasks. Data were gathered through classroom observations, student-teacher feedback sessions, and performance analysis across two academic semesters. These data points were aligned with stages of the experiential learning cycle, providing rich insights into how students internalize complex marketing concepts through hands-on practice, reflection, and iterative learning. Findings indicate that assessments grounded in experiential learning significantly improved student engagement, conceptual understanding, and career readiness. Students showed measurable performance gains in mastering threshold concepts such as market segmentation, branding, and strategic positioning. The iterative refinement of assessment design further ensured alignment with both academic outcomes and industry expectations. This study offers a replicable framework for embedding experiential and conceptually rich assessment strategies within marketing curricula. By bridging theory and practice, it addresses critical pedagogical gaps and contributes to the development of graduates equipped to navigate the dynamic challenges of the marketing profession.

*Keywords:* assessment design, threshold concept, experiential learning theory, marketing program

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## **Introduction**

As global markets continue to evolve and marketing roles become increasingly dynamic, universities are under growing pressure to produce graduates who are not only theoretically grounded but also practically equipped to meet industry demands. Within this context, threshold concepts in marketing—such as segmentation, branding, and strategic positioning—represent essential yet often challenging areas of learning that students must master to progress meaningfully in the discipline (Meyer & Land, 2005). To address these conceptual barriers, this study incorporates Experiential Learning Theory (Kolb, 1984) as a complementary pedagogical framework, emphasizing the role of real-world, reflective, and iterative learning experiences in fostering deeper understanding.

This action research investigates how embedding experiential, concept-focused assessment strategies within undergraduate marketing curricula can support students in overcoming troublesome knowledge and enhancing their career readiness. Conducted at a British-system university in the UAE, the study used qualitative methods including classroom observations, student feedback sessions, and performance analysis across two academic semesters. This dual-semester, iterative approach enabled the continuous refinement of assessment design and provided a robust, practice-informed understanding of how students internalize key marketing concepts through experiential learning.

## **Literature Review**

### **Threshold Concepts in Marketing Education**

Threshold concepts are core disciplinary ideas that, once understood, lead to a transformative shift in a student's comprehension and worldview (Meyer & Land, 2005). In the context of marketing education, these concepts typically include customer value, market segmentation, branding, and strategic positioning (Davies & Mangan, 2007). Mastery of these ideas is essential for both academic success and industry relevance. However, students often struggle to engage with these concepts because they are abstract, integrative, and contextually complex. Without meaningful pedagogical strategies, such concepts remain “troublesome knowledge,” impeding student progression and deeper understanding. Addressing these difficulties requires learning environments that make these ideas visible, actionable, and embedded in practice.

### **Assessment Design and Industry Alignment**

Assessment design plays a critical role in shaping how students approach and internalize disciplinary knowledge. Nicol and Macfarlane-Dick (2006) highlight the value of formative assessment in promoting self-regulated learning, while Carless (2015) emphasizes the role of feedback literacy in helping students prepare for professional environments. Assessments that replicate real-world marketing challenges—such as data-driven segmentation tasks or strategic brand positioning exercises—enable students to bridge theory and practice. When assessments are aligned with authentic, industry-relevant tasks, students are more likely to see the relevance of abstract concepts and engage with them meaningfully.

## Experiential Learning in Undergraduate Marketing Programs

To further support the acquisition of threshold concepts, this study draws on Experiential Learning Theory (Kolb, 1984), which provides a cyclical model of learning based on four key stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. In marketing education, experiential learning is particularly effective because it mirrors the dynamic, iterative nature of professional marketing work. Activities such as group projects, simulated client pitches, and peer-reviewed case studies allow students to encounter marketing challenges directly (concrete experience), reflect on their performance and decisions (reflective observation), connect their experiences to theory (abstract conceptualization), and apply revised strategies in new contexts (active experimentation).

When integrated into assessment design, experiential learning fosters not only deeper cognitive engagement with threshold concepts but also the development of transferable skills such as collaboration, communication, and problem-solving. These approaches prepare students for the complexities of real-world marketing roles while simultaneously supporting academic mastery.

### Methodology

This study adopted a qualitative action research methodology, grounded in cycles of implementation, observation, reflection, and iterative refinement. The approach was theoretically informed by Experiential Learning Theory (ELT), which conceptualizes learning as a continuous process involving concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). This lens enabled the study to systematically explore how experiential assessment strategies support students in mastering threshold concepts in marketing education.

Data were collected across two academic semesters using the following methods, each mapped to a corresponding stage of the experiential learning cycle:

- **Concrete Experience – Real-world Assessments:** Students engaged in group projects, case studies, and simulated marketing presentations designed to embed abstract concepts into practical tasks. These activities functioned as the “experience” phase, giving students direct encounters with key marketing challenges such as segmentation, branding, and positioning.
- **Reflective Observation – Feedback Sessions:** Mid- and end-semester group feedback discussions captured students’ reflections on the relevance, difficulty, and impact of the assessment tasks. These sessions provided insight into how students made sense of their experiences and identified obstacles in their conceptual understanding.
- **Abstract Conceptualization – Thematic Analysis:** Qualitative analysis of student reflections and performance trends helped identify patterns in learning progression. This analytical phase aligned with the ELT stage in which students begin to connect experience to broader theoretical frameworks.
- **Active Experimentation – Iterative Assessment Redesign:** Based on insights from performance data and feedback, assessment tasks were revised and re-implemented in the following semester. This phase supported continuous refinement of learning design and allowed both students and instructors to re-engage with tasks in new ways.

The sample included Year 2 undergraduate marketing students enrolled in a Consumer Behaviour module at a British-system university in the UAE. These students were chosen due to their transitional stage in the curriculum—having acquired foundational marketing knowledge but lacking real-world application experience. This positioning made them ideal participants for examining the impact of experiential, threshold-driven assessments on conceptual development and industry readiness.

## Findings and Analysis

The findings are structured around three core threshold concepts identified as particularly challenging for students: market segmentation, branding, and strategic positioning. These were intentionally embedded into real-world, experiential assessment tasks designed to follow the four stages of Experiential Learning Theory (ELT): concrete experience, reflective observation, abstract conceptualization, and active experimentation. Assessment redesigns scaffolded these concepts through applied tasks, peer collaboration, and industry-relevant simulations.

**Table 1**

*Threshold Concepts and Experiential Assessment Strategies*

Threshold Concept	Assessment Strategy (Concrete Experience)	Observation & Reflection Outcome	Avg. Performance Improvement
Market Segmentation	Group project applying segmentation to a real brand	Students actively engaged with real consumer data; clearer link to theory through hands-on application	<b>+18%</b>
Branding	Case study analysis with peer feedback	Improved comprehension of brand identity; deeper reflection via peer discussion	<b>+15%</b>
Strategic Positioning	Client pitch simulation (presentation)	Increased confidence and ability to articulate positioning strategies in realistic contexts	<b>+22%</b>

These quantitative improvements were reinforced by qualitative insights gathered through feedback sessions and classroom observation. Students expressed a stronger connection between marketing theory and practical application. For example, during reflective discussions, one student shared, “Doing the pitch made me feel like I was in an agency—I finally understood what strategic positioning meant.”

Such reflections illustrate the transformative effect of assessment tasks designed through the experiential learning cycle. Students not only demonstrated improved performance but also internalized previously abstract concepts by actively engaging in authentic marketing scenarios. Furthermore, the iterative refinement of these assessments across two semesters supported active experimentation, where both students and faculty adapted and reapplied learning strategies based on observed outcomes.

The integrated approach of threshold-concept-focused content and experiential pedagogy fostered measurable learning gains, deeper conceptual clarity, and enhanced professional readiness among students.

## Discussion

The findings reaffirm that assessment strategies aligned with threshold concepts can lead to transformative learning experiences. As Cousin (2006) argues, once students internalize these threshold concepts, their understanding of the subject undergoes a fundamental and irreversible shift. In this study, embedding concepts such as segmentation, branding, and strategic positioning within experiential, real-world assessments provided students with the necessary context to engage more deeply with disciplinary knowledge.

The integration of Experiential Learning Theory (Kolb, 1984) further enriched this transformation. By structuring assessment tasks around Kolb's learning cycle—concrete experience, reflective observation, abstract conceptualization, and active experimentation—students were not only exposed to practical challenges but also guided through reflective and conceptual stages that promoted lasting understanding. This alignment helped convert previously "troublesome" knowledge into actionable competence, as students moved from surface-level recall to applied mastery.

The iterative nature of action research played a vital role in the process. Cycles of feedback, performance analysis, and refinement enabled the ongoing alignment of assessment practices with both academic objectives and industry needs. These adaptations were responsive to student feedback and cohort-specific dynamics, ensuring that learning experiences remained relevant, inclusive, and developmental.

Moreover, the inclusion of peer review, formative feedback, and collaborative tasks encouraged students to engage in self-regulated and socially situated learning. These mechanisms helped students develop not only individual understanding but also key professional competencies such as teamwork, evaluation, and communication. Such outcomes reflect the dual purpose of the assessment model: fostering academic development and cultivating industry readiness.

In sum, the study demonstrates that embedding threshold concepts within an experiential learning framework—and refining it through action research—results in more engaged, capable, and confident learners. It bridges the divide between theory and practice, positioning students to succeed both in academic progression and future professional roles.

## Conclusion and Recommendations

This study demonstrates the value of embedding threshold concepts within an experiential learning framework to effectively bridge the gap between academic learning and industry expectations in undergraduate marketing education. By aligning assessment design with Kolb's Experiential Learning Cycle—through real-world application, structured reflection, and iterative refinement—students not only overcame troublesome knowledge but also developed critical professional competencies. The dual impact on conceptual mastery and career readiness highlights the importance of integrating theory and practice through purposeful pedagogical design.

The implications extend beyond the discipline of marketing, offering a transferable model for curriculum development in other fields seeking to align learning outcomes with evolving labor market demands. Through action research and responsive assessment design, institutions can foster learning environments that are adaptive, inclusive, and outcome-driven.

To enhance undergraduate education effectively, several research-informed and replicable strategies are recommended. First, assessments should be designed to embed threshold concepts within real-world, industry-relevant tasks—such as brand simulations, segmentation projects, and strategic positioning pitches—ensuring both conceptual clarity and practical application. This approach can be further strengthened by aligning assessments with Kolb’s Experiential Learning Theory, structuring tasks around the four-stage cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Additionally, promoting feedback literacy and peer learning is crucial; incorporating formative peer reviews, industry-style simulations, and feedback portfolios enables students to take ownership of their learning while developing evaluative judgment. Finally, adopting an iterative, data-informed approach to assessment design allows for continuous refinement through action research cycles, leveraging performance data and student reflections to better respond to learner needs and evolving professional standards. Together, these recommendations offer a strategic framework for embedding academic rigor, experiential engagement, and industry relevance into assessment practices, ultimately preparing graduates not only to navigate professional challenges but to lead within them.



## References

- Carless, D. (2015). *Excellence in university assessment: Learning from award-winning practice*. Routledge.
- Cousin, G. (2006). An introduction to threshold concepts. *Planet*, 17(1), 4–5. <https://doi.org/10.11120/plan.2006.00170004>
- Davies, P., & Mangan, J. (2007). Threshold concepts and the integration of understanding in economics. *Studies in Higher Education*, 32(6), 711–726. <https://doi.org/10.1080/03075070701685148>
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.
- Meyer, J. H. F., & Land, R. (2005). Threshold concepts and troublesome knowledge: Epistemological considerations and a conceptual framework for teaching and learning. *Higher Education*, 49(3), 373–388. <https://doi.org/10.1007/s10734-004-6779-5>
- Nicol, D., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education*, 31(2), 199–218. <https://doi.org/10.1080/03075070600572090>

**Contact email:** s.samadi@hw.ac.uk



## **Pronunciation Difficulties Among EFL Learners: The Case of Undergraduate Students at Mascara University**

Asmaa Kaddour-Trea, Mustapha Stambouli-Mascara University, Algeria

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Pronunciation is crucial in foreign language learning, aiding learners in both speech production and comprehension. However, EFL students often struggle with consonant and vowel pronunciation. This study investigates these pronunciation errors among first-year B.A. students at the University of Mustapha-Stambouli Mascara during the 2023-2024 academic year. Data were gathered from semi-structured interviews with seven teachers, a questionnaire answered by 101 English language students and 23 translation students, and a pronunciation test of 80 English words. The findings reveal difficulties with silent sounds and specific consonants such as [t], [ŋ], [z], [s], [ʒ], [tʃ], [θ], [ð], and [k], as well as vowels like [ʌ], [ə], [ʊə], [ɪə], [eə], [eɪə], and [əʊə]. Additionally, errors were found in long vowel pronunciations, including [i:], [ɔ:], and [a:]. These difficulties stem from lack of practice, mother tongue interference, French language influence, and mismatched spelling and pronunciation. Demotivation, being taught by less qualified teachers in middle and high school, and challenging classroom environments also contribute. Although pronunciation is taught in phonetics courses, the study recommends incorporating technology and laboratory resources to improve pronunciation skills. It also suggests including phonetics in the translation curriculum, emphasizing the importance of speaking in language learning.

*Keywords:* pronunciation, consonants, vowels, sounds, EFL, phonetics

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

English has become an instrument for communication and education. It is the official language of 59 countries and the unofficial lingua franca of dozens (Mikanowski, 2018). Although the official language in Algeria is Arabic, English has begun to play a subsequent role in education. English is considered to be a foreign language (EFL) in Algerian schools. Therefore, students from 11 years of age study English in middle school. French is offered, however, to pupils from the age of nine in primary school. More recently, in 2022, Algerian President Abdelmadjid Tebboune considered an amendment to the educational programme by offering English to pupils from the age of nine (Rouaba, 2022).

Despite the President's attempt to strengthen the English language in the education program, students face difficulties in pronunciation, as they do not practice English outside the classroom. This pronunciation obstacle appears among students in English at the university level. Particularly among first-year English B.A. students at the University of Mustapha Stambouli Mascara, they find it hard to pronounce words in Received Pronunciation (RP).

Pronunciation is a significant aspect of foreign language learning. According to Yakout and Amel (2019), "Though grammar and vocabulary are very important elements in any language, they can be useless if the speaker cannot pronounce accurately" (p. 220).

Teaching pronunciation depends on two skills: the flow of speech, and the production of spoken language or fluency (Broughton et al., 2003). Acquiring these skills is based on constant practice of listening and speaking. In practising listening, students will listen to understand and imitate (Cruttenden, 2014, p. 5), but in terms of speaking, the proper use of the vocal organs to articulate sounds can help learners acquire the habit of perfecting their articulation of English words. Here, teachers can also help students acquire reasonable pronunciation by concentrating on sounds, showing the precise articulation of the sounds in the mouth, and making students aware of where words should be stressed (Harmer, 2001, p. 183).

On this subject, Broughton et al. (2003) pointed out that "Sounds used in a language are therefore distinctive so that words can be distinguished from each other when heard just as can be distinguished when written" (51). Hence, the significance of teaching pronunciation lies in achieving easy English that is not confusing to the listener, helping learners feel comfortable when speaking English, developing positive self-awareness as a non-native speaker of English, and monitoring strategies to help learners achieve correct pronunciation of the words in oral communication inside and outside the classroom (Yakout & Amel, 2019, p. 220).

This study focuses on tackling the obstacles to the pronunciation of English sounds among EFL learners. It also highlights the factors behind the difficulties encountered by students in pronunciation. The study, thus, seeks to answer the following questions:

1. Why do the students face pronunciation difficulties?
2. What are the challenges faced by the teachers in teaching pronunciation?

## Literature Review

While reviewing the literature on EFL learners' difficulties in the pronunciation of English sounds, this literature has focused on pronunciation problems, highlighting the factors of

difficulties in the pronunciation of English sounds among Arab learners (for example, AbdAlgane & Idris, 2020; Abdulwahid, 2023; Broughton et al., 2003; O'Connor, 1998). Abdulwahid (2023) was more concerned with examining the pronunciation of consonants and vowels among EFL learners by conducting interviews with teachers and questionnaires answered by students in the Department of English and Translation in Cihan University-Erbil, Kurdistan Region, Iraq. The study concluded that in both departments, students had difficulties in pronouncing consonants that consist of two phonemes, such as /f/ and /tʃ/, /ʒ/, and /dʒ/. As such, the students transcribed the word “jazz” as /ʒaez/ instead of /dʒaez/.

The findings of Jahara and Abdelrady (2021) are similar. In applying periodic recording assessment using Blackboard Collaborate Ultra LMS to test the pronunciation skills of thirty-two B. A. undergraduates at Qassim University, Saudi Arabia, Jahara and Abdelrady (2021) found that 50% of the research participants did not learn to differentiate between /p/ and /b/, as the former is not available in Arabic, which could be a significant barrier to Arab learners in distinguishing between voiced bilabial and voiceless bilabial sounds. Vowels also confused participants. The authors suggest that some participants were confused between /ɪ/ and /e/ and between /ɪ/ and /i:/. However, the authors pointed out that most participants failed to distinguish between /ʌ/, /e/, and /ɒ/ (Jahara & Abdelrady, 2021, p. 205). The pronunciation difficulties of vowels are also linked to their inconsistency of the English vowels. Students lack knowledge of the different pronunciations of English vowels.

In addition, the study by AbdAlgane and Idris (2020) assigns the pronunciation problems to the influence of spelling on pronunciation, which poses a major problem to EFL learners. Their study tested the English pronunciations of 100 students. Approximately 58% of participants strongly agreed that they faced difficulties in identifying silent letters in words. As such, students who did not learn how to pronounce the knee, knight, knife, know, and knot would pronounce them with /k/ (AbdAlgane & Idris, 2020, p. 197).

There is limited literature in the Algerian context and, with an odd exception (for example, Berrabah & Benabed, 2021; Ghounane, 2018; Yakout & Amel, 2019), in examining the pronunciation problems and the reasons behind those pronunciation problems among the first-year university EFL learners in Algeria. Therefore, to bridge this gap, this study examines pronunciation problems among EFL learners of first-year English B.A. at the University of Mustapha Stambouli-Mascara. It explores the factors behind the difficulties in achieving native-like pronunciation of English sounds. It also seeks to tackle the issue from the lecturer's perspective to explore the challenges encountered in teaching phonetics.

## **Methodology**

### **Data Collection**

This study utilized a combination of qualitative and quantitative approaches for data collection. The qualitative data were gathered through semi-structured interviews with seven teachers—three specializing in phonetics for first-year English students, one in phonology, and three in Arabic-English and English-Arabic translation for first-year translation students. These interviews were designed to explore teaching methods, pronunciation proficiencies, and the challenges faced by phonetics instructors. On the quantitative side, data were collected through a questionnaire administered to 101 first-year English language students and 23 first-year translation students, all aged 18-25, with Arabic as their first language and

French as their second. Additionally, students participated in a pronunciation test of over 80 English words, with 19 translation students agreeing to this test.

## **Data Analysis**

The qualitative data from the semi-structured interviews were analyzed to extract themes related to teaching experiences, pronunciation proficiency, and instructional challenges. The teachers' insights provided a deeper understanding of the difficulties students face in mastering English pronunciation. The quantitative data from the questionnaires were analyzed using tables and graphs to illustrate students' opinions on their pronunciation abilities and the obstacles they encounter in speaking correctly. The pronunciation test results were examined to identify specific phonetic errors, which further enriched the analysis by highlighting particular areas of difficulty in English pronunciation among the students.

## **Results and Discussion**

### **Results of the Semi-structured Interviews**

During the interviews, the teachers claimed that they were sometimes satisfied with their students' pronunciations during the lesson. Accordingly, the teachers believed that the students had to practice speaking in English and the English words' pronunciations. They also provided other reasons for the pronunciation errors among their students, such as the interference of the mother tongue and mismatching spelling with pronunciation. Those reasons are further discussed below in this study.

When the teachers were asked if they focused on pronouncing the words correctly, five teachers answered that they attempted to pronounce the words correctly during the lessons, as they saw that learning phonetics was essential for English pronunciation proficiencies. They also asserted that they corrected the students if they heard pronunciation errors. Only one teacher claimed he did not focus on English word pronunciations and students' fluency. He added that he sometimes corrected the students' pronunciation errors during the lecture, although he believed that the English pronunciation proficiencies were important for the students' careers.

Further, the teachers of phonetics explained the problems they were facing in teaching phonetics. The three teachers mentioned that the combination of phonetics and linguistics presented an obstacle to providing sufficient teaching hours for learning pronunciation of English sounds, as 1h30mn would be provided to teaching phonetics every week of each semester instead of 3 hours. One teacher explained that large classes also formed an obstacle in teaching phonetics, as he couldn't allow all students to practice the pronunciation of English words and hear the pronunciation errors they make.

In terms of teaching consonants and vowels, three teachers of phonetics saw that consonant sounds were easy to teach to the students, whereas vowels, including monophthongs, diphthongs, triphthongs, short and long vowels, were all plain. One teacher saw that consonant sounds were plain, while all vowels were challenging to students (see Table 1).

**Table 1***Teachers' Opinion on Consonant and Vowel Sounds' Difficulty Level*

Sounds	easy	plain	difficult	Total number of teachers of phonetics
Consonants	3	1		4
monophthongs		3	1	4
diphthongs		3	1	4
Short vowels		3	1	4
Long vowels		3	1	4

As already mentioned, the students of translation do not study phonetics. Therefore, the teachers shared their opinions about this issue. The teachers of phonetics and translation believe that translation students should learn phonetics for their pronunciation proficiencies in their careers. They also added that translation is related to the language's four skills: reading, writing, listening and speaking. Speaking skills are strictly related to phonetics. According to a teacher of translation,

Students of translation are supposed to work in the field of interpreting, which relies, among others, on phonetics and pronunciation. There are many situations where the lack of phonetic skills leads to serious mistakes, especially when [translating speeches] from Arabic into English. (Anonymous, 2024)

The teacher also believes that the correct pronunciation of the words would deliver the message accurately to the listener. He explained,

The comprehension of a message largely depends on the ability to decipher what the speaker is saying; hence, vocabulary and lexis are not the only elements that exist but the way the speaker pronounces the utterance too. (Anonymous, 2024)

Overall, the semi-structured interviews highlighted three key elements. Firstly, the teachers found that the lack of practice, mismatching spelling and pronunciation, and the interference of the mother tongue were problems encountered by the EFL students. Secondly, the combination of phonetics and linguistics and large classes were perceived as challenges to the teachers of phonetics to deliver the lessons. Finally, the teachers recommend phonetics syllabus to the students of translation. Those students learn the translation from Arabic to English and from English to Arabic; therefore, they should develop an understanding of the English language fourth skill of speaking.

### Results of the Questionnaire

Table 2. shows that the answers to Question 1, "Are you satisfied with your pronunciation?" reveal that 47.50% of the students of the English Language and 52.1% of the students of translation believe that they are sometimes satisfied with their pronunciation, compared to those who claim that they are not happy with their pronunciation proficiencies. Meanwhile, question 2, "Do you think that you need to improve your English pronunciation?" indicates that 80.1% of English language students and 95.6% of translation students believe they must improve their English pronunciation (see Table 3 below). In Question 3, "Do you think that learning phonetics is important for your English proficiencies?" 81% of students of English and 69.50% of Translation students think that learning phonetics is significant for their

English Language proficiencies, compared to 5.9% among the students of English and 13% among the students of Translation who were not sure if learning phonetics would help them improve their English pronunciation (See Table 4 below).

**Table 2**

*Students' Satisfaction Towards Their English Pronunciation*

Question 1	Yes	No	Sometimes	Not sure
English students	27%	15.80%	47.50%	8.90%
Translation students	13%	13%	52.10%	21.70%

**Table 3**

*Students' Opinion on Improving Their Pronunciation Proficiencies*

Question 2	Yes	No	Sometimes	Not sure
English students	80.10%	1.90%	11.80%	5.90%
Translation students	95.60%	0%	4.30%	0%

**Table 4**

*The Importance of Learning Phonetics*

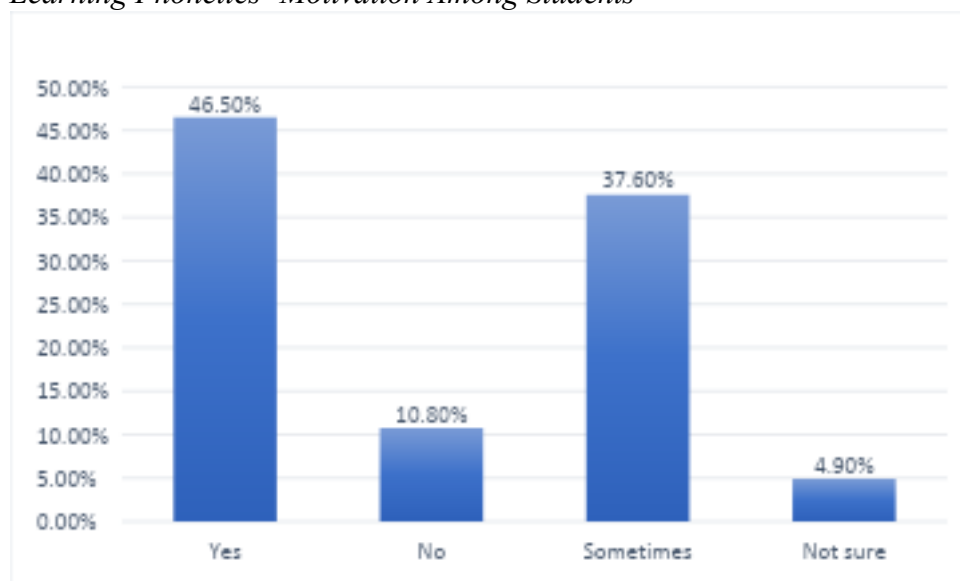
Question 3	Yes	No	Sometimes	Not sure
English students	81%	4.90%	7.90%	5.90%
Translation students	69.50%	8.60%	8.60%	13%

It is worth noting that the fourth question of the questionnaire deals with the motivation for learning phonetics. This question is only asked to the students of English, as the students of Translation do not study phonetics. Therefore, Figure 1. Shows that 46.5% of the students of English claim that they feel motivated when they study phonetics, compared to 37.60% among the students who are sometimes motivated during the lectures.

Question 4: Do you feel motivated when learning phonetics?

**Figure 1**

*Learning Phonetics' Motivation Among Students*





Further, the questionnaire examined the exposure to the English language and imitation of how native speakers of English pronounce the words. These aspects reflect Question 5, “Do you get exposed to English?” and Question 6, “Do you fear that your colleagues will mock you if you imitate a native speaker?” For question 5, 60.3% of English students and 65.2% of translation students claim that they get exposed to English through listening to music and watching movies in English (see Table 5). As for Question 6, students’ answers to the question clarify that about 47.5% of the students of English and 52.7% of the students of Translation claim that they do not fear if they get mocked by their colleagues if they imitate a native speaker when speaking English. (see Table 6 below).

**Table 5**

*Students’ Exposure to English Language in Movies and Music*

Question 5	Yes	No	Sometimes	Not sure
English students	60.30%	3.90%	26.70%	0%
Translation students	65.20%	4.30%	30.40%	0%

**Table 6**

*Students’ Fear of Using a Native-Like Pronunciation in the Classroom*

Question 6	Yes	No	Sometimes	Not sure
English students	17.80%	47.50%	26.70%	7.90%
Translation students	8.60%	52.10%	34.70%	4.30%

Other questions explored whether students check the pronunciation of the words they learn. This aspect reflects Question 7 “When you learn new words, do you check the correct pronunciation of those words?” 55.4% and 47.8% of English students and the students of translation, respectively, check the pronunciation of English words they learn. 35.6% of English students and 43.4% of translation students claim they sometimes examine the pronunciation of the words they learn (see Table 7 below). Question 8 explored the significance of pronunciation perceived by the students through the following question: Do you think that English pronunciation proficiencies are significant for your career? Table 8 shows that 97% of English students and 95% of translation students believe that English language pronunciation proficiencies are essential for their future careers.

**Table 7**

*Students’ Examination to Make Certain That Words They Learn Are Correctly Pronounced*

Question 7	Yes	No	Sometimes	Not sure
English students	55.40%	5.90%	35.60%	2.90%
Translation students	47.80%	8.60%	43.40%	0%

**Table 8**

*The Importance of English Pronunciation Proficiencies in the Students’ Career*

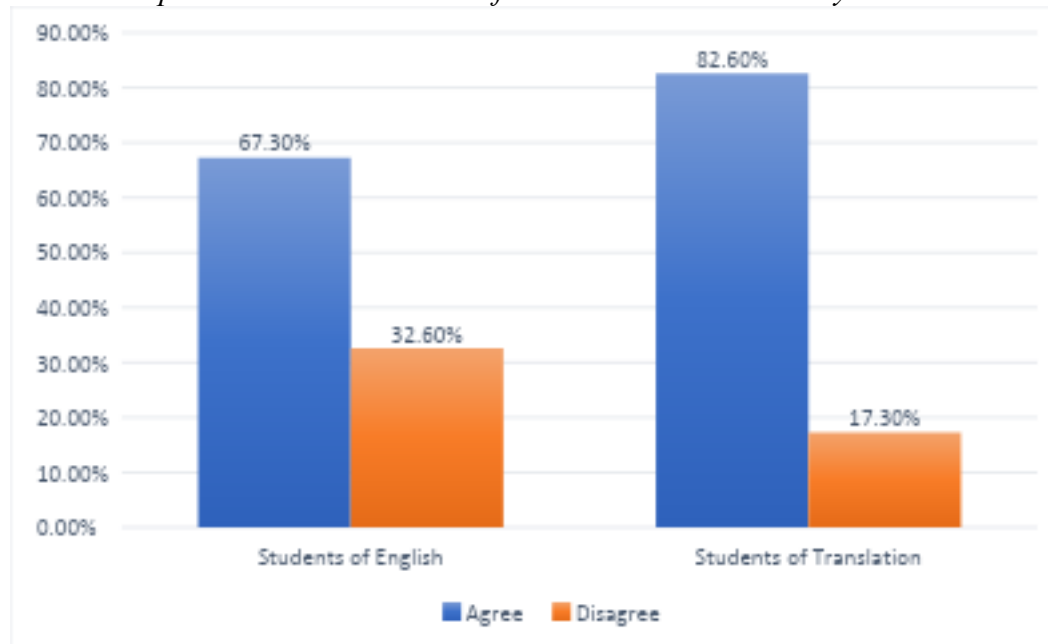
Question 8	Yes	No	Sometimes	Not sure
English students	97%	0%	1.90%	0.90%
Translation students	95.60%	0%	0%	4.30%

The last two questions reflected the students' influence by the pronunciation of the secondary school teachers and the reasons they considered behind their pronunciation difficulty. Question 9 included: Do you agree with the statement: “I have been taught by less qualified teachers in the middle and secondary schools who have pronunciation problems”. Figure 2

shows that about 67.3% of the English students and 82.6% of the translation students agree with the statement (see Figure 2 below).

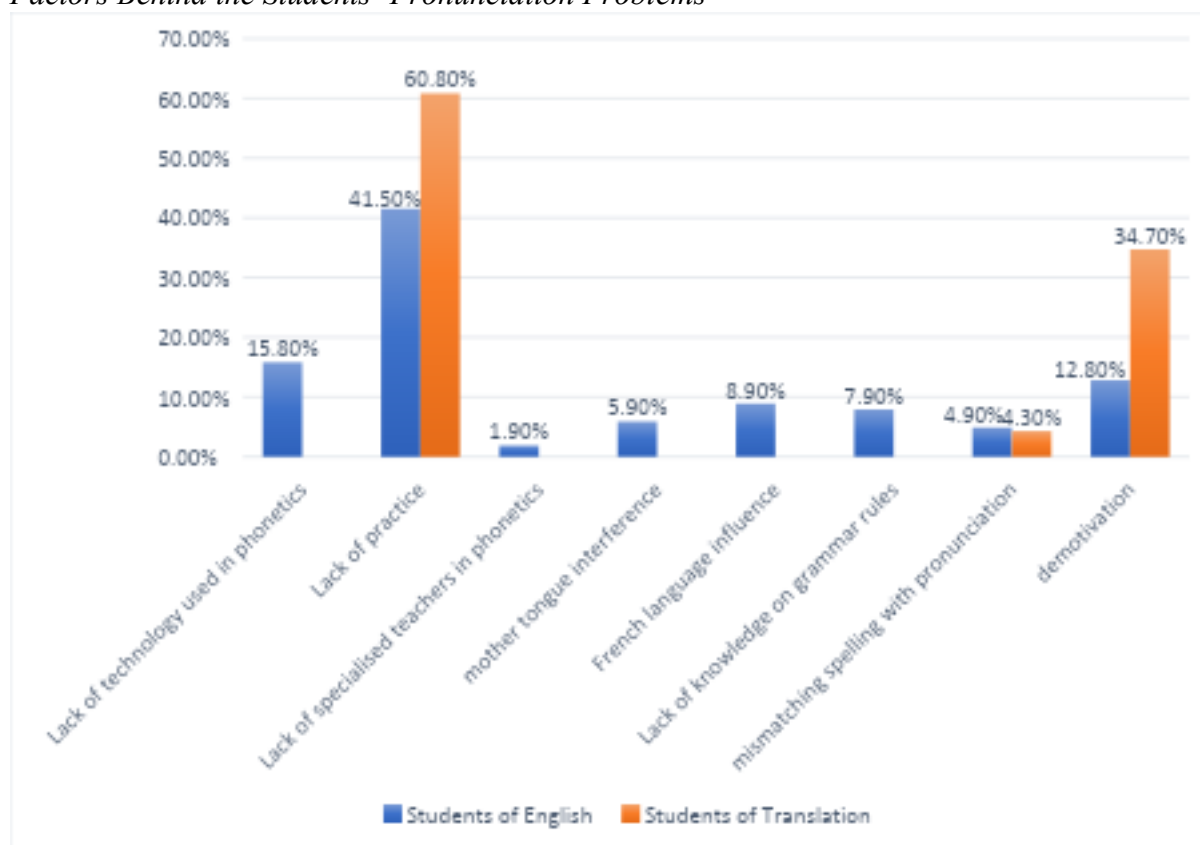
**Figure 2**

*Students' Opinion on Their Teacher of the Middle and Secondary Schools' Pronunciation*



Question 10 mentioned: What are the problems you are facing in improving your pronunciation? Figure 3 shows the reasons behind the pronunciation problems among the students. English students clarified that lack of practice (41.5%), lack of technology used in phonetics by the teachers (15.8%) and demotivation (12.8%) were among the reasons that influenced their pronunciation proficiencies. Meanwhile, the students of translation claimed that lack of practice (60.8%), demotivation (34.7%) and mismatching spelling with pronunciation (4.3%) were the factors behind their pronunciation difficulties (see Figure 3 below).

**Figure 3**  
*Factors Behind the Students' Pronunciation Problems*



### Results of the Pronunciation Test

The pronunciation test includes all the students who answered the questionnaire. The results are shown in tables to examine the correct and incorrect pronunciation of selected words with considerable pronunciation errors. The incorrect pronunciation section of each table shows the most common errors pronounced by English language and translation students.

Table 9. shows the words with silent sounds. The students failed to pronounce most of the words, such as pseudo, tomb, womb, limb, and hymn, except for “knock”, as 71 (70.2%) students of English and 7 (36.8%) students of translation succeeded to identify the silent /k/ in the word (see Table 9). Apart from “knock”, the students pronounced all the sounds in each word without recognising the silent sounds in the words (see Table 9).

**Table 9***The Pronunciation of the Words With Silent Sounds*

Words	Correct pronunciation	English students	Translation students	Incorrect pronunciation	English students	Translation students
Fasten	/fɑ:sən/	11	0	/fæsten/	90	19
Hymn	/hɪm/	4	0	/hɪmn/	97	19
Knock	/nɒk/	71	12	/knɒk/	30	7
Limb	/lɪm/	3	0	/lɪmb/	98	19
Moisten	/mɔɪ.sən/	10	0	/mɔɪstən/	91	19
Plumber	/plʌm.ər/	3	0	/plɪmbər/	98	19
Pseudo	/sju:.dəʊ/	3	0	/psɛɪdɒ/	98	19
Subtle	/sʌt.əl/	8	2	/sʌbtəl/	93	17
Tomb	/tu:m/	2	0	/tɒmb/	99	19
Womb	/wu:m/	0	0	/wɒmb/	101	19

While the students encountered difficulty in recognizing the silent sounds in the words mentioned, the pronunciation of consonant sounds also revealed that students made errors in pronouncing t, ɪ, z, s, ʒ, tʃ, θ, ð, and k in the words shown in Table 10 below. For example, [θ] and [k] were pronounced as [t] and [tʃ] in “thumb”, “alchemy”, and “anchor”. The students also made errors in pronouncing [k] in “archives” and “toothache” and [tʃ] in “chips” and “chew”. Both sounds were pronounced as [ʃ] in the words. Further, the students pronounced [ɪ] as [n] in “anchor”, “tongue” and “young”.

The Table also includes errors in pronouncing [t] and [ð]. The students pronounced [t] in “Thames” and “Thailand” and [ð] in “soothe” and “bathe” as [θ]. In terms of the pronunciation of s, z and ʒ, the students failed to recognise those sounds in “Oasis”, “Closet”, “Leisure”, and “Sabotage”. The students were confused between [s] and [z] in “Oasis” and “Closet” (see Table 10). Meanwhile, students pronounced [s] in “Leisure” as [z] and [ʒ] in “Sabotage” as [dʒ].

**Table 10***The Pronunciation of Consonant Sounds*

Words	Correct pronunciation	English students	Translation students	Incorrect pronunciation	English students	Translation students
Alchemy	/æɪ.kə.mi/	43	4	/æɪ. tʃə.mi/	58	15
Anchor	/æŋ.kər/	34	0	/æntʃər/	67	19
Archives	/ɑː.kɑɪv	5	0	/æɪfɪ:v/	96	19
Bathe	/beɪð/	1	0	/beɪθ/	100	19
Chew	/tʃu:/	7	1	/ʃəʊ/	94	18
Chips	/tʃɪps/	72	7	/ʃɪps/	29	12
Closet	/kləʊz.ɪt/	16	0	/kləʊst/	84	19
Join	/dʒɔɪn/	94	17	/ʒɔɪn/	7	2
Leisure	/leɪz.ər/	21	2	/lɪzər/	81	17
Oasis	/əʊ ɛɪ.sɪs/	7	0	/aʊzɪs/	91	19
Sabotage	/sæb.ə.tɑːʒ/	9	0	/sæbuːteɪdʒ/	92	19
Soothe	/suːð/	5	0	/suːθ/	96	19
Thailand	/taɪ.lænd/	63	14	/θaɪlænd/	38	5
Thames	/temz/	18	1	/θeɪmz/	83	18
Tongue	/tʌŋ/	0	0	/tɒŋg/	101	19
Toothache	/tuːθ.eɪk/	28	0	/tuːtæʃ/	73	19
Thumb	/θʌm/	4	0	/tʌmb/	97	19
Young	/jʌŋ/	0	3	/jɒŋg/	101	16

Table 11 also shows that the English language and translation students faced difficulties in recognising the pronunciation of vowel sounds and articulating them. Table 11 highlights the errors found in the pronunciation test of the monophthongs, diphthongs, triphthongs, and long and short vowels. For example, the students pronounced [ʌ] and [u:] in “above” and “chew” as [əʊ]. The students also pronounced [ʌ] as [ɒ] in “Tongue” and “Young”. Further, the diphthongs were pronounced as monophthongs in “cure”, “lure”, “open”, and “sofa”. The diphthongs [ʊə] in “cure” and “lure”, and [əʊ] in “open” and “sofa” were pronounced as [u:]. In addition, [ɪə] in “clear” was pronounced as [i:], and [eə] in “stair” was pronounced as [æ]. Also, the students could not identify the shwa vowel, [ə], in “doctor” and “upon”.

Although most of the students did not face difficulty in pronouncing the triphthongs [ɔɪə], [aʊə], [aɪə] in “loyal”, “hour”, “fire”, many students did not pronounce the triphthongs [eɪə] and [əʊə] correctly in “lower” and “layer”. The students pronounced [eɪə] and [əʊə] in “lower” and “layer” as [aʊə] and [aɪə].

In terms of the short and long vowels, the students could not identify long vowels in “leave”, “law”, “door”, “car”, and “laugh”. The students pronounced [i:] as [ɪ] in “leave”, [ɔ:] as [ɒ] in “Law” and “door”, and [a:] as [æ] in “car” and “laugh”.

**Table 11***The Pronunciation of Vowels*

Words	Correct pronunciation	English students	Translation students	Incorrect pronunciation	English students	Translation students
Above	/əbʌv/	3	1	/əbəʊv/	98	18
Car	/kɑ:r /	0	0	/kær/	101	19
chew	/tʃu:/	7	1	/fəʊ/	94	18
confirm	/kən'fɜ:m/	15	1	/kɒnfirm/	86	18
cure	/kjʊər/	0	0	/kju:r/	101	19
Classroom	/klɑ:s.rʊm/	101	19	/	0	0
Clear	/kliər/	36	2	/kli:r/	65	17
Crowd	/kraʊd/	84	11	/krəʊd/	16	8
David	/deɪ.vɪd/	90	17	/dævɪd/	11	2
Doctor	/dɒk.tər/	3	5	/dɒktər/	98	14
Door	/dɔ:r/	38	5	/dɒr/	63	14
Doubt	/daʊt/	5	0	/dɒbt/	96	19
Draught	/dra:ft/	6	0	/draʊt/	95	19
Father	/fɑ:.ðər/	29	11	/fæðər/	72	8
Feather	/feð.ər/	16	0	/fi:ðər/	85	19
Fire	/faɪər/	91	15	/fɪr/	10	4
Found	/faʊnd/	89	18	/fɒnd/	12	1
Fragile	/frædʒ.aɪl/	2	0	/fræʒɪl/	99	19
George	/dʒɔ:dʒ/	33	6	/dʒɪɒrdʒ/	68	13
Hour	/aʊər/	92	14	/həʊər/	9	5
Join	/dʒɔɪn/	94	17	/ʒɔɪn/	7	2
Laugh	/lɑ:f/	16	1	/læf/	85	18
Law	/lɔ:/	9	2	/laʊ/-/lɒ/	92	17
Layer	/leɪ.ər/	53	0	/laɪər/	48	19

Leave	/li:v/	53	7	/lɪv/	48	12
Lower	/ləʊ.ər/	61	7	/laʊər/	40	12
Loyal	/ləɪ.əl/	99	17	/lə:jə/	2	2
Lure	/lʊər/	0	0	/lu:r/	101	19
Nuclear	/nju:.klɪər/	8	0	/nyklɪər/	93	19
Open	/əʊ.pən/	38	3	/u:pen/	63	16
Sofa	/səʊ.fə/	10	4	/sɒfæ/	91	15
Speck	/spek/	26	0	/spɪk/	75	19
Stairs	/steər/	57	9	/stær/	43	10
Tongue	/tʌŋ/	0	0	/tɒŋg/	101	19
Upon	/əpən/	18	1	/ju:pen/- /æpen/	83	18
Young	/jʌŋ/	0	3	/jɒŋg/	101	16

## Discussion

As seen, the students of the first-year English Language and the students of translation encountered difficulties in recognising the correct sounds in the words given to them in the pronunciation test. The students could not pronounce accurately the consonant sounds (t, ɲ, z, s, ʒ, tʃ, θ, ð, k), and vowel sounds. The students found difficulty in pronouncing the monophthongs (ʌ, u: and ə), long vowels (a:, ɔ: and i:), diphthongs (ʊə, əʊ, ɪə, eə) and triphthongs (eɪə, əʊə). Several reasons led to these pronunciation errors, such as lack of practice, the interference of the mother tongue, the interference of the French Language and mismatching spelling and pronunciation. Let's explore each one of them separately.

### Lack of Practice

Although the students claim that they get exposed to the English language, they believe that the lack of speaking English influences their pronunciation proficiencies (see Figure 3 above). Similarly, from the semi-structured interviews, the teachers see that the student's lack of practice posed a major reason behind pronunciation difficulty among the students, as it would affect the knowledge about the pronunciation of English words. Thus, the lack of time to practice pronunciation is also a reason leading instructors not to pay enough attention to English pronunciation (Harmer, 2001).

### Interference of the Mother Tongue

Another reason behind the pronunciation difficulty among students is the interference of the mother tongue. According to AbdAlgane and Idris (2020), "When speaking the target language, learners tend to rely on their native language [1] structures to produce a response" (p 196). They added that the native language (L1) and the target language (L2) have significantly different structures that lead to high frequency of errors to occur in L2, therefore, indicating an interference of L1 on L2 (AbdAlgane & Idris, 2020). This aspect is

present in the pronunciation of “thumb”. The students replaced [θ] with [t]; this sound does not exist in the dialect of Mascara. The word “join” serves as another example, as a few students replaced the initial sound [dʒ] with [ʒ] and pronounced the word as /ʒɔɪn/, as [dʒ] does not exist in their dialect. Thus, the use of a different sound corresponding to English sounds will contribute to performing a foreign accent (O’Connor, 1998).

### **Interference of the French Language**

The interference of the French Language appeared significantly in several words pronounced by the students in the pronunciation test. Perhaps the words “nuclear”, “fragile”, “chips”, and “archives” serve as examples of the interference of the French Language in the pronunciation of English among Algerian EFL learners. As such, “nuclear” /nju:.klɪər/ was pronounced as /nyklɪər/. The students replaced /ju:/ with /y/, a sound found in the French Language. Further, the students pronounced “fragile” /frædʒ.aɪl/ as /fræʒɪl/, as it is a borrowed word from French and not a native English word. The word “chips” /tʃɪps/ was pronounced as /ʃɪps/ and “archives” /ɑ:.kɑrvz/ as /ærʃɪ:v/. The students used French pronunciation for both words.

### **Mismatching Spelling With Pronunciation**

Spelling and pronunciation are two different aspects that represent an obstacle for EFL learners to pronounce English words correctly. According to O’Connor (1998), “In ordinary English spelling it is not always easy to know what sounds the letters stand for” (p. 7). The students confused between spelling and pronunciation during the pronunciation of the words with silent sounds, such as “fasten”, “plumber”, “hymn”, “subtle”, and “Moisten” (see Table 9 above). Also, students could not pronounce the consonant [k] in “toothache” and “Anchor” as they pronounced [k] as [ʃ] and [tʃ]. The former was pronounced as /tu:tæʃ/, and the latter as /æntʃər/. “Thames”, “leisure” and “bathe” represent other examples of students' mispronunciation of sounds, as they pronounced “Thames” as /θeɪmz/ instead of /temz/, and “leisure” /leʒ.ər/ as /lɪzər/, “bathe” /beɪð/ as /beɪθ/.

While the problem of mismatching spelling with pronunciation marked the pronunciation of consonant sounds among first-year EFL learners, vowels also reflected pronunciation errors among the students. For example, “sofa” /səʊ.fə/ was pronounced as /sɒfæ/, “George” /dʒɔ:dʒ/ as /dʒɔ:rdʒ/, “cure” /kjʊər/ as /kju:r/, “confirm” /kən fɜ:m/ as /kɒnfirm/, “layer” /ˈleɪ.ər/ as /laɪər/, “draught” /dra:ft/ as /draʊt/, and “tomb” /tu:m/ as /tɒmb/, “pseudo” /sju:.dəʊ/ pronounced as /psɛɪdɒ/, “spek” /spek/ as /spɪk/, and “lure” /lʊər/ as /lu:r/. The students attempt to pronounce every single letter in the word without considering that the spelt letters sound differently in the spoken form. According to AbdAlgene and Idris (2020), “Any time the student meets such words he will be confused to pronounce them correctly he just guesses the pronunciation by looking at the spelling of the word unless he has previous background” (p. 197).

### **Other Reasons**

Although the reasons mentioned above explain the pronunciation difficulty among the first-year EFL learners at the University of Mustapha Stambouli-Mascara, other reasons cited by the students in the questionnaire included being taught by less qualified teachers, demotivation and stress. The students of English and the students of translation agree that they were taught by less qualified teachers in middle and high school who themselves have



pronunciation problems (see Figure 2 above). Abdulwahid (2023) stated that, “The basic reason behind mispronunciation is caused by the teacher” (p. 27).

Students of the English language (12.80%) and translation students (34.70%) believe that demotivation is among the reasons for the pronunciation difficulties they face when learning the English language (See Figure 3 above). Demotivation can influence the student’s lack of practice and willingness to learn the English language pronunciation rules and check the pronunciation of words. Thus, students focus on grades and getting the certificate rather than improving their pronunciation. According to Abdulwahid (2023), “[Students] might not have self-esteem encourages them to develop their pronunciation since their main goal behind attending the university is to get a certificate” (p. 27).

Further, the students of English Language and translation students believe that they are sometimes stressed when speaking English in the classrooms in front of their colleagues and teachers. Students in large-scale classes experience noise and cannot get involved in the lessons. The teachers would not be able to listen to each student’s pronunciation errors and correct them.

### **Conclusion**

Overall, this research highlights the pronunciation difficulties among EFL learners at the University of Mustapha Stambouli- Mascara Algeria, exploring the pronunciation errors and factors behind those errors among first-year EFL learners, specifically among English language and translation students. The students made errors in consonants, vowels and silent sounds due to the lack of practice, interference with the mother tongue, interference with the French language, mismatching spelling with pronunciation, and lack of knowledge related to vocabulary and grammar. Other reasons for this include demotivation and large and noisy classrooms.

Further, for the students to avoid pronunciation errors and for the teachers to improve their teaching experience, this study recommends that lectures on phonetics could include small groups of students to enhance their motivation and engage each student in the learning process. Phonetics also should be taught in laboratories to allow the teachers to use technology, such as providing each student with headphones to listen carefully to the audio on word pronunciation. Moreover, although phonetics is a sub-discipline of linguistics, this study recommends that phonetics and linguistics should be thought of separately. The students need sufficient time to understand the articulation of sounds.

Finally, this study recommends that the students of translation need phonetics in their curriculum. Translation students learn languages such as Arabic, French, and English. It is a significant part of learning language skills, which includes speaking. Therefore, pronunciation proficiencies play a fundamental part in understanding and delivering the translated message in the field of interpretation.

## References

- AbdAlgane, M., & Idris, S. A. M. (2020). Challenges of pronunciation to EFL learners in spoken English. *Multicultural education*, 6(5), 193–203.
- Abdulwahid, H. Y. (2023). Teaching and Learning Phonetics Obstacles in EFL Classrooms: Cihan University-Erbil. *Cihan University-Erbil Journal for Humanities and Social Sciences*, 7(1), 22–28. <https://doi.org/10.24086/cuejhss.v7n1y2023.pp22-28>
- Almusharraf, A. (2022). 'EFL learners' confidence, attitudes, and practice towards learning pronunciation'. *International Journal of Applied Linguistics*, 32(1), 126–141.
- Berrabah, A., & Benabed, A. (2021). Contact-induced phonological change of the phoneme /s/ in the speech of the EFL learners and teachers in Algeria: A case study. *International Journal of Linguistics, Literature and Translation*, 4(5), 136–143.
- British Council. (2023). The Future of English: Global Perspectives. <https://www.britishcouncil.org/future-of-english#:~:text=English%20is%20currently%20the%20most,and%20the%20forces%20driving%20them>
- Broughton, G., Brumfit, C., Flavell, R., Hill, P., & Pincas, A. (2003). *Teaching English as a Foreign Language*. (2<sup>nd</sup> ed.). Routledge.
- Cruttenden, A. (2014). *Gimson's Pronunciation of English*. (8<sup>th</sup> ed.). Routledge.
- Dost, E. N. (2017). Pronunciation problems of high school EFL students: An error analysis approach with pedagogical implications. *International Journal of English Research*, 3(4), 77–82.
- Forel, C. A., & Puskas, G. (2005). *Phonetics and phonology: Reader for first year English linguistics*. University of Geneva.
- Galletta, A. (2013). *Mastering the semi-structured interviews and beyond: From research design to analysis and publication*. New York University Press.
- Ghounane, N. (2018). Difficulties encountered for teaching pronunciation for EFL learners. *El Ansina Journal for Research and Studies*, 9(1), 426–439.
- Harmer, J. (2001). *The practice of English language teaching*. (3<sup>rd</sup> ed.). Longman.
- Jahara, S. F., & Abdelrady, A. H. (2021). Pronunciation problems encountered by EFL learners: An emperial study. *Arab World English Journal*, 12(4), 194–212.
- Mikanowski, J. (2018, July 27). Behemoth, bully, thief: how the English language is taking over the planet. *The Guardian*. <https://www.theguardian.com/news/2018/jul/27/english-language-global-dominance>
- Naser, I. M. M., & Hamzah, M. H. B. (2018). Pronunciation and conversation challenges among Saudi EFL students. *Journal of English Educators society*, 3(1), pp 85–104.

- O'Connor, J. D. (1998). *Better English Pronunciation*. (2<sup>nd</sup> ed.). Cambridge University Press.
- Roach, P. (2009). *English phonetics and phonology: paperback with audio CDs (2) a practical course*. Cambridge University Press.
- Rouaba, A. (2022, July 31). Algerian leader in bold move to promote English at junior school. *BBC*. <https://www.bbc.com/news/world-africa-62368931>
- Yakout, K., & Amel, M. H. (2019). The EFL learners' fossilization of the /θ/ and /ð/ sounds. Case study: First year EFL students at Tahri Mohamed University, Bachar, Algeria. *International Journal of Linguistics, Literature, and Translation (IJLLT)*, 4(2), 219–228.

**Contact email:** asmaa.kaddourtrea@univ-mascara.dz



## **Tactile Processing and Fine Motor Skills in Developmental Coordination Disorder and Autism Spectrum Disorders**

Bartosz Bagrowski, Poznan University of Medical Sciences, Poland

Bartosz Grobelny, Poznan University of Medical Sciences, Poland

Ewa Mojs, Poznan University of Medical Sciences, Poland

The Paris Conference on Education 2025

Official Conference Proceedings

### **Abstract**

Developmental Coordination Disorder (DCD) is a psychomotor development disorder, which is associated with motor clumsiness, lack of fluidity of movement, muscle tension disorders, and sometimes involuntary movements. Autism Spectrum Disorder (ASD), in turn, is a neurodevelopmental disorder, which is associated with difficulties in social interactions, communication dysfunctions and repetitive or limited behaviours. In ASD, however, more and more attention is paid to sensorimotor aspects of development. Therefore, it seems justified to examine the level of tactile processing and fine motor skills in the group of children with ASD. The study included those functions that were defined by International Classification of Functioning, Disability and Health (ICF). The study involved 8 early school children (4 children with ASD and 4 children with DCD), aged 6-7, who were examined in terms of general manual motor skills (ICF: d440), sequencing praxis of hands (ICF: b176), tactile-protopathic processing (ICF: b265) and tactile-epicritic processing (ICF: b1564), using DCDQ (Developmental Coordination Disorder Questionnaire) and SIPT (Sensory Integration and Praxis Tests). It has been shown that children with ASD achieve significantly worse results in the general manual motor skills, sequencing praxis of hands and tactile-epicritic processing than the DCD group. Although DCD is a dysfunction directly related to motor coordination (also fine motor), ASD is associated with even lower results in the fine motor domains. This indicates a clear need to implement hand therapy in groups of children with ASD, in addition to traditional interventions.

*Keywords:* ASD, DCD, dyspraxia, ICF, manual motor skills, sequencing praxis, tactile processing

**iafor**

The International Academic Forum

[www.iafor.org](http://www.iafor.org)

## Introduction

Developmental Coordination Disorder (DCD), also known as developmental dyspraxia, is a disorder of psychomotor development associated with a dysfunction of the nervous system, but without signs of its damage. The main symptoms of DCD include: clumsiness of movement (problems with coordination and dysfunction of motor planning), lack of fluidity of movement, muscle tone disorders, balance disorders, concentration disorders, and sometimes involuntary movements (Bagrowski, 2024a; Bagrowski & Olesińska, 2022; Kułakowska et al., 2012). In the search for neural correlates of DCD symptoms, attention is most often paid to the prefrontal area (related to attention and working memory, among other things), the parietal area (related to somatognosia, among other things), and the cerebellum (the center of motor coordination) (Biotteau et al., 2020), but the exact causes of DCD have not been fully understood, because neuroimaging studies are ambiguous (Farmer et al., 2017).

According to Jean Ayres, creator of the Sensory Integration therapeutic method, the cause of developmental dyspraxia may be disorders of integrative sensory processes (especially tactile and proprioceptive) in subcortical structures, which are necessary for the proper course of praxis. Among the functional difficulties during the child's development, noticeable symptoms of dyspraxia may include stumbling, difficulties in buttoning, using cutlery, and graphomotor activities. In a broader sense, developmental dyspraxia may manifest itself in the form of: inability to perform movement despite its careful planning; lack of precision of movement; problems in switching from one activity to another; difficulties in performing a sequence of activities; problems in imitating movements; inability to combine movements into a whole; inadequacy of movements; inappropriate use of articulation organs; problems in dressing; difficulties in holding objects; lack of creativity in play; problems in following instructions; difficulties in rhythmization (Pąchalska, 2012; Podemski, 2011).

Due to the multifaceted nature of the symptoms of developmental dyspraxia, it is indexed both in the International Classification of Diseases (In the ICD-11 classification, Developmental Coordination Disorder is defined as difficulties in acquiring gross and fine motor skills, as well as problems in performing coordinated motor activities, manifested by clumsiness, slowness and imprecision of movements) and in the Classification of Mental Disorders of the American Psychiatric Association (In the DSM-5 classification, Developmental Dyspraxia is defined as difficulties in motor coordination, motor learning, speed and accuracy of movements, which significantly and permanently interferes with daily life activities and affects productivity in learning, other activities, leisure and play). Depending on the diagnostic criteria, the occurrence of DCD is estimated at 1.8% to even 9% (Biotteau et al., 2020; Cairney et al., 2005), while among school-age children it is 5–6% (Harris et al., 2015; Zwicker et al., 2012).

Another group of disorders that concern dysfunctions of the nervous system during the developmental period are Autism Spectrum Disorders (ASD), which are characterized by a set of symptoms related to repetitive behaviors and restricted interests, dysfunctions in communication and social interactions (Lord et al., 2020). The main symptoms of ASD include: difficulties in symbolic play and imitation, a problem with sharing the field of attention with another person, difficulties in realizing emotional empathy, rigidity in thinking, failure to understand the soft rules of the social world, and failure to perceive the face as a communicator of emotional states (Bagrowski, 2024b).

Due to the multifaceted nature of the symptoms of neurodevelopmental disorders on the autism spectrum, they are indexed both in the International Classification of Diseases (ICD-11 focuses on two areas of symptoms: the level of intellectual development and the level of functional language development) and in the Classification of Mental Disorders of the American Psychiatric Association (DSM-5 focuses on two main groups of ASD symptoms: deficits in social communication and social interactions, and restricted and repetitive patterns of behavior, interests and activities). The incidence of ASD is estimated at 0.76% to 2.5% (Baxter et al., 2015; Kogan et al., 2018), while among early school-age children it is about 1.68% (Baio et al., 2018; Palinkas et al., 2019).

Although the characteristics of ASD mainly focus on emotional and social difficulties, it is increasingly emphasized that they may also be accompanied by sensorimotor symptoms (Levy et al., 2010; Soke et al., 2018). This is due to the fact that in ASD, not only are abnormalities in opioid metabolism, reduced oxytocin levels, or disorders of the serotonergic system, which affect the aforementioned emotional and social functioning, but also dysfunctions of the dopaminergic system (related to, among others, motor control), a reduction in the number of Purkinje cells in the cerebellum (which may translate into coordination difficulties or fine motor disorders), and dysfunctions in the cerebellum-cortex-subcortical structures connectivity, which may translate into difficulties in planning and execution (Jiang et al., 2022; John & Jaeggi, 2021; Lord et al., 2020; Marotta et al., 2020; Martin et al., 2024). In light of the aforementioned studies, it seems reasonable to examine the sensorimotor aspects of fine motor skills among children with ASD.

## Method

The study was conducted in a group of early school children with the DCD or ASD. The study was approved by the Bioethics Committee of the Poznan University of Medical Sciences (Resolution No. 847/22 of November 03, 2022) with later changes (accepted by Resolution No. 214/24 of March 07, 2024), and participation in the study was voluntary – parents or legal guardians gave their consent to the child's participation. The inclusion criteria were: diagnosed Autism Spectrum Disorder or occurrence of symptoms of Developmental Coordination Disorder. The study group consisted of 8 participants (M = 5; F = 3), aged 6 to 7 years (M = 6.37; SD = 0.52; CV = 8,12%). Participants were divided into two groups depending on basic clinical problem: the DCD group consisted of 4 children (M = 2; F = 2) and the ASD group consisted of 4 children (M = 3; F = 1).

The study examined functions related to fine motor skills and sensory skills in the hands using the following research tools: Developmental Coordination Disorder Questionnaire – DCDQ (Wilson et al., 2000) and Sensory Integration and Praxis Tests – SIPT (Ayres, 1989). The study included those functions that were defined by the International Classification of Functioning, Disability and Health (ICF) and could be tested by DCDQ or SIPT. The following functions were examined: general manual motor skills (ICF: d440), sequencing praxis of hands (ICF: b176), tactile-protopathic processing (ICF: b265) and tactile-epicritic processing (ICF: b1564).

General manual motor skills (ICF: d440) were examined using the dexterity section of the DCDQ and were interpreted according to the interpretation key. The remaining functional indicators were examined using the SIPT battery. Sequencing praxis of hands (ICF: b176) was examined using the Sequencing Praxis test, which involves imitating a specific sequence of hand movements. Tactile-protopathic processing (ICF: b265) was examined using the

Localization of Tactile Stimuli test, which involves assessing the location of touch on the upper limb. Tactile-epicritic processing (ICF: b1564) was examined using the Manual Form Perception test, which involves recognizing shapes solely by touch (Ayres, 1989; Wilson et al., 2000). In each of the scales, specific numerical values correspond to specific functional criteria. In tests DCDQ, Sequencing Praxis and Manual Form Perception the higher scores mean better level of functioning in the mentioned domain. In the Localization of Tactile Stimuli test the higher the score, the higher the level of dysfunction of tactile-protopathic processing.

To compare functional levels between DCD and ASD groups and to perform the statistical analysis, the PQStat software (version 1.8.6.122) was used. The Shapiro-Wilk test was used to test the normality of the distribution of variables in individual groups. The Mann-Whitney U-test or the Student's t-test for the comparison of the groups in terms of scores, due to the parametricity of the type of distribution. The significance was determined based on the verified p value of 0.05.

## Results

The results of functional tests were compared between groups. Tables 1 to 4 present the comparison of the DCD and ASD groups in terms of functional status within the tested sensorimotor domains.

**Table 1**

*Summary of Data Obtained as a Result of Measurements of the Manual Motor Skills in the ASD and DCD Groups*

<b>Manual motor skills (ICF: d440)</b>		
<b>Group</b>	<b>ASD</b>	<b>DCD</b>
<b>Min</b>	7	12
<b>Max</b>	8	15
<b>Me</b>	7.50	13.50
<b>IQR</b>	1.00	1.50
<b>Shapiro–Wilk</b>	p = 0.024	p = 0.972
<b>Mann-Whitney U-test</b>	<b>p = 0.028</b>	

*Note.* The Higher the Score, the Better the Level of Functioning in the Mentioned Domain. The Table Presents the Values of the Level of the Manual Motor Skills in a Given Group and the Results of the Mann-Whitney U-test for the Purpose of Comparing the Score Between the Groups.



**Table 2**

*Summary of Data Obtained as a Result of Measurements of the Sequencing Praxis of Hands in the ASD and DCD Groups*

<b>Sequencing praxis of hands (ICF: b176)</b>		
<b>Group</b>	<b>ASD</b>	<b>DCD</b>
<b>Min</b>	6	48
<b>Max</b>	45	53
<b>Me</b>	42.00	51.50
<b>IQR</b>	12.75	3.50
<b>Shapiro–Wilk</b>	p = 0.001	p = 0.272
<b>Mann-Whitney U-test</b>	<b>p = 0.029</b>	

*Note.* The Higher the Score, the Better the Level of Functioning in the Mentioned Domain. The Table Presents the Values of the Level of the Sequencing Praxis of Hands in a Given Group and the Results of the Mann-Whitney U-test for the Purpose of Comparing the Score Between the Groups.

**Table 3**

*Summary of Data Obtained as a Result of Measurements of the Tactile-Protopathic Processing in the ASD and DCD Groups*

<b>Tactile-protopathic processing (ICF: b265)</b>		
<b>Group</b>	<b>ASD</b>	<b>DCD</b>
<b>Min</b>	6.10	9.50
<b>Max</b>	18.50	17.50
<b>M</b>	14.33	13.23
<b>SD</b>	5.68	3.58
<b>Shapiro–Wilk</b>	p = 0.169	p = 0.792
<b>Student's t-test</b>	<b>p = 0.735</b>	

*Note.* The Higher the Score, the Higher the Level of Disfunction in the Mentioned Domain. The Table Presents the Values of the Level of the Tactile-Protopathic Processing Disfunction in a Given Group and the Results of the Student's T-test for the Purpose of Comparing the Score Between the Groups.

**Table 4**

*Summary of Data Obtained as a Result of Measurements of the Tactile-Epicritic Processing in the ASD and DCD Groups*

<b>Tactile-epicritic processing (ICF: b1564)</b>		
<b>Group</b>	<b>ASD</b>	<b>DCD</b>
<b>Min</b>	7	8
<b>Max</b>	8	10
<b>M</b>	7.25	8.75
<b>SD</b>	0.50	0.96
<b>Shapiro–Wilk</b>	p = 0.336	p = 0.676
<b>Student's t-test</b>	<b>p = 0.032</b>	

*Note.* The Higher the Score, the Better the Level of Functioning in the Mentioned Domain. The Table Presents the Values of the Level of the Tactile-Epicritic Processing in a Given Group and the Results of the Student's T-test for the Purpose of Comparing the Score Between the Groups.

It has been shown that children with ASD achieve significantly worse results in the general manual motor skills, sequencing praxis of hands and tactile-epicritic processing than the DCD group. There was no statistically significant difference between groups in terms of tactile-protopathic processing.

## Discussion

The presented study demonstrated that children with ASD achieved significantly lower scores in generalized fine motor skills than children with DCD. Functional tests also indicated that children with ASD had poorer hand movement sequence recall in the Sequencing Praxis test and poorer shape recognition by touch in the Manual Form Perception test. Although Autism Spectrum Disorders are not directly associated with motor dysfunctions or characterized as such, this study clearly indicates that motor impairments constitute another challenge faced by children with ASD. This study is not unique in these findings, as other authors also emphasize the need to consider motor aspects in the diagnosis and treatment of children with ASD (Miller et al., 2023).

It has been shown, among other things, that grip development is atypical in individuals with ASD, as its efficiency deteriorates during adolescence. Grip strength, in turn, is clearly correlated with adaptive daily living skills (Travers et al., 2017). Another study showed that children with ASD exhibited a marked deficit in gesture production and movement imitation (Kilroy et al., 2022), which is consistent with the results obtained in the field of sequencing praxis of hands. Other authors noted that children and adolescents with ASD made significantly more errors in motor tasks involving praxis (De Marchena et al., 2023).

## Conclusion

Although DCD is a dysfunction directly related to motor coordination (also fine motor), ASD is associated with even lower results in the fine motor domains. This indicates a clear need to implement motor interventions – especially hand therapy – in groups of children with ASD, in addition to traditional interventions, such as behavioural, pedagogical and psychological interventions. A better understanding of the functioning of children with ASD – including motor functioning – will allow for more effective planning of preventive and therapeutic programs.

## Acknowledgements

The study was financed from the large research grant from statutory funding for young researchers – doctoral students for 2023-2025 in Poznan University of Medical Sciences (Funding no SDUM-DGB 02/04/23).

## References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5<sup>th</sup> ed.)*.
- Ayres, A. J. (1989). *Sensory Integration and Praxis Tests (updated ed.) (SIPT) Manual*. Western Psychological Services.
- Bagrowski, B. (2024a). Dyspraksja rozwojowa w ujęciu teoretycznym oraz diagnostyczno-terapeutycznym [Developmental Dyspraxia in Theoretical, Diagnostic And Therapeutic Terms]. *Integracja Sensoryczna*, 2, 5–8.
- Bagrowski, B. (2024b). Neuropsychologia i neuropsychiatria zaburzeń ze spektrum autyzmu [Neuropsychology And Neuropsychiatry of Autism Spectrum Disorders]. *Integracja Sensoryczna*, 3, 10–20.
- Bagrowski, B., & Olesińska, M. T. (2022). Specjalistyczne metody fizjoterapii wspierające rozwój psychomotoryczny dziecka [Specialized Physiotherapy Methods Supporting the Child's Psychomotor Development]. *Standardy Medyczne/ Pediatria*, 19, 500–506.
- Baio, J., Wiggins, L., Christensen, D. L., Maenner, M. J., Daniels, J., Warren, Z., Kurzius-Spencer, M., Zahorodny, W., Robinson Rosenberg, C., White, T., Durkin, M. S., Imm, P., Nikolaou, L., Yeargin-Allsopp, M., Lee, L. C., Harrington, R., Lopez, M., Fitzgerald, R. T., Hewitt, A., Pettygrove, S., Constantino, J. N., Vehorn, A., Shenouda, J., Hall-Lande, J., Van Naarden Braun, K., Dowling, N. F. (2018). Prevalence of Autism Spectrum Disorder among Children Aged 8 Years – Autism And Developmental Disabilities Monitoring Network, 11 Sites, United States, 2014. *Morbidity and Mortality Weekly Report. Surveillance Summaries*, 67(6), 1–23. <https://doi.org/10.15585/mmwr.ss6706a1>
- Baxter, A. J., Brugha, T. S., Erskine, H. E., Scheurer, R. W., Vos, T., & Scott, J. G. (2015). The Epidemiology And Global Burden of Autism Spectrum Disorders. *Psychological Medicine*, 45(3), 601–613.
- Biotteau, M., Albaret, J. M., & Chaix, Y. (2020). Developmental Coordination Disorder. *Handbook of Clinical Neurology*, 174, 3–20.
- Cairney, J., Hay, J. A., Fought, B. E., & Hawers, R. (2005). Developmental Coordination Disorder and Overweight and Obesity in Children Aged 9–14 y. *International Journal of Obesity*, 29(4), 369–372.
- De Marchena, A., Zampella, C. J., Dravis, Z., Pandey, J., Mostofsky, S., & Schultz, R. T. (2023). Measuring Dyspraxia in Autism Using A Five-minute Praxis Exam. *Research in Autism Spectrum Disorders*, 106, 102200.
- Farmer, M., Echenne, B., Drouin, R., & Bentourkia, M. (2017). Insights in Developmental Coordination Disorder. *Current Pediatric Reviews*, 13(2), 111–119.

- Harris, S. R., Mickelson, E. C. R., & Zwicker, J. G. (2015). Diagnosis and Management of Developmental Coordination Disorder. *Canadian Medical Association Journal*, 187(9), 659–665.
- Jiang, C. C., Lin, L. S., Long, S., Ke, X. Y., Fukunaga, K., Lu, Y. M., & Han, F. (2022). Signalling Pathways in Autism Spectrum Disorder: Mechanisms and Therapeutic Implications. *Signal Transduction and Targeted Therapy*, 7, 229.
- John, S., Jaeggi, A.V. (2021). Oxytocin Levels Tend to be Lower in Autistic Children: A Meta-Analysis of 31 Studies. *Autism*, 25(8), 2152–2161.
- Kilroy, E., Ring, P., Hossain, A., Nalbach, A., Butera, C., Harrison, L., Jayachankar, A., Vigen, C., Aziz-Zadeh, L., & Cermak, S. A. (2022). Motor Performance, Praxis, And Social Skills in Autism Spectrum Disorder And Developmental Coordination Disorder. *Autism Research*, 25(9), 1649–1664.
- Kogan, M. D., Vladutiu, C. J., Schieve, L. A., Ghandour, R. M., Blumberg, S. J., Zablotsky, B., Perrin, J. M., Shattuck, P., Kuhlthau, K. A., Harwood, R. L., & Lu, M. C. (2018). The Prevalence of Parent-Reported Autism Spectrum Disorder among US Children. *Pediatrics*, 142(6), e20174161.
- Kuřakowska, Z., Borkowska, M., & Zychowicz, B. (2012). *Terapia psychomotoryczna dzieci metodą Procus i Block [Psychomotor Therapy for Children Using the Procus and Block Method]*. PZWL.
- Levy, S. E., Giarelli, E., Lee, L. C., Schieve, L. A., Kirby, R. S., Cuniff, C., Nicholas, J., Reaven, J., & Rice, C. E. (2010). Autism Spectrum Disorder and co-occurring developmental, psychiatric, and medical conditions among children in multiple populations of the United States. *Journal of Developmental and Behavioral Pediatrics*, 31(4), 267–275.
- Lord, C., Brugha, T. S., Charman, T., Cusack, J., Dumas, G., Frazier, T., Jones, E. J. H., Jones, R. M., Pickles, A., State, M. W., Lounds Taylor, J., & Veenstra van der Weele, J. (2020). Autism Spectrum Disorder. *Nature Reviews Disease Primers*, 6, 5.
- Marotta, R., Risoleo, M. C., Messina, G., Parisi, L., Carotenuto, M., Vetri, L., & Roccella, M. (2020). The Neurochemistry of Autism. *Brain Sciences*, 10(3), 163.
- Martin, H., Choi, J. E., Rodrigues, A. R., & Eshel, N. (2024). Review: Dopamine, Serotonin, and the Translational Neuroscience of Aggression in Autism Spectrum Disorder. *JAACAP Open*, 1, 10.
- Miller, H. L., Licari, M. K., Bhat, A., Aziz-Zadeh, L. S., Van Damme, T., Fears, N. E., Cermak, S. A., & Tamplain, P. M. (2023). Motor Problems in Autism: Co-occurrence of Feature? *Developmental Medicine & Child Neurology*, 66(1), 16–22.
- Pachalska, M. (2012). *Neuropsychologia kliniczna, Urazy mózgu t. 1 [Clinical Neuropsychology, Brain Injuries, Vol. 1]*. PWN.

- Palinkas, L. A., Mendon, S. J., & Hamilton, A. B. (2019). Innovations in Mixed Methods Evaluations. *Annual Review of Public Health*, 40, 423–442.
- Podemski, R. (2011). *Kompendium neurologii [Compendium of Neurology]*. Via–Medica.
- Soke, G. N., Maenner, M. J., Christensen, D., Kurzius–Spencer, M., Schieve, L. A. (2018). Prevalence of co–occurring medical and behavioral conditions/symptoms among 4– and 8–year–old children with Autism Spectrum Disorder in selected areas of the United States in 2010. *Journal of Autism and Developmental Disorders*, 48(8), 2663–2676.
- Travers, B. G., Bigler, E. D., Duffield, T. C., Prigge, M. D. B., Froehlich, A. L., Lange, N., Alexander, A. L., & Lainhart, J. E. (2017). Longitudinal Development of Manual Motor Ability in Autism Spectrum Disorder from Childhood to Mid-adulthood Relates to Adaptive Daily Living Skills. *Developmental Science*, 20(4), 12401.
- Wilson, B. N., Kaplan, B. J., Crawford, S. G., Campbell, A., & Dewey, D. (2000). Reliability And Validity of a Parent Questionnaire on Childhood Motor Skills. *American Journal of Occupational Therapy*, 54(5), 484–493.
- World Health Organization. (2007). *International Classification of Functioning, Disability and Health – Children & Youth Version (ICF-CY)*.
- World Health Organization. (2019). *International statistical classification of diseases and related health problems (11th ed.)*.
- Zwicker, J.G., Missiuna, C., Harris, S.R., Boyd, L.A. (2012). Developmental Coordination Disorder: A Review and Update. *European Journal of Paediatric Neurology*, 16(6), 573–581.

**Contact email:** bbagrowski@gpsk.ump.edu.pl



## **AI-Powered Situated Learning: Challenges and Opportunities in the New Mexican School**

Juan Manuel Tapia Diaz, Secretaría de Educación Pública, México

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Education in Mexico is undergoing a profound transformation, moving from a traditional, passive and repetitive model towards a more humanistic, integral educational paradigm focused on the learning of students and the development of community environments. This transition on the educational model is no longer an isolated approach to the real and territorial conditions of the different schools and their educational agents, it's consider a process in construction and flexible called the New Mexican School (NMS or NEM). This proposal is based on article 3 of the Mexican Political Constitution, from a theoretical and pedagogical framework such as the epistemologies of the south to the decolonization of knowledge and power structures, as well as the indignations and contradictions of society against the devices of control, as education came to be. This new socio-educational model proposes that teachers from their initial training in the Normal Schools (public teacher training schools) to their continuing training (in service) should base their reflective practice on elements such as professional autonomy, authentic curricular integration and territoriality. School as a center for community development and education as a right. It is also intended to strengthen holistic development from the individual, but always thinking as a collective, encourage curiosity, inquiry, critical reflection, gender perspective, respect of community-ancestral knowledge and the responsible integration of New Technologies of Information, Communication, Teaching and Learning (NTICTL or NTICEA) as Generative Artificial Intelligence (GenAI).

*Keywords:* artificial intelligence, New Mexican School, educational technology, new technologies of information, communication, teaching and learning, human capabilities

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The inherent emergence of New Technologies of Information, Communication, Teaching and Learning in different areas of daily life has transformed how community reality is conceived, the processes of interaction between people, the socio-economic models, and thus the educational systems, whose purpose is to go beyond the processes of administrative simplification, by focusing on the integration of technological innovations into teaching and learning processes.

Normal Education in the State of Michoacan, in México, through the official normal schools and the responsibility of the educational authorities has made it possible to meet the challenges of training new generations of teachers in basic education, which has marked a historic milestone during the 2023-2024 and 2024-2025. Currently, there is a concern of the teaching staff and the other educational agents of the institutions against the radical changes posed by the integration of the New Mexican School and Artificial Intelligence as an integral and flexible educational project.

Cooperation and coordination with experts in the field is essential to empower learning communities towards the initial training of fourth-grade academics and micro-classrooms practitioners for the strengthening of the various educational intervention through courses, workshops, seminars, colloquia and study circles, with the aim of integrating into their educational intervention projects and didactic planning a hybrid model between the digital world and the potential of the humanistic approach of the New Mexican School.

### Figure 1

*Workshop With Practicing Teachers of the Benemerita y Centenaria Escuela Normal Urbana Federal Prof. J. Jesús Romero Flores*



Education policies must foster the convergence of new technologies within and outside their transformation processes, as well as revolutionary or cutting edge technologies converge in our daily lives, in the way we communicate, the way we transport ourselves, how we cook, including how we think. It is necessary to channel this progress into our classrooms; and at the right time education will have two important transformations possibilities: teaching and learning from an approach of educational excellence to reinvent the design and elaboration of class plans, physical and digital materials, as well as the ongoing evaluation processes. Community members will also be responsible for co-building guidelines for the monitoring and evaluation of their knowledge, human capabilities, knowledge, Learning Development Processes (LDP or PDA), with the aim of transforming the reality in which they are immersed.



## The Challenge of Disruptive Innovation in Education: Opportunities and Challenges

The New Mexican School involves a process of training not only students, but also the pedagogical practice of teachers who exercise the profession, as well as those and future teachers that the normal school delivers to society each school cycle. Therefore, as the first aspect between the dialectic of humanism and technological innovation is to carry out the “Reading of Reality” with a critical awareness, where the Needs, Interests and Problems (NIP) of different communities are recognized. This milestone breaks the traditional paradigm where teachers repeat an “educational market” that has a single purpose on producing efficient beings loyal to the interests of industry or the market, but with little or no critical awareness of its reality.

This is why Diamandis and Kotler (2021) claim that government agencies (such as the education system) are not prepared for the exponential advances implied by the technological revolution, since they were designed for another century, with other goals and objectives. His eagerness to remain in the “moments” or “golden times” perpetuates his immovability. In Mexico, it is common to hear that the education system has aged, and practices to rejuvenate them in the face of the current times are light breezes in the face of the hurricanes of the perpetuity of neoliberal systems. However, the implementation of vocational autonomy has led to the creation of “non-formal” and “informal” groups of teachers who, in their desire to develop a professional practice, and not just a repetitive educational practice, come together to talk collectively, to propose the needs, interests or problems of their schools with a view to making proposals for action where their peers act as an engine for change and integration into a wider network of professional cooperation; In particular, advances in new technologies.

We cannot continue with an educational system of the eighteenth century, educational spaces and classrooms of the nineteenth century, teachers with vocational training of the twentieth century, students of the twenty-first century and technological and digital resources of a premature twenty-second century. This is why the teachers are a source of transformation and mobility of the education system, “being in the time and for the time that runs” (Freire, 2024, p. 36) the change in educational paradigms, where new technologies converge and the Project of Educational Intervention they are conceiving, allows a worldview of an educator-critical, political and technological cooperation between the members of communities and educational agents in the social interweaving of knowledge and know-how.

### Figure 2

*Presentation of Educational Intervention Projects Contextualized and Supported With the Use of Generative Artificial Intelligence*



The integration of Generative Artificial Intelligence into initial training processes in normal schools provides undeniable advantages alongside the approach of the New Mexican School, since it allows a co-creation of knowledge and skills when designing and developing projects, from the reading of their reality and the contextualization of the contents and PDAs of the synthetic programmes which are integrated in training fields at different stages of education; to create a professional and authentic pedagogical experience, not generic or instructive as traditional models have demonstrated in past school cycles.

This contextualization implies strengthening the professional capacities of curricular autonomy as a axis of NEM in order to design educational intervention projects that respond to cognitive, socio-affective, physical and motor, social, economic, the local, state, national and international levels of education and to relate them to their experiences in the environment.

### Figure 3

*Workshop: Beyond the Chalkboard - The Power of Artificial Intelligence to Transform Teaching and Learning*



The co-design, together with the opportunity of “increased” innovation through AI, provides a point of convergence for incorporating “relevant” and “new” content which is not found in synthetic programmes, where active participation, conscious and decision-making by the educational community (teachers, students, parents and other actors in the environment) enables teaching and learning to be transformed through a pedagogy centred on the transformation of reality, and their emancipation from power structures or figures, since “there would be no culture or history without innovation, creativity, curiosity, freedom exercised or freedom to fight when denied” (Freire, 2024, p.36).

### **Normal Education at the Forefront: Exploring the Possibilities of Integrating New Technologies Into Initial Training**

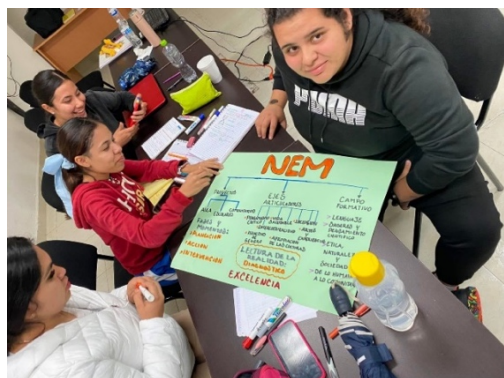
The origin of the Normal Schools in Mexico, arise in the eighteenth century with the Lancasterian company as a pedagogical innovation, although with a simple approach, beyond to train technical specialists in aspects of basic education, It aimed to integrate future students into the school system in rural and urban environments, under a scheme of mutual support between peers, where they would form a sense of identity, responsibility and transformation of their environment with a humanistic and social vision. From the following years, normal education went through a process of professionalization as an institution, but also on its meanings and values towards development and liberation, especially in rural environments.

However, the pressing scientific and technological modernization of the nineteenth and twentieth centuries brought about a crossroads and an awakening of consciousness of normalism in Mexico to meet the challenges of new learning and teaching practices, in order not to maintain archaic systems of “intellectual” domination as they had been decades ago, but to challenge the etymological and functional notion of knowledge, as well as its obscure meaning, oriented towards predesigned, fixed and submissive responses, “Pedagogy of Liberation”, as Paulo Freire has already said.

It is for this reason that the vision of humanist-scientific-technological normalism in comparison with the ages of GenAI, the overcoming of the cruelties of progress which has threatened education and has slowed down the integral development of some educational intervention projects for teachers and teachers who are practising in normal schools; that they could return to the golden ages of normal education, but that due to ideological and materialistic gaps prevent the success of this revolution, but do not limit the idealism for its implementation against the desire to innovate and evolve curricular structures of study programmes, as true revolutions throughout life, Where should I ask? What do I have to do to meet the challenge of incorporating the technological revolution into my educational intervention project? How can I adapt my initial training as a professional in the normal education to artificial intelligence? What do I hope to know and learn in order not to encourage ideological and materialistic gaps in the face of new technologies for teaching and learning?

#### Figure 4

*Workshop: Design and Elaboration of Conceptual Maps and Digital Materials With the Support of Artificial Intelligence With Practicing Teachers From the Escuela Normal De Educación Física*



The different activities of training complementary to the curricular framework on new technologies and GenAI has led both teachers in normal schools, and future teachers to develop a dialectical synthesis of knowledge and capabilities to be developed from the individual, empirical and reflexive on the pedagogical practice of the education professional (intrinsic process), its implementation, communication and interaction of his project with his colleagues and fellow teachers (extrinsic process) and its potential for transformation, liberation and emancipation of the students and community members so that everyone is an enhancer and creator of knowledge, content and materials, with the aim of carrying out a hybrid training and dialogue process in normal schools by building learning communities, through workshops, seminars, lectures, conferences, dissemination and dissemination articles, digital resources, participation in congresses, colloquia and forums with the aim of fostering exchange and facilitating the exchange of ideas through active listening.

The teachers and practitioners of academies and micro-classrooms are reinventing themselves in their professional aspect due to the hyperconnectivity they find themselves in through the different social networks and the ease of connection points to the mega-network or online knowledge networks; from this process arises the opportunity for self-training of pedagogical practice, since by means of videos, “papers” (specific academic, scientific or technological articles), post and recommendations analyse and incorporate technological innovations into their professional foundations in a non-formal and informal way, but with a high socio-cognitive value to have the possibility of understanding the world that is being constituted socially and historically in front of their eyes.

As mentioned by the South Korean writer Byung-Chul (2010) as education professionals we must learn to look significantly at our reality, to accustom the eye to look with calm and patience at these new changes and cinematics that might seem unreal as a priority for human and spiritual development. The NEM proposes the construction of a critical pedagogy of the use of AI, focused on the development of slow and deep thinking in front of automation from the first childhood and Initial Training through surprise and curiosity. This new pedagogy enables future teachers not only to fill spaces, places or job placements in different schools, but also to share experiences of the use of new technologies, some important challenges for “humanizing” and “territorializing” in accordance with their professional universes, to avoid robotized and over-digitalized practices, as opposed to proposals that can be considered in real contexts and become part of the formal curriculum, the ability to be independent in their profession, as is the case with normal schools.

### Figure 5

*Workshop: Recovery of Learning Experiences From Educational Practice by Practicing Teachers*



In the face of the accelerated self-training of normal school students, normal schools are faced with a challenge to connect the reality of educational communities or practice universes through socio-educative diagnosis, the role of NEM as an educational paradigm managing knowledge through projects from the classroom, school and community scenarios, and the implementation of technological tools such as GenAI to link what was previously impossible to relate, to make these technologies accessible, replicable, reproducible and usable for generating knowledge and know-how, solving everyday problems, innovating and realizing mistakes, not to eliminate them but to know their reasons, quality and prevent them in the future.

In order not to increase these gaps in education it is necessary to reflect and question its essential hybrid role on teaching and learning, not as a tool but as a cognitive mediator that



favours reflective processes, collaborative and personalized in basic and normal education, respecting the socio-cultural approach of knowledge. The new technologies provide an opportunity to break traditional patterns which, out of a fear of “what will they say”, are rejected or discredited such as “that does not work”, “it is a fad”, “it will replace my profession” or “it is forbidden within the school”, in the face of new opportunities for linking GenAI, which not only passively transmit or “copy” information, but also “generate” multidirectional communication in different formats or schemes that allow educational actors to act “boldly” In the face of their innate curiosity, encourage their own judgement, reasoned and argued, and actively participate in the “rediscovery” of educational practice.

The technological reinvention from the educational approach in the normal schools implies a reflection on the technological paradigm that supports necessary guidelines for the individual together with his “technological and digital cooperation” denote that information is the primary matter, not only data or references, but also means of construction itself and knowledge, the model of society ad hoc to new technologies, a society that has adapted to the technological needs which they demand of society; is in this area, where we must make a greater analysis,

### **The Technological Legacy of AI Facing the Challenge of Innovation**

The new technologies not only acts as online, immediate or consumer information, but they are the means or tools by which everyone becomes creator of new content through technologies and is co-creator of them. More, however, the traditional paradigm in the framework of education carries a progressive vision, of establishing bridges between the socio-cultural and historical moment in which we find ourselves facing the challenge of the digital age. Teachers in Basic Education are a step away from working hand-in-hand with AI agents, that is to say, customized, territorialized and “sensitized” AI models to the NIP of different communities with all the ethical and the legal implications of this, it is for this reason that the establishment of a link between reality reading and technologies to enhance educational intervention projects involves “the use of Artificial Intelligence to facilitate innovation in teaching and learning, drawing conclusions from successful cases and expanding practices based on empirical data” (UNESCO, 2019, p. 33).

#### **Figure 6**

*Workshop: Learn How to Create Situational Learning Experiences Using Artificial Intelligence in Special Education*



Under this premise, it is necessary to strengthen learning communities within basic education schools and normal schools to share the different advances and/or progress, formal, informal or non-formal learning should be acquired in a creative and critical way with regard to the role of technology in initial training and in everyday pedagogical practice. It is necessary for teachers to take preventive measures against the disruption of their educational practice in the framework of technologies, in order to avoid self-exploitation by the excessive pedagogical and administrative burden between the transition from traditional to innovation, as well as the deep boredom. It is essential that initial education programmes in normal schools include specific content on the use and management of Artificial Intelligence and its application in the educational process, with the aim of facilitating co-construction of new learning and thus reaching the human capacities that teachers and practitioners require to consolidate their profile characteristics.

### Conclusion

The construction of the New Mexican School by the different educational agents implies an alliance between technological innovation and critical practice that is erected as a transversal axis of the educational transformation in the different territories. The use of Generative Artificial Intelligence by teachers, students and the community cannot be naively assumed as simply a tool or a fashion. On the contrary, GenAI poses a deep question about the processes of subjectivation in working with these innovations. Retaking a reconfigured idea of Jacques Lacan (2008) on these modern times we must reflect, although we know that these machines with which we live do not think -they are human creations repeating what has been said to them. What is unsettling is not their automatism or predesigned responses, but our thinking about them. If we claim that these machines reproduce logic without consciousness, What does this reveal about us, when we teach and learn without questioning, repeating schemes, operating under standardized formulas, obeying protocols as automata of the system?

This lacanian paradox becomes essential in the contemporary teaching task. The GenAI must not only be integrated as a functional tool, but understood as a mirror that returns to education its greatest challenge: returning to thought, to the subject, to the question of meaning. Critical educational practice, then, cannot be limited to operating devices; it must create conditions of indignation as already mentioned in the same way by Freire (2024), as well as a struggle and revolution of consciences for the democratization of these machines so that the pedagogical act recovers its ethical, critical and symbolic dimension. Because if the machine does not think, and we do not think when we act like it, the task of the teacher in this new school is precisely to break that cycle of automatisms, recover the word, interrupt the repetition, and open spaces for desire, the difference and true invention.

In conclusion, GenAI represents an opportunity for the transformation of Normal Education, to strengthen the dialectic about teaching and learning; however, it requires a management and treatment with “high” degree of responsibility, ethics and professionalism, it can be seen as a step backwards in the processes of pedagogical reflection or as a simplistic formula for the design of didactic planning. The teachers and practitioners of the normal schools are transforming their role as agents of change by developing human and digital skills necessary to contribute to build an innovative, inclusive, critical and dialogical New Mexican School, where the unusual, novel or different is not a reason for rejection or devaluation within initial training; on the contrary, if it is part of progress in transforming pedagogical practice, it should be studied and reflected upon; because teachers are socio-historical subjects that need to be in time and with the time they are, as Paulo Freire (2024) argues, it is necessary to

recognize “minimally” the culture of our time, in order to understand the students, their processes of relationship and learning, to leave on the one hand a “dormant” society, and on the other hand strengthen it, with a sense always attentive to the understanding of the new, change and transformation, as part of a further gear in the National Educational System for mobility and consciousness revolution, since there is no human existence without challenges, without risks, without desire and motivation for change, without the encouragement of sentient subjects who are able to use technologies in their concrete reality, and who make sense of it and transform it.

### **Declaration of Generative AI and AI-Assisted Technologies in Writing Process**

The use of generative artificial intelligence in this paper was for assistance and support, as well as revision of grammatical aspects and coherence through software such as ChatGPT and Gemini. The ideas presented are unique and original on the part of the author that reflect the reality of the subject as well as its development in his territory.

## References

- Aprende Virtual. (2024). *Inteligencia Artificial en la Educación. Una guía práctica para profesores en la era digital* [Artificial Intelligence in Education. A practical guide for teachers in the digital age]. Latin American Institute of Professional Teacher Development. Buenos Aires.
- Byung-Chul, H. (2010). *La sociedad del cansancio* [The society of fatigue]. Turolero.
- Diamandis, P; Kotler, S. (2021). *El futuro va más rápido de lo que crees. Cómo la convergencia tecnológica está transformando las empresas, la economía y nuestras vidas* [The future is faster than you think. How Converging Technologies Are Transforming Business, Industries, and Our Lives]. Deusto.
- Díaz Barriga, A. F. (2006). *Enseñanza situada: Vínculo entre la escuela y la vida* [Situated Teaching: Link between school and life]. McGraw-Hill.
- Freire, P. (2024a). *Por una pedagogía de la pregunta* [Learning to Question]. Colección Paulo Freire. Siglo XXI Editores.
- Freire, P. (2024b). *Pedagogía de la Indignación. Cartas pedagógicas en un mundo revuelto en SEP* [Pedagogy of Indignation. Pedagogical letters in a troubled world]. Colección Paulo Freire. Siglo XXI Editores.
- Lacan, J. (2008). *El seminario de Jacques Lacan. Libro 2: El Yo en la Teoría de Freud y en la técnica Psicoanalítica* [The Seminar of Jacques Lacan, Book 2: The Ego in Freud's Theory and in the Technique of Psychoanalysis]. Paidós.
- SEP. (2022a). *Anexo 5. Plan de estudios de la Licenciatura en Educación Primaria* [Annex 5. Curriculum Plan for the Bachelor's Degree in Primary Education]. [https://dgesum.sep.gob.mx/storage/recursos/2023/08/3EmyP2Zz8h-ANEXO\\_5\\_DEL\\_ACUERDO\\_16\\_08\\_22.pdf](https://dgesum.sep.gob.mx/storage/recursos/2023/08/3EmyP2Zz8h-ANEXO_5_DEL_ACUERDO_16_08_22.pdf)
- SEP. (2022b). *Anexo 9. Plan de estudios de la Licenciatura en Educación Física* [Annex 9. Curriculum of the Bachelor's Degree in Physical Education]. [https://dgesum.sep.gob.mx/storage/recursos/2023/08/q41PXFQ7bS-ANEXO\\_9\\_DEL\\_ACUERDO\\_16\\_08\\_22.pdf](https://dgesum.sep.gob.mx/storage/recursos/2023/08/q41PXFQ7bS-ANEXO_9_DEL_ACUERDO_16_08_22.pdf)
- SEP. (2024a). *Plan de estudio para la Educación Preescolar, Primaria y Secundaria 2022* [Curriculum Plan for Preschool, Primary and Secondary Education 2022]. Mexico City.
- SEP. (2024b). *Programa de estudio para la educación primaria: Programa Sintético de la fase 3* [Study Program for Primary Education. Synthetic Program of Phase 3]. Mexico City.
- SEP. (2024c). *Programa de estudio para la educación primaria: Programa Sintético de la fase 4* [Study Program for Primary Education. Synthetic Program of Phase 4]. Mexico City.



SEP. (2024d). Programa de estudio para la educación primaria: Programa Sintético de la fase 5 [Study Program for Primary Education. Synthetic Program of Phase 5]. Mexico City.

UNESCO. (2022). Inteligencia Artificial y Educación. Guía para las personas a cargo de formular políticas [Artificial Intelligence and Education. Guidance for Policy-makers]. Paris.

UNESCO. (2023). Consenso de Beijing sobre la inteligencia artificial y la educación [Beijing Consensus on Artificial Intelligence and Education]. *Educational Profiles*. 45(180), 176–182. <https://doi.org/10.22201/iisue.24486167e.2023.180.61303>

Zarama, A. J. D. (2018). Pedagogías del sur, un enfoque de la educación de la educación para la paz [Southern pedagogies, an approach to education for peace]. *Revista de Estudios Socioeducativos*, (6), 34–56.  
[https://doi.org/http://dx.doi.org/10.25267/Rev\\_estud\\_socioeducativos.2018.i6.04](https://doi.org/http://dx.doi.org/10.25267/Rev_estud_socioeducativos.2018.i6.04)

**Contact email:** [juan.manuel.tapia.diaz@gmail.com](mailto:juan.manuel.tapia.diaz@gmail.com)



## **Development of a Mobile Application for Assessing Multiple Intelligences in Primary School Students**

Suthawan Harnkajornsuk, Srinakharinwirot University, Thailand  
Khwanying Sriprasertpap, Srinakharinwirot University, Thailand

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This study focuses on the development of an Android-based mobile application designed to assess multiple intelligences in primary school students, specifically in grades 4–6. Grounded in Howard Gardner’s theory of multiple intelligences, the application enables both teachers and parents to observe and rate children’s behaviors across eight intelligence domains. The aim is not to label students as gifted or non-gifted, but rather to identify individual strengths and areas for support, thereby informing holistic and differentiated educational planning. The assessment tool consists of four rating scales with 64 behavior-based items. A total of 145 teachers and 77 parents from 19 schools participated in the study, which was selected through a multi-stage sampling process to ensure a diverse range of educational contexts. The validity of the instrument was examined through content validation by experts, item-total correlation, and reliability analysis, including internal consistency and test-retest methods. Cut-off scores were determined through expert judgment and refined based on the results of pilot testing. These scores help users interpret student profiles without stigmatization, providing targeted recommendations for fostering each child’s potential across all areas of intelligence. User feedback indicated high levels of satisfaction regarding ease of use, clarity, and usefulness of the results for both classroom and home contexts. The findings suggest that the application is a valid, reliable, and accessible tool that can guide teachers and parents in supporting the comprehensive development of students through a strength-based perspective. The study highlights the potential of integrating digital assessment tools into daily educational practice to promote inclusive, student-centered learning environments.

*Keywords:* assessment, multiple intelligences, mobile application

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

In the context of Thailand's education system, academic achievement remains a dominant priority. Standardized national assessments are widely implemented across grade levels; however, these assessments often lack alignment with broader curriculum goals and tend to reinforce a high-stakes, exam-oriented culture (OECD/UNESCO, 2016). Success in education is typically measured by test performance, which leads to intensive academic competition and a narrow focus on linguistic and logical-mathematical abilities. As a result, other dimensions of student development—such as creativity, interpersonal skills, and emotional intelligence—are frequently overlooked. Despite national reform efforts, overall student learning outcomes in core subjects such as mathematics, science, and English remain low, and progress has been limited, particularly in rural and under-resourced schools (Durongkaveroj, 2023). This narrow focus can result in children developing only a limited range of skills, while their other intelligences—such as musical, kinesthetic, interpersonal, or naturalistic—are left undernourished. Consequently, many students are unable to fully explore and express their potential across different areas.

Howard Gardner's (1999) Theory of Multiple Intelligences (MI) provides a comprehensive framework that challenges the traditional notion of intelligence as a single, general cognitive ability. Instead, Gardner posits that human intelligence is multidimensional, comprising multiple interrelated domains that collectively influence learning and problem-solving. In practical contexts, individuals rarely rely on a single cognitive ability; instead, they draw upon a dynamic combination of intelligences—such as logical reasoning, spatial awareness, emotional understanding, and interpersonal collaboration—to navigate complex tasks and real-world challenges. This theoretical perspective has contributed significantly to educational paradigms that emphasize the holistic development of learners.

As Thailand prepares for a rapidly changing future, shaped by advanced technologies and automation, it is increasingly important to develop a workforce with diverse capabilities. Intelligent systems are replacing routine, single-skill jobs, while demand is growing for individuals who can think critically, adapt creatively, and apply diverse skills across various contexts. This requires an education system that goes beyond academic testing and supports the holistic development of every learner. Thailand's 20-Year National Strategy (2018–2037) and the National Education Scheme (2017–2036) place a strong emphasis on developing human capital in a multidimensional manner. This includes cultivating multiple intelligences from an early age through coordinated efforts across family, educational institutions, and broader social environments (Government of Thailand, 2017). The policy aims to foster physical, mental, intellectual, social, and moral growth, equipping citizens with 21st-century skills and enabling them to engage in lifelong learning, thereby achieving personal well-being.

This study addresses this need by developing an Android-based mobile application grounded in multiple intelligence theory. The app enables both teachers and parents to assess students' observable behaviors across eight intelligence domains, identifying strengths and areas for support. Rather than labeling students as gifted or non-gifted, the tool helps guide inclusive and personalized educational planning that nurtures every child's potential.

The objective of this research is to design and develop a digital application that assesses the characteristics of various intelligences in primary school children, based on the Theory of Multiple Intelligences.

## Literature Review

Howard Gardner's (1999) Theory of Multiple Intelligences (MI) challenges the traditional view of intelligence as a single, general cognitive ability. Instead, Gardner conceptualizes intelligence as comprising multiple distinct yet interrelated domains, including linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, intrapersonal, naturalistic, and existential intelligences. These intelligences function in combination to support learning, problem-solving, and personal development in real-life contexts.

Practical assessment of multiple intelligences requires tools that capture student behavior in naturalistic settings. In alignment with Thailand's 20-Year National Strategy, which emphasizes holistic human development through families, schools, and communities (Government of Thailand, 2017), efforts have been made to develop assessment tools that reflect a broader conception of intelligence. One such initiative is the development of a multiple intelligences (MI) screening tool for basic education students, based on Gardner's MI theory. The tool was created by the Office of the Education Council (Office of the Education Council, 2021). It adopts an indirect measurement approach, using behavioral observations by adults to assess students' strengths across nine intelligence domains: linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, naturalistic, and existential intelligences. The tool includes 45 items—five per domain—rated on a two-point scale. Scores are interpreted to identify whether a student demonstrates distinctive strengths in particular intelligences or exhibits development consistent with general peer-level expectations. This initiative represents a national-level effort to integrate MI theory into educational practice and assessment, supporting inclusive and individualized learning in alignment with national reform objectives.

Teachers and parents, as primary observers of children in school and home contexts, play critical roles in identifying students' strengths. When both groups collaborate in assessment, educational planning becomes more accurate and responsive to individual needs. However, few available tools facilitate such collaboration through accessible, context-sensitive formats suitable for everyday use.

The growing adoption of mobile applications in educational assessment reflects their potential to address these gaps. Mobile tools offer accessible, time-efficient platforms for collecting and visualizing student data. Projects such as the Tree of Intelligences (TOI) software have demonstrated the feasibility of evaluating MI through interactive digital games for young children (Garmen et al., 2019). Nevertheless, few existing platforms are designed to support structured, scalable MI assessment based on adult observer input. Even fewer allow comparison of teacher and parent perspectives or provide immediate, strength-based recommendations tailored to a student's intelligence profile. This lack of integrated, collaborative digital tools limits the potential for holistic educational planning.

Previous research has introduced a range of MI-based tools, including paper-based checklists, classroom observation instruments, and digital prototypes. While some of these tools incorporate existential intelligence, educators and caregivers often report difficulty understanding and applying this domain. As a result, most practical instruments focus on the eight more observable intelligences in early and primary education settings.

In summary, although the concept of multiple intelligences is widely acknowledged, many existing tools remain overly theoretical, limited in practical utility, or inaccessible to

everyday users. There is a clear need for a validated, user-friendly, mobile-based instrument that enables collaborative assessment by both teachers and parents, and that offers concrete, constructive insights to support each child's development. This study responds to that need.

## **Methodology**

### **Ethical Considerations**

All research procedures were conducted in accordance with ethical standards and were approved by the Human Research Ethics Committee of Srinakharinwirot University (Approval No. SWUEC 323/61).

### **Development of the Rating Scales Instrument**

This study aimed to develop a behavior-based rating scale instrument embedded within a mobile application for assessing multiple intelligences in primary school students. The application was designed for use by both teachers and parents to support personalized educational planning based on each child's strengths and needs.

### ***Needs Analysis and Literature Review***

To establish a strong theoretical and contextual foundation for the assessment tool, a comprehensive needs analysis and literature review were conducted. The needs analysis involved examining current educational practices in Thailand, which continue to emphasize academic achievement, standardized testing, and narrow conceptions of intelligence. These practices often result in the underdevelopment of children's broader abilities and reduce opportunities for holistic learning. As Thailand transitions into an innovation-driven society, there is an increasing need to cultivate diverse talents among students to meet the demands of the 21st-century workforce.

The literature review covered international and Thai studies on multiple intelligences, including Gardner's theoretical framework, MI assessment tools, and digital applications for education. Particular attention was given to existing MI-based instruments used in schools, as well as their limitations, particularly in terms of accessibility, cultural relevance, and parent involvement. The review also identified key behavioural indicators associated with each of the eight selected intelligences (excluding existential intelligence), which served as the basis for constructing the rating scale items.

Findings from this phase confirmed the need for a user-friendly, digital assessment tool that could be used collaboratively by both teachers and parents. It also highlighted the importance of avoiding labels such as "gifted" or "non-gifted," instead focusing on identifying strengths, emerging potentials, and areas for support in each child to inform inclusive, strength-based educational planning.

### ***Design of Application Structure and Content***

The mobile application was designed to assess students' multiple intelligences based on Howard Gardner's theory, with consideration given to developmental appropriateness for primary school children and usability for adult assessors, namely teachers and parents. The

design focused on creating a comprehensive and user-friendly tool that supports collaborative assessment and educational planning.

**Interface Design.** The user interface (UI) was designed to be intuitive and accessible, allowing adult users to navigate the system easily. Upon launching the application, users are prompted to select their role—either teacher or parent—which directs them to distinct but parallel assessment modules. Each module contains behavior-based items relevant to the user’s context of interaction with the child (e.g., classroom behaviors for teachers and home-based behaviors for parents). This structure ensures that both assessors can contribute valuable, context-specific observations based on their daily interactions with the student.

**Assessment Structure and Rating Scale.** The assessment comprises 64 behavioral items, distributed equally across eight domains of intelligence (eight items per domain). These items were developed based on a review of MI literature and expert input, excluding existential intelligence in this version due to observed difficulties in interpretation and application in previous trials. Each item is rated using a five-point Likert scale to capture the frequency of observed behaviors, with scale points interpreted as follows:

- 4 = Always – The child consistently demonstrates this behavior.
- 3 = Often – The child frequently demonstrates this behavior.
- 2 = Sometimes – The child occasionally demonstrates this behavior.
- 1 = Rarely – The child seldom demonstrates this behavior.
- 0 = Never / Not Yet Tried – The child has never demonstrated this behavior or has not yet had the opportunity.

This frequency-based format enables flexible yet structured observation of students' abilities in natural settings, thereby enhancing both ecological validity and practical utility.

**Interpretation Framework.** To support constructive interpretation and avoid labeling, a three-level classification system was developed in collaboration with expert reviewers. Each intelligence domain is interpreted as follows:

Level	Suggested Term	Interpretation
High	Strength Area	The student consistently demonstrates this domain. Further enrichment is encouraged.
Moderate	Emerging Potential	The student shows developing ability; continued support will help nurture this area.
Low	Encouragement	The student shows limited behaviors in this area; targeted intervention is recommended.

This framework supports strength-based educational planning, allowing both teachers and parents to recognize diverse talents without categorizing students as gifted or non-gifted.

**Assessment Features and Reporting.** To facilitate comprehensive use, the application includes the following features:

- *Data saving and PDF reporting.* The application allows users to save assessment data, export results, and automatically generate reports in PDF format, making it easier to archive and share student profiles.
- *In-app result sharing via email.* Users can send completed reports directly from the application through email, streamlining communication between teachers and parents.

- *Radar chart comparisons between assessors.* The app features visual comparisons of teacher and parent assessments using radar charts, helping to identify consistent or divergent observations and foster collaborative educational planning.

These functions aim to foster a shared understanding among stakeholders and serve as a foundation for developing individualized learning plans.

**Recommendation System.** Upon completion of the assessment, the system automatically generates personalized recommendations tailored to each child's intelligence profile. The recommendations differ by user group:

- *For teachers.* Suggested classroom strategies, lesson adaptations, and activity-based supports aligned with students' identified strengths and areas for development.
- *For parents.* Home-based activities, play-based learning ideas, and communication techniques that reinforce specific domains of intelligence.

This feature enables users to translate assessment results into practical actions that support the student's ongoing development in both school and home environments.

### ***Development of the Prototype***

The prototype version of the application was developed through close collaboration between the research team, software developers, and instructional designers. The objective was to create a functional and user-friendly mobile tool that accurately reflects the theoretical framework of multiple intelligences and supports practical use by both teachers and parents. The prototype integrated 64 behavioral assessment items representing eight intelligence domains, with a consistent structure across both teacher and parent modules. The design also incorporated features for data entry, report generation, and automated recommendations tailored to users' roles and the child's assessed strengths.

### ***Validity and Reliability Analysis of the Application***

To ensure the quality and rigor of the developed instrument, the application underwent a multi-phase validation and reliability analysis process, using both qualitative expert review and quantitative statistical methods.

**Content Validation.** Five experts with backgrounds in gifted education, educational psychology, and instructional technology were invited to evaluate the clarity, relevance, and theoretical alignment of all 64 behavioral items across the eight intelligence domains. The Item-Objective Congruence (IOC) index was calculated.

**Item Analysis.** Total Item Correlations were computed to assess the internal consistency of each domain-specific subscale.

**Reliability Analysis.** Two types of reliability assessments were employed:

- *Test-Retest Reliability.* A subset of participants ( $n = 30$  teachers) completed the same assessment twice over a two-week interval. Pearson's correlation coefficient was calculated between the two test administrations to evaluate temporal stability.
- *Internal Consistency.* Cronbach's alpha coefficients were calculated for each of the eight subscales. All domains demonstrated acceptable to high internal consistency,



with alpha values equal to or exceeding 0.70, indicating that the items reliably measured each intended intelligence domain.

**Expert-Defined Cut-Off Scores and Educational Implications.** To support the practical interpretation of assessment results, expert-defined cut-off scores were developed in consultation with the validation panel. These scores were refined through the analysis of pilot data, taking into account item difficulty and the distribution of scores. The interpretation framework categorizes each intelligence domain into three levels—strength area, emerging potential, and area for support—without labeling children as “gifted” or “non-gifted.” Instead, the focus is placed on identifying individual profiles to inform differentiated learning opportunities and encourage the holistic development of all students.

### ***Pilot Testing and Refinement***

To ensure that the developed mobile application was both practical and pedagogically suitable, a pilot study was conducted before its wider implementation. This phase focused on examining the usability, clarity, and contextual suitability of the application in authentic classroom settings to refine the tool based on user experience and feedback.

Participants were selected from diverse primary school contexts to represent a variety of classroom environments, including both urban and rural schools. Teachers and students who participated were chosen to represent diverse teaching practices and learner needs, ensuring that the tool could be evaluated for its adaptability across real-world educational settings. Before implementation, participating teachers received a brief orientation session. This session aimed to familiarize them with the structure and function of the application, including how to complete the behavioral assessments, interpret results, and provide constructive feedback to the research team. Where applicable, parents were also included in the training to promote alignment between home and school assessment perspectives.

The application was then integrated into classroom activities over a trial period of one to two weeks. Teachers were encouraged to use the tool during regular student observations, entering data through the app as they identified behaviors aligned with the eight domains of multiple intelligences. This allowed for a naturalistic assessment of the child’s strengths and areas for development without disrupting everyday classroom routines.

Data collection during this phase employed multiple methods to ensure a comprehensive evaluation. The research team conducted classroom observations to document how teachers interacted with the application, the clarity of the instructions, and the level of engagement among both teachers and students. In addition, teachers were invited to complete usability questionnaires and participate in semi-structured interviews or focus group discussions. These interactions provided valuable insights into the tool’s perceived usefulness, its compatibility with teaching practices, and any challenges encountered during implementation. Parents who used the application in parallel were also invited to submit brief feedback forms to reflect on their experience using the app at home.

The data collected were analyzed using a set of pre-determined usability and appropriateness criteria. Usability was assessed based on the ease of navigation, clarity of language, time efficiency, accuracy of data entry, and user engagement. Teachers’ feedback on the relevance and clarity of the automated recommendations generated by the application was also taken into consideration. Meanwhile, appropriateness was evaluated by examining the tool’s

alignment with classroom objectives, its perceived value for supporting student development, and its adaptability to different types of learners.

Following the pilot phase, the research team synthesized the findings and identified key areas for improvement. These included refinements to the interface design, adjustments to item wording for greater clarity, and enhancements to the structure and language of the recommendation system. The insights gathered during this stage contributed significantly to the finalization of the application, ensuring that it is not only theoretically sound but also practically usable by teachers and parents working together to support the holistic development of primary school students.

### ***Finalization of the Application***

Following the pilot testing and usability evaluation phase, the research team finalized the application by systematically incorporating all necessary revisions. The feedback obtained from teachers, parents, and direct classroom observations played a critical role in guiding these improvements. Key aspects revised during this stage included user interface design, clarity of assessment items, and the recommendation system that generates personalized suggestions based on each child's intelligence profile.

Special attention was given to ensuring that the application operated smoothly and consistently across different Android devices. Technical refinements included optimizing the screen layout for various screen sizes, enhancing system responsiveness, and ensuring stable data storage and export functions. Functions such as PDF report generation, email sharing, and side-by-side comparison of teacher and parent assessments were also reviewed and tested extensively to ensure accuracy and usability.

At this stage, the full integration of all components, including the behavior-based rating system, role-specific user pathways, automated interpretation framework, and recommendation features, was completed. The refined version of the application was reviewed for internal coherence, user flow, and consistency with the theoretical foundation of Gardner's multiple intelligences.

This final version of the application was then prepared for future phases, including broader classroom implementation and more extensive quality evaluations. These subsequent stages aim to examine the application's effectiveness in supporting differentiated instruction, enhancing parent-teacher collaboration, and promoting the holistic development of students. The final product is positioned not merely as a digital assessment tool but as a practical resource that encourages inclusive, strength-based educational planning in both school and home environments.

## **Results and Discussion**

The results of this study are presented in three parts: (1) content validity and reliability of the rating scales, (2) findings from the pilot testing and classroom implementation, and (3) overall usability and appropriateness of the application based on teacher and parent feedback.

## **Validity and Reliability of the Instrument**

Content validation was conducted by five experts in the fields of gifted education, educational psychology, and instructional design. The Item-Objective Congruence (IOC) scores for the 64 behavioral items across eight intelligence domains ranged from 0.60 to 1.00, with all items meeting or exceeding the commonly accepted threshold of 0.50. Items receiving lower scores were revised based on expert feedback to enhance clarity and ensure alignment with Gardner's theoretical constructs.

Internal consistency was assessed using Cronbach's alpha. All eight subscales demonstrated strong internal reliability, with alpha coefficients ranging from 0.83 to 0.90—exceeding the recommended minimum of 0.70—indicating that items within each domain consistently measured the intended constructs.

Test-retest reliability was evaluated with a subsample of 30 teachers who completed the assessment twice over a two-week interval. The Pearson correlation coefficient between the two administrations was 0.79, indicating strong temporal stability and consistency of the tool over time.

These findings support the psychometric soundness of the developed instrument and confirm its suitability for use in both school and home contexts.

## **Pilot Testing and Classroom Implementation**

The pilot testing phase involved teachers using the application in real classroom settings throughout one to two weeks. Observations revealed that the application was easy to integrate into regular classroom activities and that teachers were able to complete the assessments with minimal technical support. Most users found the behavior-based rating scale intuitive and age-appropriate for students in grades 4–6. The process of observing and rating behaviors encouraged more intentional reflection on individual student strengths and learning preferences.

Teachers also reported that the ability to generate personalized profiles for each student provided practical insights into how to support differentiated instruction. In cases where both teachers and parents completed the assessments, the visual comparison features (e.g., radar charts) helped reveal consistent patterns and differences in perspectives, fostering deeper dialogue between school and home.

## **Usability and Appropriateness of the Application**

Feedback gathered through usability questionnaires and interviews indicated high levels of satisfaction among teachers and parents. The application was rated positively in terms of ease of navigation, clarity of instructions, and time efficiency. The generated recommendations—tailored to each user's role—were perceived as relevant, specific, and applicable to both classroom and home contexts.

The appropriateness of the tool was also affirmed, particularly in its alignment with educational goals that emphasize student-centered learning. Teachers appreciated the three-level interpretation framework (“Strength Area,” “Emerging Potential,” and “Area for Support”) as a non-stigmatizing way to guide instructional planning. Rather than labeling

students as “gifted” or “non-gifted,” the system encouraged educators and parents to view intelligence as multifaceted and developmental.

### **Conclusion**

This study developed and validated a mobile application designed to assess multiple intelligences in primary school students, based on Howard Gardner’s theory of multiple intelligences. This tool enables teachers and parents to collaboratively observe and evaluate children’s behavior across eight intelligence domains through a user-friendly, behavior-based rating system. By avoiding labels such as “gifted” or “non-gifted,” the application encourages strength-based educational planning that supports each child’s holistic development. The app’s features—such as PDF report generation, comparison between teacher and parent input, and tailored recommendations—were positively received in pilot testing, demonstrating high usability, contextual relevance, and educational value.

However, the study faced some limitations. The sample size was limited to a specific group of schools, which may affect the generalizability of the findings. Additionally, the assessment relied solely on adult observations without incorporating student self-assessment or performance-based tasks.

Future research should explore broader implementation across diverse educational settings, including rural and underserved areas. Integrating student input and developing supporting materials, such as training modules for parents and teachers, could further enhance the impact and sustainability of this tool. The continued development of inclusive, accessible assessment technologies holds promise for advancing personalized, student-centered learning in both school and home environments.

### **Acknowledgements**

Srinakharinwirot University, Thailand, funded this research project. The project number is 111/2562.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

ChatGPT was utilized to assist with content organization and language refinement, while Grammarly was employed for proofreading. All content was reviewed and finalized by the authors.

## References

- Durongkaveroj, W. (2023). Recent developments in basic education in Thailand: Issues and challenges. *Journal of Southeast Asian Economies*, 39, S20–S33.  
<https://www.jstor.org/stable/27211214>
- Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. Basic Books.
- Garmen, P., Rodríguez, C., García-Redondo, P., & San Pedro Veledo, J.C. (2019). Multiple intelligences and video games: Assessment and intervention with software TOI. *Comunicar*, 27(58), 83–91. <https://doi.org/10.3916/C58-2019-09>
- Government of Thailand. (2017). *National strategy 2018–2037* (Summary). Office of the National Economic and Social Development Board.
- OECD/UNESCO. (2016). *Education in Thailand: An OECD-UNESCO perspective* (Reviews of National Policies for Education). OECD Publishing.  
<https://doi.org/10.1787/9789264259119-en>
- Office of the Education Council. (2021). *Khūmū khatkrōng læ phatthanā phahuppanya* [Manual for screening and developing multiple intelligences]. Office of the Education Council. <https://online.fliphtml5.com/wbpvz/zjss/#p=5>

**Contact email:** [suthawan@g.swu.ac.th](mailto:suthawan@g.swu.ac.th)



## **Evaluating Assessment Practices in a Language Teaching Sequence: The Role of Policy and Continuous Review in Enhancing Formative Assessment**

Imad Nasr, Al Jinan University, Lebanon

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This small-scale qualitative study explores the assessment practices in Arabic language instruction within the International Baccalaureate (IB) Middle Years Programme (MYP), focusing on the balance between formative (Assessment for Learning – AfL) and summative (Assessment of Learning – AoL) approaches. Drawing on literature that emphasizes the evolving purpose of assessment in language learning, the research examines how formative strategies, such as questioning, peer collaboration, and self-assessment, can enhance student engagement, reduce anxiety, and support deeper learning. Semi-structured interviews with teachers of Arabic as a foreign language (Arabic B), classroom observations, and a student interview were conducted to provide a rich, contextual understanding of current practices and perceptions. Findings reveal that while teachers value formative assessment for its role in facilitating feedback and promoting autonomy, institutional pressures tied to grading and reporting often prioritize summative evaluations. This tension hinders the consistent implementation of AfL strategies, despite their pedagogical benefits. Observations demonstrated effective use of interactive techniques; however, a more strategic and policy-aligned integration of formative assessment is needed. The study highlights the importance of professional development and clear assessment frameworks that empower teachers to make informed instructional decisions. Ultimately, the research calls for a more balanced and integrated approach to assessment in MFL and Arabic language classrooms, one that aligns pedagogical intentions with institutional expectations and places student learning and well-being at the centre.

*Keywords:* formative assessment, summative assessment, language acquisition, IB MYP, pedagogical approaches, student engagement

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Assessment plays an essential role in shaping both teaching strategies and student learning outcomes, serving multiple functions: it helps evaluate students' understanding and progress, informs instructional decisions, and supports the development of effective pedagogy (Brooks, 2002; Scarino, 2013). Garrison and Ehringhaus (2007) and Mertler (2009) argue that assessment impacts every stage of educational planning and delivery, while Eckhout et al. (2005, p. 3) state that "effective teaching cannot exist without effective assessment." Despite this consensus, there remains an ongoing debate about the purposes of assessment, particularly the balance between formative (assessment for learning) and summative (assessment of learning) approaches, and how they are applied in real classroom settings.

This study investigates assessment practices within a language teaching sequence in the International Baccalaureate (IB) Middle Years Programme (MYP), with a particular focus on Arabic B, a foreign language course offered in an international secondary school. While the IB framework promotes a holistic, student-centred approach to assessment that emphasizes inquiry, conceptual understanding, and critical thinking (International Baccalaureate Organization [IBO], 2014) the practical implementation of these principles often reveals tensions between formative ideals and summative priorities.

To explore these dynamics, I conducted a small-scale qualitative case study in the school setting. The research involved two primary methods: a review of assessment-related documents (e.g., unit plans, marking criteria, and student work samples) and a series of informal, semi-structured interviews with Arabic language teachers, coordinators, and one student. The aim was to evaluate how assessment policies and practices are interpreted and applied at the classroom level, and to what extent continuous review supports the development of formative assessment strategies.

This paper highlights the challenges teachers face in embedding formative assessment meaningfully within a system that places considerable weight on summative outcomes. It also examines how policy directives and school-level expectations shape assessment practices and teacher agency. By critically evaluating these factors, the research offers insights that enrich the wider scholarly dialogue on improving language assessment in international school contexts. In a nutshell, the research seeks to contribute to the ongoing conversation around improving assessment in language education by examining the alignment or misalignment between policy, practice, and pedagogy.

## Review of Relevant Literature

The understanding of assessment has evolved over time, reflecting broader shifts in educational priorities and pedagogy (Sumner, 2002). Traditionally, it was seen as a way to evaluate students' strengths and weaknesses, enabling teachers to monitor progress and tailor instruction (Heaton, 1990). Stiggins (1992) and Garrison and Ehringhaus (2007) further position assessment as a feedback mechanism that informs teaching and supports instructional decisions based on student growth.

Research, most notably by Black and Wiliam (1998), highlights the power of formative assessment, or what's called Assessment for Learning (AfL), in enhancing student achievement. AfL is characterized by its ongoing, informal nature and its focus on guiding future learning rather than merely recording past performance. Black and Wiliam (2003) note



that formative assessment, occurring throughout a lesson, offers real-time insights into student understanding, while Garrison and Ehringhaus (2007) argue that it enables teachers to adjust instruction responsively for deeper learning and equity.

Despite growing support for formative methods, many systems still prioritize summative assessment (AoL) as the main measure of achievement. Black and Wiliam (2003) acknowledge the need for formal assessments in high-stakes contexts. Dixon and Worrell (2016) define summative assessments as evaluations at the end of an instructional period, typically via formal tests, yet Harlen (2007) notes they offer few opportunities for reflection or immediate improvement.

The dominance of summative assessment poses challenges, especially in language education where continuous feedback is crucial. Scholars like Maki (2002) and Boud (2006) warn that overreliance on summative measures can undermine motivation, increase stress, and harm lower-performing students. Harlen (2007) argues that assessment should be sensitive to student well-being. In contrast, Miller and Lavin (2007) suggest that integrating formative practices into daily instruction better supports development, while Bennett (2011) finds that well-designed formative assessments boost achievement, self-esteem, and engagement.

Finally, assessment policy and continuous review are vital in shaping effective classroom practices. Clear policies that prioritize formative assessment create balanced, inclusive learning environments (Black & Wiliam, 1998) by reducing ambiguity and alleviating student anxiety, enabling teachers to refine their strategies through ongoing reflection.

Overall, this literature underscores the need for a deliberate, policy-driven approach to assessment that values formative processes alongside summative measures and ensures regular review to meet the evolving needs of learners and educators.

### **Modern Foreign Language Learning**

Over the past two decades, language learning has undergone significant transformation. This evolution has been shaped by three main factors: teachers' knowledge of assessment, the impact of teacher training, and assessment literacy (Vahid & Nasreen, 2019). Inbar-Lourie (2008) suggests that assessment literacy, when used as a reflective practice, enables language teachers to critically analyse the aims, available resources, and situational conditions of assessment practices, and explore how the findings can be effectively put to use.

In the British curriculum's Key Stage 3, current language teaching practices aim to improve students' abilities in all language skills while supporting them with key grammar and vocabulary. This approach encourages learners to communicate effectively and express themselves beyond their immediate needs (Department for Education [DfE], n.d.). The IB curriculum likewise promotes multilingualism and intercultural understanding. In the IB MYP language acquisition framework, the focus is on developing competency in language skills, rather than strict grammatical learning, while supporting students' mother tongues.

Assessment in IB MYP language acquisition centres on student progression in language skills, with a strong emphasis on formative assessments. Summative assessments also play a crucial role, taking place multiple times throughout the academic year. Following clear objectives and assessment criteria is essential. Rubric-based assessments outline learning expectations across the three phases of language acquisition: emergent, capable, and

proficient. To address the diverse needs of all students, assessments are designed in various formats and ensure accessibility for all students. Multimodality in teaching, learning, and assessment is a significant advancement introduced in 2020 to align with modern educational practices (IB MYP Language Acquisition Guide, 2020). Furthermore, IB MYP requires collaborative assessment planning prior to teaching each unit, as the curriculum is inquiry-based and conceptual in nature, covering all subjects (IBO, 2020).

In the UAE, the Ministry of Education (MoE) has established a framework for teaching and assessing Arabic as an additional language. This framework aligns with the assessment practices of schools offering various curricula, including IB MYP. The MYP language acquisition assessment aligns with the MoE framework in its emphasis on summative assessment of the four language skills. However, the MoE framework uses language proficiency levels determined by how many years non-Arab learners have been exposed to Arabic instruction, rather than their actual abilities, making it challenging for teachers and students to meet these expectations (Ministry of Education [MoE], 2017).

### **Questioning as a Formative Assessment Tool**

Questioning is a central aspect of formative assessment, allowing teachers to gauge students' understanding and performance, which in turn informs future teaching strategies aimed at improving language skills. It plays a dual role not only as a diagnostic tool but also as an instructional strategy that actively shapes learning. Black and Wiliam (2003) argue that questioning is not merely a method of checking knowledge but a key element of effective teaching, contributing significantly to student engagement and the creation of an interactive classroom environment. Through thoughtful questioning, teachers can challenge students to reflect, elaborate on their answers, and clarify misconceptions. Chin (2007) emphasizes that well-crafted questions promote higher-order thinking, helping learners develop deeper comprehension and the ability to make connections across different linguistic concepts.

In the context of Modern Foreign Language (MFL) classes, questioning serves a particularly important function. It is routinely employed to support the development of core language skills (Pronunciation, writing, reading, and listening) by drawing attention to patterns, structures, and usage. Teachers use questioning to clarify complex grammar rules, expand vocabulary, and prompt students to construct more sophisticated responses. According to (Department for Education [DfE], 2003), strategic questioning can significantly enhance linguistic accuracy and fluency, making it a cornerstone of effective MFL instruction.

### **Self and Peer Assessments**

Self- and peer-assessment are vital components of formative assessment, fostering greater student autonomy and ownership of learning. Self-assessment encourages learners to reflect critically on their own work, set personal goals, and identify areas for improvement, thus cultivating independent learning skills (Spendlove, 2009). According to Black and Wiliam (2018), honest and structured self-assessment contributes to the development of metacognitive skills, enabling students to monitor their progress and adjust their learning strategies accordingly. Andrade and Du (2007) also highlight the importance of clearly defined rubrics and criteria in supporting effective self-assessment, as they provide learners with concrete benchmarks for evaluating their work.

Peer assessment, meanwhile, allows students to engage in collaborative learning by evaluating and providing constructive feedback on each other's performance. Gielen et al. (2010) emphasize that peer assessment develops critical thinking and communication skills while promoting accountability and active engagement. However, the success of peer assessment largely depends on clear guidance and the establishment of transparent learning objectives and criteria (Black et al., 2003). Some students, as noted by Butt (2010), may initially view peer assessment as a teacher's duty, leading to hesitation or lack of confidence in giving feedback. Therefore, training and gradual implementation are essential to ensure effectiveness and student buy-in.

## **Research Methodology**

This small-scale qualitative study employed three primary research methods: a semi-structured teacher interview, a lesson observation, and a student interview. All data collection took place face-to-face within the school environment to ensure contextual relevance and capture a deeper understanding of classroom interactions, teacher perspectives, and the student experience.

A purposive sampling strategy (a form of non-probability sampling) was used to select participants, focusing on two Arabic B teachers from the Middle Years Programme (MYP). For confidentiality and ethical integrity, the teachers are referred to as "A" and "B", the student as "S", and the school as "T". School T follows the International Baccalaureate (IB) curriculum and serves around 1450 students across its 4 programmes: Primary Years Programme (PYP), Middle Years Programme (MYP), Diploma Programme (DP), and Career-related Programme (CP).

The study adhered to British Educational Research Association (BERA) ethical guidelines (2018). Written approval was obtained from school leadership, and informed consent was secured from all participants, including parental consent for the student interview.

The semi-structured teacher interview lasted 30 minutes and was audio-recorded for accuracy, as recommended by Robson and McCartan (2016). Recordings were transcribed verbatim, securely stored on an encrypted laptop, and deleted post-transcription in line with General Data Protection Regulation [GDPR], 2018.

A live, in-person observation was conducted in a Grade 9 Arabic B class taught by Teacher B, providing insights into classroom practice and assessment use. A brief student interview followed to explore learner perceptions, triangulating the findings.

## **Research Questions**

This research was structured around the following key questions:

1. How do Arabic B teachers perceive and implement formative assessment practices within their classrooms?
2. What formative assessment strategies are most commonly used in the teaching of Arabic as an additional language, and how are these integrated alongside summative assessments?
3. How do students experience and perceive formative assessment practices in Arabic B classes?

4. What institutional or structural factors influence the implementation and balance of formative and summative assessment in Arabic B instruction?

## **Data Collection**

Three qualitative data collection methods were employed in this study: a semi-structured teacher interview, a lesson observation, and a student interview. This multimethod approach enhanced data triangulation and provided a comprehensive understanding of assessment practices within the Arabic B classroom.

A semi-structured interview was conducted with Teacher A, chosen for its flexibility and capacity to generate rich, in-depth insights into educators' lived experiences and professional perspectives. Unlike structured interviews, this format allows for follow-up and probing questions, leading to more nuanced responses (Robson & McCartan, 2016). One limitation, however, is the potential for bias—both from the interviewer and interviewee (Cohen et al., 2018). In this case, the prior professional relationship between the researcher and Teacher A may have contributed to unintentionally socially desirable or overly positive responses. Nonetheless, the interview yielded valuable insights that might have been inaccessible through more rigid or quantitative methods.

The second method was a lesson observation of a Grade 9 Arabic B class taught by Teacher B. Conducted face-to-face, it enabled the researcher to take detailed notes on instructional strategies, teacher-student interactions, and classroom dynamics. Observations are often considered more objective than interviews, as they capture teaching practices as they naturally occur (Wellington, 2015). Yet, observational data remain open to interpretation, introducing subjectivity. To minimise this, the researcher maintained a non-intrusive presence and focused on descriptive field notes. The existing rapport with staff also helped ensure a typical lesson structure, reducing the risk of the Hawthorne effect (Thomas, 2017).

The third method involved a brief semi-structured interview with a Grade 9 student (Student S) who participated in the observed lesson. It explored the learner's perspective on assessment practices, particularly formative feedback and summative evaluation. While student interviews offer valuable insights, they are influenced by confidence, language proficiency, and willingness to speak openly. To address this, the interview was conducted in a supportive environment and adapted to suit the student's comfort and comprehension. This interview served as a crucial triangulation point, adding context to teacher input and classroom observation.

Together, these three methods offered a holistic view of assessment practice and experience in the Arabic B classroom, reflecting multiple stakeholder perspectives.

## **Data Analysis and Findings**

When asked to define assessment for learning, Teacher A articulated a view closely aligned with established academic definitions. He described it as an ongoing, informal process aimed at supporting student learning rather than assigning grades. According to him, it serves to monitor progress, adjust instruction, and provide timely feedback that fosters improvement. Contrasting this with summative assessment, typically linked to end-of-term evaluations, he emphasized the distinctive, developmental nature of formative practices. His perspective reflects the definitions offered by (Bennett, 2011; Black & Wiliam, 2003; Dixon & Worrell,

2016; Gardner, 2012), and his recognition of the complementary relationship between formative and summative assessments echoes Garrison and Ehringhaus (2007), who advocate for a balanced approach.

On preferred assessment methods, Teacher A highlighted the value of questioning techniques, particularly in language instruction, for promoting engagement and comprehension. He noted the consistent implementation of both self- and peer-assessment practices, especially for spelling and vocabulary tasks, where students check work against answer keys. This, he explained, fosters reflective learning and reinforces correct usage, aligning with (DfE, 2003)sted. Notably, he reported no significant challenges with peer assessment, a finding that contrasts with Butt's (2010) concerns, though time constraints limited further exploration of this point.

When asked whether formative assessment could replace summative tasks, Teacher A offered a balanced view. He supported Miller and Lavin's (2007) argument that reducing summative pressure can alleviate student stress but maintained that summative assessments serve necessary functions, such as communicating progress to stakeholders and meeting accountability requirements. This reflects Harlen (2007) and Looney's (2011) view of summative assessment's institutional role.

The lesson observation reinforced these findings. In a Grade 9 Arabic B class, Teacher B employed several formative strategies, including differentiated questioning, immediate verbal feedback, and guided written exercises. However, the class concluded with a written comprehension task used for grading, illustrating a dual focus: supporting learning while meeting summative requirements. Despite integrating AfL strategies, summative goals remained central to planning and delivery.

Additional insights came from a student interview. The student, enrolled in Arabic B for four years, preferred interactive, feedback-rich activities like vocabulary games, group discussions, and peer assessments. She remarked, "I like when we correct each other's work because it helps me remember the words better." Yet, she noted these methods were less frequent than test preparation: "A lot of the time we are just getting ready for tests." This highlights students' appreciation for formative practices, though they appear overshadowed by the emphasis on summative tasks.

Both teacher and student accounts reveal a shared understanding of formative assessment's value while exposing structural constraints, particularly national policy expectations, that compel teachers to prioritize summative outcomes in curriculum delivery.

## **Observation**

The observed lesson, delivered by Teacher B, focused on the theme of careers and future aspirations and was designed to build students' vocabulary and conversational skills in Arabic through real-world application. The session began with a review of prior learning, during which the teacher used targeted questioning to activate students' recall of job-related vocabulary. Correct responses were visually reinforced through a shared slide, which highlighted key terms and provided immediate feedback—an effective Assessment for Learning (AfL) strategy.

Formative assessment techniques were consistently embedded throughout the lesson. Teacher B employed both open and closed questions, ensuring sufficient wait time after open-ended prompts, a strategy endorsed by Bartlett (2015) for encouraging critical thinking and meaningful student engagement. These dialogic interactions enabled learners to articulate their understanding, revise misconceptions, and participate more actively in classroom discourse.

A key strength of the session was its emphasis on oral communication. Students read model sentences aloud and responded to personalized questions, such as “What would you like to be in the future, and why?” This transitioned into a paired speaking activity in which one student assumed the role of a job applicant and the other acted as an employer, conducting mock interviews. This task demonstrated meaningful use of the target language in context, fostering peer interaction and reinforcing vocabulary through authentic communication.

Additionally, digital self-assessment was integrated Microsoft Forms using. Students independently reviewed vocabulary items and corrected their responses, promoting autonomous learning. Teacher B supported this process by circulating around the room, providing feedback and clarification, and prompting learners to reflect on their progress. This aligns with Office for Standards in Education [Ofsted], 2003, assertion that active student involvement in assessment enhances motivation and contributes to learning clarity.

However, despite the rich use of formative strategies, the lesson concluded with a worksheet-style task that resembled a summative assessment format, to be collected and marked later. The content and structure of the task echoed standard exam-style questioning, indicating that even within a formative-rich environment, summative requirements continue to shape the lesson’s pacing and endpoint. This reflects a broader systemic constraint, where the expectations of the local curriculum framework, particularly for Arabic as a second language, guide teachers to deliver lessons that align with end-of-term exam structures, even when formative practices are embedded throughout.

## Discussion

The findings of this study reinforce the complex and often conflicting realities that teachers face when implementing assessment practices in the context of Arabic as a second language within the IB Middle Years Programme (MYP). Both teacher and student perspectives revealed a strong awareness of the value and purpose of formative assessment, yet their experiences also highlighted systemic constraints that hinder its effective implementation.

Teacher A’s conceptualization of assessment aligns closely with the literature, viewing AfL as a continuous, student-centred process aimed at guiding instruction and monitoring progress (Bennett, 2011; Black & Wiliam, 2003). His reliance on questioning, peer correction, and self-assessment techniques reflects a thoughtful effort to engage learners in reflective and interactive learning experiences. Similarly, the classroom observation of Teacher B demonstrated how formative strategies, such as speaking tasks, digital self-assessment tools, and dialogic questioning, can be embedded within language instruction to enhance learner engagement and promote deeper understanding.

Despite these efforts, the interviews and observation also revealed a persistent tension between formative intentions and summative demands. Teacher A acknowledged that his formative practices were often shaped by school and policy-level expectations that prioritize

measurable outcomes. This mirrors Harlen's (2007) assertion that assessment policies can inadvertently encourage a focus on Assessment of Learning (AoL), thereby limiting opportunities for innovation and personalization in classroom assessment.

The student interview supported this view. The student appreciated interactive, feedback-rich activities but felt that assessments "count" only when tied to grades. This reflects the influence of a school culture dominated by summative evaluation and indicates a potential misalignment between students' experiences of learning and the pedagogical aims of AfL. Garrison and Ehringhaus (2007) warn that such misalignments may cause formative assessment to be undervalued or misunderstood unless institutional support is in place to embed AfL meaningfully into the school culture.

Furthermore, the observation revealed that although AfL strategies were present, they were frequently positioned within a framework designed to prepare students for summative assessments. For example, speaking and vocabulary activities were effectively implemented but framed as preparation for a formal written task. This indicates that while formative practices are being used, they often function in service of summative benchmarks, a situation that underscores the dominance of external assessment frameworks in shaping classroom practice.

These findings suggest that while teachers may be well-versed in the principles of AfL and demonstrate good practice, their ability to fully realize these methods is often limited by institutional and policy-driven expectations. As Boud (2006) and Looney (2011) argue, for formative assessment to truly support learning, it must be embedded within a school-wide culture that values growth over performance.

To move toward a more balanced and developmentally appropriate assessment environment, schools must empower educators with the flexibility, resources, and policy support necessary to prioritize formative learning experiences. Professional development, clearer alignment between IB assessment philosophy and national curricular expectations, and greater adaptability in assessment design are crucial—particularly in the context of Arabic as a second language, where learners' confidence and motivation are highly sensitive to the nature of classroom assessment.

## **Conclusion and Recommendations**

This study examined assessment practices in Arabic B within an IB MYP framework, focusing on the balance between formative and summative assessments. It highlighted the influence of institutional policies, teacher strategies, and student engagement in shaping assessment approaches. Findings indicate that while formative assessments, such as questioning, peer collaboration, and self-assessment, are effectively implemented, particularly by Teacher B, these practices are constrained by the dominant emphasis on summative assessments.

The observed lesson on careers and future aspirations showcased a highly effective application of Assessment for Learning (AfL) strategies. Teacher B successfully embedded real-world contexts to engage students, foster independence, and support language development, aligning with the pedagogical aims of the IB framework. However, the interview with Teacher A revealed a key tension: the institutional over-reliance on summative assessments for grading and reporting. This systemic dependence limits the full integration of

formative assessment and reflects a broader challenge in aligning educational practices with contemporary pedagogy.

The study suggests schools should reevaluate assessment policies to better support the development of formative assessment while maintaining accountability through summative assessments. It underscores the need for a school culture where formative assessment is not just an expectation but a consistent, supported practice, reinforced by professional development and cross-departmental collaboration. Aligning assessment frameworks with both student and educator needs will improve teaching effectiveness and deepen learning outcomes.

## **Limitations**

As a small-scale qualitative inquiry, this study's findings are based on data from two teachers and one student within a single IB school, limiting their generalizability to other educational settings. Additionally, the researcher's existing professional relationship with the participants may have influenced the openness and framing of their responses. These factors should be considered when interpreting the results.

This study suggests that schools need to reevaluate their assessment policies to better support the development of formative assessment practices while maintaining the necessary accountability for summative assessments. The findings underscore the importance of creating a school culture where formative assessment is not just a principle but a consistent practice, supported by professional development and cross-departmental collaboration. Furthermore, aligning assessment frameworks with the needs of both students and educators will enhance the effectiveness of teaching and foster deeper learning outcomes.

*Recommendations* arising from this research include:

- **Policy Alignment:** Revise school assessment policies to foster a balanced approach between formative and summative assessments, especially in language programs like Arabic B.
- **Professional Development:** Provide ongoing training in formative assessment strategies, emphasizing practical, easily applicable techniques.
- **Student Engagement:** Prioritize active student involvement in the assessment process through peer and self-assessment, promoting reflective, learner-centred practices.
- **Future Research:** Explore how schools can reconcile administrative accountability demands with the pedagogical benefits of flexible, student-centred learning, particularly in diverse educational contexts.

Ultimately, for formative assessment to reach its full potential, it must be systematically supported by both policy and classroom practice, enabling teachers and students to fully leverage its benefits for meaningful learning.

## **Acknowledgments**

I would like to express my sincere gratitude to Mr. Richard Jhon Drew, JBS School Principal and my Professor, Dr. Jean Touma for their valuable guidance, encouragement, and feedback throughout this research journey. I am also deeply thankful to the school leadership for granting permission to conduct the study and to the Arabic B teachers who participated in the



interviews and classroom observations for their openness and support. Their contributions were essential to the completion of this work. I also extend my appreciation to my colleagues and peers for their insights and encouragement during the research process.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

ChatGPT was used during the preparation of this manuscript to support language refinement, enhance clarity, and paraphrase selected sections. All research ideas, theoretical concepts, data interpretations, and discussions presented in this work are entirely the author's own. The content has been thoroughly reviewed and edited by the author to ensure accuracy, originality, and academic integrity.

## References

- Andrade, H. L., & Du, Y. (2007). Student responses to criteria-referenced self-assessment. *Assessment & Evaluation in Higher Education*, 32(2), 159–181.  
<https://doi.org/10.1080/02602930600801928>
- Bartlett, S. (2015). *Introduction to education studies* (3rd ed.). SAGE Publications.
- Bennett, R. E. (2011). Formative assessment: A critical review. *Assessment in Education: Principles, Policy & Practice*, 18(1), 5–25.  
<https://doi.org/10.1080/0969594X.2010.513678>
- Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education: Principles, Policy & Practice*, 5(1), 7–74.  
<https://doi.org/10.1080/0969595980050102>
- Black, P., & Wiliam, D. (2003). Involvement and autonomy in assessment: An alternative to the summative/ formative dichotomy. In M. Segers, F. Dochy, & E. Cascallar (Eds.), *Optimising new modes of assessment: In search of qualities and standards* (pp. 33–54). Springer.
- Black, P., & Wiliam, D. (2018). Classroom assessment and pedagogy. *Assessment in Education: Principles, Policy & Practice*, 25(6), 551–575.  
<https://doi.org/10.1080/0969594X.2018.1441807>
- Boud, D. (2006). Implementing student self-assessment. *Higher Education Research & Development*, 25(3), 339–354. <https://doi.org/10.1080/07294360600891886>
- British Educational Research Association. (2018). *Ethical guidelines for educational research* (4th ed.). <https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018>
- Brooks, V. (2002). *Assessment in secondary schools: The new teacher's guide to monitoring, assessment, recording, reporting, and accountability*. Open University Press.
- Butt, G. (2010). *Making assessment matter*. Continuum International Publishing Group.
- Chin, C. (2007). Teacher questioning in science classrooms: Approaches that stimulate productive thinking. *Journal of Research in Science Teaching*, 44(6), 815–843.  
<https://doi.org/10.1002/tea.20171>
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge.
- Department for Education. (2003). *Good practice in modern foreign languages assessment at Key Stage 3*. Department for Education and Skills.  
<https://dera.ioe.ac.uk/id/eprint/4976>

- Department of Education. (n.d.). *Languages programmes of study: Key Stage 3. National curriculum in England*. <https://www.gov.uk/government/publications/national-curriculum-in-england-languages-programmes-of-study>
- Dixon, D., & Worrell, F. C. (2016). Formative and summative assessment in the classroom. *Theory Into Practice*, 55(2), 153–159. <https://doi.org/10.1080/00405841.2016.1148989>
- Eckhout, T., Davis, S., Mickelson, K., & Goodburn, A. (2005, January). A method for providing assessment training to in-service and pre-service teachers. Paper presented at the *Southwestern Educational Research Association*, New Orleans, LA.
- Gardner, J. (2012). *Assessment and learning* (2nd ed.). Sage Publications.
- Garrison, C., & Ehringhaus, M. (2007). *Formative and summative assessments in the classroom*. [https://www.nmsa.org/portals/0/pdf/publications/On\\_Target/formative\\_assessment/On\\_Target\\_Assessment.pdf](https://www.nmsa.org/portals/0/pdf/publications/On_Target/formative_assessment/On_Target_Assessment.pdf)
- Gielen, S., Tops, L., Dochy, F., Onghena, P., & Smeets, S. (2010). A comparative study of peer and teacher feedback and of various peer feedback forms in a secondary school writing curriculum. *British Educational Research Journal*, 36(1), 143–162. <https://doi.org/10.1080/01411920802042370>
- Good assessment practice in modern foreign languages (MFL). (2003). Ofsted. <https://dera.ioe.ac.uk/id/eprint/4976>
- Harlen, W. (2007). Teachers' summative practices and assessment for learning – Tensions and synergies. *The Curriculum Journal*, 16(2), 207–223. <https://doi.org/10.1080/09585170500136093>
- Heaton, J. B. (1990). *Writing English language tests* (New ed.). Longman.
- Inbar-Lourie, O. (2008). Constructing a language assessment knowledge base: A focus on language assessment courses. *Language Testing*, 25(3), 385–402. <https://doi.org/10.1177/0265532208090158>
- International Baccalaureate. (2014). *MYP: From principles into practice*. International Baccalaureate Organization.
- International Baccalaureate. (2020). *Language acquisition guide*. International Baccalaureate Organization.
- Looney, J. W. (2011). Integrating formative and summative assessment: Progress toward a seamless system? OECD Education Working Papers, No. 58. <https://doi.org/10.1787/5kghx3kbl734-en>
- Maki, P. L. (2002). Developing an assessment plan to learn about student learning. *The Journal of Academic Librarianship*, 28(1–2), 8–13. [https://doi.org/10.1016/S0099-1333\(01\)00295-2](https://doi.org/10.1016/S0099-1333(01)00295-2)

- Mertler, C. A. (2009). *Action research: Teachers as researchers in the classroom* (2nd ed.). SAGE Publications.
- Miller, D., & Lavin, F. (2007). But now I feel I want to give it a try: Formative assessment, self-esteem and a sense of competence. *The Curriculum Journal*, 18(1), 3–25. <https://doi.org/10.1080/09585170701292109>
- Robson, C., & McCartan, K. (2016). *Real world research* (4th ed.). Wiley.
- Scarino, A. (2013). Language assessment literacy as self-awareness: Understanding the role of interpretation in assessment and in teacher learning. *Language Testing*, 30(3), 309–327. <https://doi.org/10.1177/0265532213480128>
- Spendlove, D. (2009). *Putting assessment for learning into practice*. Continuum.
- Stiggins, R. J. (1992). Assessment literacy. *The Phi Delta Kappan*, 74(7), 534–539.
- Sumner, R. (2002). *The role of assessment in school*. NFER Nelson Publishing Company.
- Thomas, G. (2017). *How to do your research project: A guide for students in education and applied social sciences* (3rd ed.). SAGE.
- United Arab Emirates Ministry of Education. (2017). *Framework for learning Arabic as an additional language*. Ministry of Education.
- Vahid, N., & Nasrin, B. (2019). A review of literature on language assessment literacy in the last two decades (1999–2018). *Assessment*, 8(11), 1–16.
- Wellington, J. (2015). *Educational research: Contemporary issues and practical approaches* (2nd ed.). Bloomsbury Publishing.

**Contact email:** imad.nasr81@gmail.com

## **A Study of Problems, Needs and Guidelines for Helping Children With Cochlear Implantation in Inclusive Schools**

Chanida Mitranun, Srinakharinwirot University, Thailand  
Maliwan Tammaeng, Suan Dusit University, Thailand  
Pradabsri Pintuto, Nakhon Ratchasima Rajabhat University, Thailand

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This research aimed to study the problems, needs, and guidelines for helping children with cochlear implantation (CI) in inclusive schools. The participants were divided into two phases. Phase 1, the study of problems and needs of children with CI, included school directors, teachers, parents, and students with CI, totaling 25 people. Phase 2, the study of guidelines for helping children with CI, included 12 specialists with knowledge and/or experience related to children with CI. The data were collected through documents, observation, and focus group, and data analysis using content analysis. The research findings were as follows: The problems: a lack of specialized personnel for speech training, a limited number of schools accepting children with CI, teachers lacking knowledge and understanding of how to assist children with CI, parents and teachers lacking knowledge about the rights, welfare, and sources of assistance for children with CI. Parents were also concerned about the speech training cost and the educational future of their children with CI. The needs of children with CI: the needs for teachers who could provide speech training, the promotion of teachers' knowledge about CI, a support system for children with CI, and increased publicity about the rights and welfare of children with CI. The guidelines for helping children with CI: establishing an effective transition system, formulating robust policies and laws related to special education, developing communication skills for children with CI, organizing programs to enhance teachers' understanding, and creating a public relations system about information on CI.

*Keywords:* children with cochlear implantation, problems, guidelines for helping, inclusive schools

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Persons with hearing impairment refers to individuals who have lost auditory function due to defects or impairments in the hearing organs, such as deteriorated or damaged auditory nerves, resulting in the inability to hear sounds clearly or at all. This group includes those with hearing loss between 26–90 decibels, which impacts their daily lives. Hearing impairment can be categorized into two types: hard-of-hearing and deaf. Deaf people refer to individuals who experience such severe hearing loss that they are unable to comprehend speech through hearing, regardless of whether or not they use a hearing aid, with a measured hearing loss of 90 decibels or more (Ministry of Education, 2009).

In Thailand, according to data from the national disability registration database maintained by the National Office for Empowerment of Persons with Disabilities, it was found that the number of people with hearing and interpretive disabilities accounts for 19.12 percent of all persons with disabilities. Furthermore, an analysis of the three-year trend revealed that the number of people with hearing and interpretive disabilities has continued to increase annually (Committee of Empowerment of Persons with Disabilities, 2024).

Although hearing loss may arise from many uncontrollable causes, systematic screening, treatment, rehabilitation, and care must be implemented to reduce the incidence of hearing loss across all age groups (Communication Unit, Health Systems Research Institute, 2019).

Medical advancements in “cochlear implantation” have enabled individuals with hearing loss or deafness to regain the ability to hear, improve their quality of life in society, and reduce the social costs associated with assisting the deaf. At present, cochlear implantation can be performed in young children aged one year and older and has shown positive outcomes in language development among children with cochlear implants, with development close to that of children with normal hearing (Komin, 2008).

This is consistent with the research of Tammasaeng and Mitranun (2018), which found that children who received cochlear implantation between the ages of 1 year and 5 years 6 months had better post-implantation quality of life, according to the perspectives and experiences of their parents, compared to children who received implantation between the ages of 5 years 7 months and 10 years 6 months, and children who received implantation at the age of 10 years 7 months and above.

According to a report on the status of the cochlear implant registry in Thailand as of 31 August 2019, the system contained data on all registered patients. It was found that the majority of the children were between the ages of 2–4 years and had been assessed for cochlear implantation (19.14 percent) (Piromchai et al., 2020). However, when considering statistics on children with cochlear implants who were unable to enroll in inclusive schools and had to return to study in schools for disabilities in significant numbers, this reflects a lack of cost-effectiveness in cochlear implantation. One contributing factor is the education system’s refusal to accept children with cochlear implantation into schools, resulting in suboptimal outcomes in auditory and speech rehabilitation following the cochlear implantation. This aligns with the findings of Tammasaeng and Mitranun (2018), who found that parents of CI children were concerned that many schools refused to accept CI children. As a result, families had to relocate to live near schools that accepted CI children, enroll in expensive private schools, or send their children to schools for the deaf, which limited the CI children’s opportunities to develop spoken language. In such environments, children tended

to adopt sign language as the primary mode of communication, influenced by the context of the school.

Therefore, the researcher was interested in studying the problems, needs, and guidelines for supporting children with cochlear implants in inclusive schools. The results of this study will be used to establish a model AVT center to support CI children in inclusive schools, aiming to enhance their educational capabilities and reduce the number of children with cochlear implants who must return to schools for the deaf. The findings will also serve as foundational information for developing policies on establishing AVT centers nationwide to support children with cochlear implants.

### **Research Objective**

To study of problems, needs and guidelines for helping children with cochlear implantation in inclusive schools.

### **Methodology**

#### **Phase 1: Study of the Problems and Needs of Children With Cochlear Implants in Inclusive Schools**

##### ***Step 1: Study of the Actual Educational Conditions of Children With Cochlear Implants in Inclusive Schools***

Details are as follows:

Participants included 1 school administrator, 2 teachers of children with cochlear implants, 2 parents of children with cochlear implants, and 2 learners with cochlear implantation from Phratumnuk SuanKularb School, a total of 7 persons. Data collection instruments included focus group discussion topics, focus group discussion record forms, and audio recorders. Data were collected through focus group discussions and a study of the actual educational conditions of children with cochlear implants in inclusive schools. Data were analyzed using content analysis.

##### ***Step 2: Study of the Problems and Needs of Children With Cochlear Implants in Inclusive Schools***

Details are as follows:

Participants included 6 teachers of children with cochlear implants in inclusive schools, 1 teacher of children with cochlear implants from the Central Special Education Center, 1 teacher of children with cochlear implants from the Demonstration and Development Center for Children with Cochlear Implant, and 10 parents of children with cochlear implants, a total of 18 persons. Data collection instruments included focus group discussion topics, focus group discussion record forms, and audio recorders. Data were collected through focus group discussions, divided into 2 groups: a group of 10 parents of children with cochlear implants supported by the Foundation for the Deaf, and a group of 8 teachers of children with cochlear implants supported by the Foundation for the Deaf. Data were analyzed using content analysis to enable the researcher to understand the problems and needs of children with cochlear implants in inclusive schools and to gather suggestions for the future.

## **Phase 2: Study of Guidelines for Helping Children With Cochlear Implants in Inclusive Schools**

Participants were specialists/experts with knowledge and/or experience related to children with cochlear implants, including 1 Director of the Educational Promotion in Schools for Disabilities Group, 1 deputy director of a special education center, 1 deputy director of an inclusive school, 1 deputy director of a school for the deaf, 2 university lecturers, 2 special education teachers from the Demonstration and Development Center for Children with Cochlear Implant, 2 special education teachers from a provincial special education center, 1 special education teacher from a school for the deaf, and 1 parent of a child with cochlear implants, a total of 12 persons. Conducting a focus group to explore of guidelines for helping children with cochlear implants in inclusive schools. The research instruments are a tape recorder, and a focus group record form. The qualitative data were analyzed through the content analysis involving the coding for the theme, looking for pattern, and making interpretations.

### **Results**

The problems of children with cochlear implants in inclusive schools are as follows:

#### **Teacher-Related Issues**

There is a lack of teachers with expertise in speech training for learners with cochlear implantation in inclusive schools. As a result, learners lack confidence in communicating with others, refuse to use spoken language, and instead rely on sign language. This negatively affects their cognitive development and various skills. Teachers lack knowledge and understanding regarding the support and care of children with cochlear implants. This includes a lack of knowledge about children with cochlear implants, failure to prepare individualized education program (IEPs) for children with cochlear implants, and insufficient understanding of cochlear implant care. Consequently, teachers may view children with cochlear implants as burdens.

#### **School-Related Issues**

There are few schools that accept children with cochlear implants, due to shortages of special education teachers, inadequate environments, learning materials, and facilities to accommodate children with cochlear implants. Additionally, there is a negative attitude among school administrators, who believe that children with cochlear implants should study in schools for disabilities rather than in mainstream schools.

#### **Parent-Related Issues**

Parents were unable to continuously take children with cochlear implants for speech training due to the high cost of speech therapy. Additionally, frequent malfunctions of the cochlear implant caused time delays for repairs and incurred high expenses. Without the cochlear implant, children with cochlear implants could not hear, which affected teaching and learning, as children with cochlear implants could not understand vocabulary and sentences spoken by the teacher. As a result, they lost interest in learning and were unable to communicate effectively, leading children with cochlear implants to use sign language instead of spoken language. Parents lacked knowledge and understanding about the rights and



welfare of children with cochlear implants, as well as information about available support services and the transition of children with cochlear implants. This led to high expenses for parents. Children who had undergone implantation were slow in developing speech because they had to wait in a long queue for speech training after cochlear implantation and due to the lack of a systematic transition process for children with cochlear implants. Parents felt anxious about the educational future of children with cochlear implants and were uncertain whether their children should continue along the vocational or academic track.

The needs of children with cochlear implants in inclusive schools revealed the following:

### **Teacher-Related Needs**

There should be special education teachers who can provide speech training for children with cochlear implants in inclusive schools. There should be dedicated rooms and scheduled hours for listening-based speech training for children with cochlear implants. Speech training clubs should be established. There should be collaboration among special education teachers, regular teachers, guidance counsellors, and speech therapists from hospitals to support and promote learning and appropriate classroom behavior for children with cochlear implants. Teachers should be encouraged to gain knowledge about supporting children with cochlear implants, such as creating IEPs, understanding the nature of children with cochlear implants, providing academic and behavioral support—e.g., speaking slowly to enable children with cochlear implants to lip-read, assigning a buddy from the regular students to assist children with cochlear implants, and fostering a supportive attitude towards children with cochlear implants. Teachers should also know how to maintain and change the battery of the cochlear implant. Parental cooperation is essential in consistently helping the child practice listening, speaking, and reading, and schools should work in coordination with parents to support the development for children with cochlear implants.

### **School-Related Needs**

Schools should provide systems for care, supplementary teaching, and support for children with cochlear implants, such as after-school tutorials, peer support systems, and buddy programs where classmates help children with special needs. There should be more dissemination of information about the rights and welfare of children with cochlear implantation and the available speech training resources so that both teachers and parents are well-informed, which would benefit the schools, parents, and children with cochlear implantation.

The guidelines for helping children with cochlear implants in inclusive schools.

### **Establishing an Effective Transition System**

The transition process should begin at the hospital level by providing knowledge and understanding of the cochlear implantation process—before, during, and after implantation—to both parents and children with cochlear implants. Information about the children with cochlear implants should then be transferred from the hospital to the provincial special education center. Parents will play a role in delivering accurate information to the provincial special education center. The center will then prepare the children with cochlear implants by providing listening-based speech training and avoiding the use of regional dialects, which may cause speech distortion in this group of children. This preparation process requires

cooperation from both parents and hospitals. When the children are ready to attend an inclusive school, the provincial special education center will create an individual transition plan (ITP) for the inclusive school and continue to monitor the children with cochlear implants through the school and parents to ensure consistent support for children with cochlear implants. Schools will need information from the special education center and accurate data from parents. It can be seen that a successful transition system requires cooperation and awareness from all parties, including hospitals, special education centers, school administrators, and all teachers, with parents serving as effective coordinators.

### **Formulation of Policies and Legislation Related to Special Education**

The formulation of policies and legislation related to special education in a serious manner by establishing a policy requiring individuals who pass the examination to become school directors, deputy school directors, and educational supervisors who did not graduate in the field of special education to complete at least one training course on “Education for Children with Special Needs.” The Teachers’ Council of Thailand must stipulate that all Bachelor of Education students must take at least one course in “Education for Children with Special Needs” in order to gain knowledge and understanding for teaching and supporting this group of children. Furthermore, there should be a policy requiring all schools to place importance on and accept children with cochlear implants into the schools, and must prepare IEP and ITP for every child in this group. In addition, there should be a policy to address the shortage of teachers in auditory-verbal teaching, divided into 3 phases as follows: short-term, hiring auditory-verbal teachers to be stationed at schools by requesting cooperation from parents to share the costs or requesting assistance from the provincial special education center; medium-term, training teachers to be able to teach auditory-verbal by requiring that every school must have one AVT teacher per school; long-term, developing a Graduate Diploma Program in the Teaching Profession in the field of education management for children with cochlear implants.

### **The Development of Communication Skills for Children With Cochlear Implants in Inclusive Schools**

Schools should continuously develop communication skills for children with CI because if development is not continuous, this group of children will revert to using sign language, especially deaf children who have undergone implantation after previously attending school for the deaf, which results in a waste of the budget used for cochlear implantation. Therefore, schools should establish a “special needs student service center” consisting of an academic support classroom and a speech training room to provide auditory-verbal training services, with an auditory-verbal teacher assigning speech training hours to children with cochlear implants. In cases where the school does not have an auditory-verbal teacher, coordination can be made with hospitals and the special education center to send students to receive speech training during class time, or request services from the provincial special education center to assist in providing learning and behavioral counselling, guidance and counselling on possible pathways after completing basic education, preparing IEP, IBP, and ITP, transitioning between grade levels and school levels, coordinating with hospitals and the special education center to support speech training and other aspects. Teachers should use spoken language with children with cochlear implants more than using sign language for communication, and should also cooperate with parents in conducting speech practice at home and follow up consistently.

## **Developing Knowledge and Understanding Programs on Children With Cochlear Implants in Inclusive Schools**

Most teachers in inclusive schools did not graduate in the field of special education, they lack knowledge and understanding in supporting children with cochlear implants. Therefore, there should be practical workshops on “supporting children with cochlear implants in school,” as well as in-house training by special education teachers and conducting PLC after school. The topics for knowledge provision include changing batteries for cochlear implants, auditory-verbal therapy (AVT), preparing IEP and ITP, etc. Continuous teacher development is necessary so that every teacher will be able to support children with cochlear implants in inclusive schools.

## **Establishing a Communication System Regarding Medical Legislation and Cochlear Implantation Information**

Establishing a communication system regarding medical legislation and cochlear implantation information in a comprehensive manner so that parents of children with hearing impairments are informed about the rights of children with cochlear implants from before the cochlear implantation process, during implantation, and after implantation in order to receive equal educational opportunities with normal children, as well as enabling early identification of children with hearing impairments from the hospital level, which will lead to earlier cochlear implantation, allowing the child to hear sounds sooner and thereby improving the quality of life for this group of children.

## **Discussion**

Shortage of teachers with expertise in speech training for learners with cochlear implantation in inclusive schools; lack of knowledge and understanding regarding the support and care for children with cochlear implants due to a shortage of special education teachers. According to the report on the number of civil servant teachers and educational personnel in inclusive schools, it was found that teachers with qualifications in special education at all levels accounted for 0.52 percent of the total number of teachers in inclusive schools (Special Education Bureau, Office of the Basic Education Commission, 2023). This is consistent with Jatuchokudom et al. (2022), who stated that obstacles to individualized special education include that teachers are not yet ready to accept students into mainstream classrooms, teachers still need additional training in special education, there is a shortage of special education teachers, and teachers resign during the semester. The number of schools accepting children with cochlear implants is low, including the negative attitudes of school administrators towards children with cochlear implants. This is because administrators are a key factor in promoting the success of inclusive education. Administrators must be the ones who implement and define strategies, establish practical and continuous policies, and must have a positive attitude towards special education, not seeing it as an obligatory burden. The attitudes of administrators greatly affect the management of special education in educational institutions (Jatuchokudom et al., 2022). This corresponds with the research by Kingkaew et al. (2019), which found that sometimes schools refuse to accept students with cochlear implantation and that schools are unable to accommodate all types of students with special needs (Songpracha, 2019). Parents are unable to bring children with cochlear implants to speech training sessions continuously due to the high costs of speech training and expenses related to cochlear implants; lack of knowledge and understanding about the rights and welfare for children with cochlear implantation; and anxiety about the educational future of

children with cochlear implantation. This is because treatment with cochlear implantation involves relatively high costs. This corresponds with Pitathawatchai (2022), who stated that a high-spec cochlear implant costs no less than 850,000 baht, and there are also other post-implantation expenses such as batteries or spare parts that break easily, averaging about 30,000–40,000 baht per year. Only children whose parents are civil servants can claim reimbursement and access cochlear implants. If they are not civil servants, very few children can access this treatment, leading parents to incur debts both within and outside formal systems to cover the medical expenses. Factors affecting the success of transition implementation include the existence of legal and policy support systems; participation of persons with disabilities, their parents or guardians, administrators, teachers and personnel in educational institutions, workplaces, organizations, and relevant agencies, all of whom must have roles, duties, and responsibilities to drive successful transition management. Related personnel must have knowledge, understanding, and a positive attitude towards transition services in order to enable practical implementation. There must be sufficient and appropriate resources in terms of budget, materials, and technology to support transition services. There must be a system for managing transition services that is appropriate to the context of the educational institution and quality coordination must be present (Special Education Bureau, Office of the Basic Education Commission, Ministry of Education, 2018). The establishment of policies and laws related to special education and their serious implementation is essential for creating an education system that fairly and equitably responds to the needs of all children. It guarantees children's rights and helps ensure that children with special needs receive the right to access education equally, including services appropriate to the specific needs of this group of children. Moreover, clear policies can support teachers and educational personnel in training and developing skills for working with children with special needs, as well as assist in allocating necessary resources for education, raising social awareness, reducing the stigmatization of children with special needs, and increasing acceptance of children with special needs, along with effective monitoring and evaluation of operations (National Centre for Learning Disabilities, 2020). This corresponds with Morrison (Morrison, 2014), who found that the establishment of policies for equal access to education and appropriate support for children with special needs is crucial for creating an education system that fairly and equitably responds to the needs of all children. Children with cochlear implantation need continuous speech training and a support system for inclusive learning in mainstream schools. The support system for children with cochlear implants is important in several respects: 1) Development of communication skills: Children with cochlear implants need support in developing speech and listening skills in order to communicate effectively. 2) Access to education: The support system helps children access quality education and enables them to learn according to appropriate standards. 3) Emotional support: Having a support system reduces the anxiety of parents and builds confidence in children. 4) Building understanding in society: It supports children in adapting to society and improving their relationships with classmates. 5) Development of social skills: The system supports children in developing social skills and collaboration with others (Luangpitakchumpon, 2010). Therefore, having a support system for children with cochlear implants is important to increase children's learning rates, provide opportunities for children to exhibit speech and conversational behaviors among themselves, and emphasize practice to enhance children's understanding. An effective child support system is thus crucial for the inclusive and sustainable development of children with cochlear implants (Preece, 2014). Training is a process of developing personnel in an organization through a systematically conducted training program, including planning the training, implementing according to the plan, and evaluating the training program, in order to enhance the working potential of personnel in terms of knowledge, skills, attitudes, and proficiency in performing their duties (Ritjaroon,

2017). The responsible government agencies should establish effective public relations strategies by building correct understanding and disseminating truthful information through appropriate media channels. Tools used for public relations include, for example, radio, television, magazines, newspapers, billboards, internet, news releases, interviews, exhibitions, seminars, forums, discussions, and competitions (Krittakom, 2021).

### **Recommendations**

The Office of Special Education Administration should an effective transition policy system, raising awareness and providing knowledge to school directors and educational supervisors, cooperation with the Teachers Council to contain special education courses for teacher student in all educational institutions, etc. and cooperate with educational institutions to promote and support teachers in all schools to receive AVT training courses, and establish a public relations system regarding medical laws and information on cochlear implantation.

### **Acknowledgements**

The author would like to thank The Foundation for the Deaf Under the Royal Patronage of Her Majesty the Queen in Thailand to support research funds for this research.

## References

- Committee of Empowerment of Persons with Disabilities. (2024). *Empowerment of Persons with Disabilities Act B.E. 2550 (2007)*. Ministry of Social Development and Human Security.
- Jatuchokudom, S., Chaowchalermgul, N., Mitranun, C., & Khiowvichit, C. (2022). Trends in the provision of inclusive education in Thailand and factors for success. *Journal of Research and Development Special Education*, 11(1), 17–34.
- Kingkaew, P., Chinnacom, D., Chanjam, C., Malathong, N., & Yimtae, K. (2019). *Service availability and readiness assessment of cochlear implantation and rehabilitation services in Thailand*. Health Systems Research Institute (HSRI).
- Komin, K. (2008). *Cochlear implant: A gateway to a world of sound*. [http://www.hopetohear.net/special\\_story1\\_ci\\_doctor.html](http://www.hopetohear.net/special_story1_ci_doctor.html)
- Krittakom, S. (2021). The basic conceptual framework of public relations. *Journal of Modern Learning Development*, 6(5), 261–273.
- Luangpitakchumpon, P. (2010). *The development of auditory verbal therapy program for prelingually deafened children with cochlear implant* [Master's thesis, Srinakharinwirot University].
- Ministry of Education. (2009). *Ministerial regulation on defining categories and criteria for students with disabilities in education, B.E. 2552 (2009)*. Ministry of Education.
- Morrison, R. (2014). Understanding special education policy in the United States. *Journal of Special Education Leadership*, 4, 31–38.
- National Centre for Learning Disabilities. (2020). *Supporting teachers in special education: Best practices*.
- Piromchai, P., Thanawirattananit, P., & Phuttharak, W. (2020). *Cochlear implant*. Health Systems Research Institute (HSRI).
- Pitathawatchai, P. (2022). *The right to implant cochlear implants in children has not yet been realized in practice*. <https://www.thecoverage.info/news/content/3612>
- Preece, P. (2014). *Special educational needs: A practical guide for teachers*. Routledge.
- Ritjaroon, P. (2017). Training project evaluation: Concepts, models, and evaluation process. *STOU Education Journal*, 10(1), 42–57.
- Songpracha, P. (2019). *The environment supporting students learning in school for the deaf* [Master's thesis, Silpakorn University].
- Special Education Bureau, Office of the Basic Education Commission, Ministry of Education. (2018). *Transition services for students with disabilities in schools*. Ministry of Education.

Tammasaeng, M., & Mitranun, C. (2018). The quality of life of children with cochlear implantation: Parental perspectives and experiences. *Journal of Graduate Studies Valaya Alongkorn Rajabhat University*, 12(2), 35–48.

**Contact email:** [chanidam@g.swu.ac.th](mailto:chanidam@g.swu.ac.th)





## **Developing a WARA in Upper Elementary School Students With Reading Difficulties**

Cheerapat Sirirak, Srinakharinwirot University, Thailand

Chanida Mitranun, Srinakharinwirot University, Thailand

Kanokporn Vibulpatanavong, Srinakharinwirot University, Thailand

Purin Nititummanusorn, Phuket Rajabhat University, Thailand

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

The purpose of this research is to develop a web application learning innovation for promoting reading ability: WARA in upper elementary school students with reading difficulties. Phase one was concerned with the creation of the web application learning innovation learning innovation for promoting reading ability in upper elementary school students with reading difficulties and the population consisted of nine experts. The instruments included a draft of a web application learning innovation package and a draft evaluation web application form. The data was statistically analyzed by mean average and standard deviation. Phase Two was experimental, with a focus on improvement. The population consisted of fifteen grades 4-6 students with reading difficulties and five teachers. The instruments included a web application learning innovation package and questionnaires. The data were statistically analyzed by mean average, standard deviation, E1/E2 and E.I. The findings were as follows: (1) A web application learning innovation for promoting reading ability in upper elementary school students with reading difficulties has the highest level of suitability evaluation results ( $\mu = 4.82$ ,  $\sigma = 0.40$ ) and (2) the efficiency was 82.06/82.92, and the effectiveness was E.I. = 0.75.

*Keywords:* web application, reading abilities, students with reading difficulties

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Dyslexia is a significant issue that must be addressed because it impacts kids' learning in all subjects as well as their motivation for self-development. Some dyslexic students experience low self-esteem, while others develop behavioral issues as a result. As a result, all educational institutions must rapidly identify solutions to the problem and promote reading. The importance of reading for Thai children can be seen in the definition of their characteristics in the 21st century, or Thailand 4.0 era, which emphasizes the 3Rs principle: Reading, Writing, and Arithmetic. Reading is an essential skill for Thai children to become significant contributors to the further development of their country. Additionally, other skills are also not neglected and developed accordingly (Education Council, 2019). Most students who receive appropriate instruction can read according to their age. Despite receiving appropriate instruction, some students struggle to read. These students, who have normal or above-average intelligence, are often diagnosed with learning disabilities (LD) after screening and diagnosis.

Students with learning disabilities are individuals whose psychological processes are impaired, resulting in challenges related to language use encompassing listening, reading, speaking, writing, and spelling, as well as difficulties in mathematics. It is important to note that these challenges are not attributed to physical, visual, hearing, or intellectual impairments, nor are they associated with cultural, economic, or environmental disadvantages in their surroundings (Arayawinyu, 2001). In fact, their intelligence levels are generally within the normal or even high range, yet they often exhibit suboptimal academic achievement (Korsuwan, 2010).

Elementary students with learning disabilities often experience problems with reading, speaking, language expression, and behavior. Without appropriate intervention, these students could potentially pose challenges to society (Arayawinyu, 2001). Reading disabilities are the most common type of learning disability, accounting for approximately 80% of all cases (Sriwanyong, 2009). Students with reading disabilities have difficulty remembering consonants and vowels, spelling words, and learning new vocabulary. As a result, they may struggle to read, read only simple words, read incorrectly, or stutter (Rajanakul Institute, 2012).

There are many ways to teach reading to students with reading difficulties, depending on the nature of the problem and the student's reading level. In all cases, it is important to make reading fun and motivating for students.

The Application for Education (WARA) is an educational innovation that meets this need, especially during the COVID-19 pandemic. Learners can access lessons anywhere, anytime, and on any digital device with an internet connection, such as a personal computer, laptop, smartphone, or tablet. WARA is easy to access and meets the diverse needs of users, reducing limitations on access devices. The application is also a new and innovative type of media that can be designed for a variety of academic purposes and functions.

WARA was primarily designed as a learning media, instruction media, or construction media (Office of the Basic Education Commission, 2012). It also promotes interaction between students and lessons, developing learning skills and creating value for learners. Learners can learn at their own pace and select or do exercises on topics that interest them first. They can easily go back and forth or to the starting point to review lessons if needed. This allows

learners to practice and learn anytime, anywhere, fulfilling their needs and abilities, and helping them achieve their goals more easily. The Application for Education can be designed to be colorful and beautiful, with text, images, animations, videos, and sounds combined to make them interesting, exciting, and engaging. This can help students respond and learn more quickly. (Chinsri & Wasukree, 2015; Donnelly, 2020; Konglun & Runawat, 2016; Lichanporn, 2013; Office of the Basic Education Commission, 2012; Suwanno, 2020; Udomphon et al., 2016).

Application developers can motivate and engage learners by incorporating game concepts into educational applications. This creates a fun and motivating learning environment that stimulates interest in learning and makes learning more enjoyable (Poondet & Lertphonkulrat, 2016). As a result, learning becomes more sustainable and meaningful. Studies have shown that introducing game mechanics or gamification into education is a significant and necessary way to motivate learners, enhance academic achievement, and improve learner attitudes. Students' concerns decline, while positive motivation increases at all levels.

Researches have shown that game-based applications are suitable for groups of learners with special needs, such as ADHD, mild intellectual disabilities, and learning disabilities (e.g., reading disabilities) (Gooch et al., 2016; Simões et al., 2013; Sitra et al., 2017; Yonwilas, 2019). The Application for Education can also be designed to provide individualized academic performance reports, informing learners, teachers, and parents of the results and allowing them to follow up and check students' learning progress. Analysis of the features and functionalities above reveals that the application can be purposefully designed and developed to adhere to a specific format conducive to learning. Such a format facilitates the realization of clearly defined learning objectives set by instructors (Steven et al., 2018). Consequently, the application emerges as a supplementary tool that effectively bolsters the learning skills and capacities of students with disabilities.

Motivated by these considerations, the researcher embarked on a study focusing on the development of the WARA as an innovative tool aimed at enhancing students' proficiency in reading basic words with accuracy, speed, and efficiency. Additionally, it aspires to cultivate a heightened motivation for reading while affording learners opportunities for communication and active participation in activities with both teachers and peers.

## **Research Objectives**

To develop a web application learning innovation for promoting reading ability in upper elementary school students with reading difficulties.

## **Literature Review**

### **Elements of Reading**

Summary of the essential elements of reading according to the National Reading Panel (USDHHS, 2000) consisting of 5 important reading points as follows:

1. Phonemic awareness is an auditory process that involves hearing the sounds of words. This skill includes rhyming sounds. Mixing sounds to form words and separating sounds in words.

2. Phonics is the realization that sounds are linked to letters and that those letters come together to form words. In reading and spelling Readers will use their knowledge of language to identify the pattern of letter sounds.
3. Fluency is reading easily and automatically. Taking into account each word only by sight (by sight), reading fluently and naturally. Like when speaking informally.
4. Vocabulary: Understanding the meaning of words and using words in listening, speaking, reading, and writing.
5. Comprehension is considered the objective of reading. It is a process of perception. complex, which allows the reader to understand the meaning of the message and can correct incorrect or unintelligible messages.

### **Target Group**

This study was conducted in two phases, each involving specific participant groups aligned with the research objectives: development, evaluation, and implementation of the web-based learning innovation designed to promote reading ability among upper primary school students with reading difficulties.

### **Participants**

#### ***Phase 1: Development of the Web-Based Learning Innovation***

A total of nine experts participated in the evaluation of the draft web-based learning innovation. The experts were selected based on purposive sampling and met at least one of the following criteria: possession of a master's degree or higher, a special academic rank, or a minimum of ten years of relevant professional experience. The panel was composed of: Three Thai language education specialists, Three experts in special education, and Three specialists in educational technology and web-based learning innovations. These experts provided feedback on content accuracy, pedagogical soundness, technical design, and applicability for students with reading difficulties.

#### ***Phase 2: Implementation and Evaluation of the Learning Innovation***

##### **1. Students With Reading Difficulties**

A group of 15 upper primary students (Years 4–6) identified as having reading difficulties participated in the experimental phase of the study. These participants were selected using purposive sampling, based on the following inclusion criteria established by the researcher: Currently enrolled in Year 4 to Year 6 at the primary education level; Demonstrated difficulty reading Thai words containing the orthographic patterns of *Mae Kok*, *Mae Kob*, *Mae Kod*, and *Mae Kon*, including both regular and irregular spelling forms; Possessed an intelligence quotient (IQ) of 90 or above; Demonstrated adequate listening, speaking, and communicative abilities; Received informed parental consent and were able to participate fully in the study for its entire duration.

##### **2. Teachers of Students With Reading Difficulties**

In addition to the student participants, five teachers responsible for instructing students with reading difficulties in Years 4–6 also participated in the study. Their role was to evaluate the

usability and effectiveness of the web-based learning innovation from a pedagogical and classroom integration perspective.

### **Variables**

A Web Application Learning Innovation for Promoting Reading Ability in Upper Elementary School Students with Reading Difficulties.

### **Research Design and Data Collection**

This study employed an experimental research design, specifically utilizing the One-Group Pretest–Posttest Design, to investigate the effectiveness of a web-based application aimed at enhancing reading ability among upper primary students with reading difficulties.

#### **Phase 1: Development and Expert Evaluation of the Web-Based Learning Innovation**

##### **1. Expert Evaluation**

An initial prototype of the web-based application was submitted to a panel of nine experts in the fields of educational technology, special education, and language instruction. The purpose of this stage was to evaluate the appropriateness, usability, and pedagogical suitability of the application in addressing the specific needs of students with reading difficulties.

##### **2. Revision Based on Expert Feedback**

Following the expert evaluations, revisions were made to the web application in accordance with the feedback received. Adjustments focused on content alignment, user interface design, instructional clarity, and the inclusion of engaging multimedia elements to enhance learner motivation and accessibility.

#### **Phase 2: Implementation and Evaluation With the Target Group**

##### **1. Orientation and Preparation**

The researcher coordinated with the participating school to schedule an orientation session for the target group. During this session, students and relevant stakeholders (including teachers and parents) were informed about the objectives, procedures, and expected outcomes of the research. Ethical considerations, including confidentiality and voluntary participation, were also addressed.

##### **2. Pretest Administration**

Prior to the intervention, a pretest was administered to assess the students' baseline reading ability. The assessment comprised word reading tasks focusing on Thai orthographic patterns known as Mae Kok, Mae Kob, Mae Kod, and Mae Kon. The test included both regular and irregular spelling forms, allowing for an in-depth analysis of decoding and phonological processing skills.

### 3. Implementation of the Web-Based Learning Innovation

The instructional phase involved the integration of the developed web application into the students' reading lessons. The application was designed to provide individualized, interactive, and gamified learning experiences tailored to the needs of students with reading disabilities. Students engaged with the application over a predetermined period, with activities aligned to improve their recognition and pronunciation of words following the targeted orthographic patterns.

### 4. Posttest Administration

Upon completion of the intervention, a posttest identical in structure to the pretest was administered to measure any changes in students' reading performance. Comparisons between pretest and posttest scores were used to assess the effectiveness of the intervention in improving reading accuracy, fluency, and word recognition skills.

### 5. Evaluation of the Web Application

To assess user satisfaction and perceived effectiveness of the application, evaluation questionnaires were distributed to both the participating students and their teachers. The questionnaires included items related to the application's usability, motivational impact, content relevance, and overall learning experience. The feedback collected contributed to a holistic understanding of the application's pedagogical value and areas for future improvement.

## Research Instruments

The study was conducted in two phases, each utilizing a specific set of research instruments to support the development, implementation, and evaluation of the web-based learning innovation designed to enhance reading ability among upper primary students with reading difficulties.

### Phase 1: Development and Expert Review

#### 1. Prototype of the Web-Based Learning Innovation

A preliminary version of the web application was developed to support reading instruction focused on Thai orthographic patterns (*Mae Kok*, *Mae Kob*, *Mae Kod*, and *Mae Kon*). The prototype incorporated multimedia elements, interactive activities, and gamification techniques aimed at enhancing learner engagement and literacy skills.

#### 2. Expert Evaluation Form

An evaluation form was developed to assess the appropriateness and quality of the web application. The form included criteria such as content accuracy, pedagogical relevance, user interface design, functionality, and overall educational value. Responses were collected using a Likert scale format and supplemented by open-ended suggestions for improvement.

### 3. Preliminary Reading Ability Test

A diagnostic test was constructed to assess students' ability to read words with Thai orthographic features (*Mae Kok*, *Mae Kob*, *Mae Kod*, and *Mae Kon*). The test included both words that conform to typical spelling conventions and those that do not, thereby measuring decoding, pronunciation, and orthographic recognition skills.

## Phase 2: Implementation and Evaluation

### 1. Finalized Web-Based Learning Innovation

Following expert revision, the refined version of the web application was employed as the main instructional tool during the intervention phase. It was designed to offer interactive, student-centered reading practice tailored to the specific needs of learners with reading disabilities.

### 2. User Guide for the Web Application

A comprehensive instructional manual was developed to guide teachers and students in the effective use of the web application. The guide included directions for navigation, lesson implementation, troubleshooting tips, and instructional suggestions.

### 3. Reading Ability Test (Pretest and Posttest)

The same reading test developed in Phase 1 was used as both a pretest and posttest to evaluate the impact of the intervention. The test measured students' reading proficiency across words containing *Mae Kok*, *Mae Kob*, *Mae Kod*, and *Mae Kon* patterns, including both standard and non-standard spellings.

### 4. Evaluation Questionnaires

Two sets of questionnaires were used to gather feedback on the application's effectiveness:

Student Questionnaire: Assessed usability, motivation, engagement, and perceived learning benefits. Teacher Questionnaire: Evaluated pedagogical utility, ease of integration, learner response, and observed improvements in students' reading abilities. All instruments were validated by experts prior to use, ensuring their reliability and appropriateness for the target population.

## Data Analysis

The data analysis was conducted in two phases, corresponding to the stages of development and implementation of the web-based learning innovation designed to enhance reading ability in upper primary students with reading difficulties.

### Phase 1: Evaluation of the Draft Learning Innovation

The data collected from expert evaluations of the draft web-based learning package were analyzed to determine the overall appropriateness and suitability of the innovation. Descriptive statistics, specifically the mean and standard deviation, were used to assess expert

agreement on various aspects of the application's design, content, functionality, and educational relevance. The results informed revisions to ensure alignment with pedagogical goals and learner needs.

## Phase 2: Implementation and Impact Assessment

The data obtained from the implementation phase were analyzed using the following statistical methods:

1. Descriptive Statistics  
The mean and standard deviation were calculated to examine students' reading performance before and after the intervention. These statistics provided a measure of central tendency and variability in reading scores, offering insight into the distribution and consistency of student performance.
2. Instructional Efficiency (E1/E2)  
The instructional efficiency of the web-based learning innovation was analyzed using the E1/E2 model, where: E1 represents the students' performance during the learning process (process efficiency), E2 represents the students' performance on the posttest (product efficiency).

This model helped evaluate whether the learning innovation supported effective engagement and knowledge retention throughout the instructional period.

3. Effectiveness Index (E.I.)  
The Effectiveness Index (E.I.) was calculated to assess the relative improvement in student performance between the pretest and posttest. This index indicates the proportion of learning gains attributable to the intervention and offers a comparative measure of its impact on reading ability.

The combined use of descriptive and inferential statistics ensured a comprehensive understanding of the innovation's effectiveness, both in terms of instructional delivery and learning outcomes.

## Results

1. The Results of evaluating the suitability of the web application learning innovation for promoting reading ability in upper elementary school students with reading difficulties. overall, it was found that the web application learning innovation for promoting reading ability in upper elementary school students with reading difficulties has the highest level of suitability evaluation results. ( $\mu = 4.82$ ,  $\sigma = 0.40$ ) However, when considering each issue, it was found that the suitability evaluation results were at the highest level in all 4 areas: 1) The usefulness, responding to the needs of users of the innovative web application learning set. ( $\mu = 4.86$ ,  $\sigma = 0.40$ ) 2) The accuracy Complete coverage and reliability. ( $\mu = 4.83$ ,  $\sigma = 0.41$ ) 3) Possibility of putting it into practice. ( $\mu = 4.83$ ,  $\sigma = 0.41$ ) and 4) The appropriateness of the elements in the web application learning innovation set. ( $\mu = 4.75$ ,  $\sigma = 0.47$ ) respectively.
2. The Results of the trial of using the web application learning innovation for promoting reading ability in upper elementary school students with reading difficulties, fifteen students, found the efficiency value of the web application learning innovation set to be 82.06/82.92, the effectiveness index (E.I.) value was 0.75.



## Discussion

### 1. Results From the Development of the Web-Based Learning Innovation

The findings from the development phase revealed that the quality assessment scores of the web-based learning innovation—designed to promote reading ability among upper primary school students with reading difficulties—indicated a high level of effectiveness and suitability for use with the target group. This outcome may be attributed to the systematic approach employed by the researcher in developing the application, which adhered to established research and development methodologies as well as sound instructional design principles.

Specifically, the development process aligned with the Waterfall Model, a well-known framework for software development proposed by Malaiwong and Punawat (1989). This model involves a linear sequence of four key stages: 1) Analysis – Identifying learner needs, content requirements, and functional specifications; 2) Design – Structuring the learning content, interface, and user experience; 3) Programming – Developing and coding the web application using appropriate technologies; 4) System Testing – Evaluating and refining the system to ensure accuracy, functionality, and pedagogical integrity.

By following this structured model, the researcher ensured that the application met both technical and educational standards, resulting in a product that is both effective in enhancing reading skills and user-friendly for the intended population.

### 2. Teachers' Perspectives on the Use of the Web-Based Learning Innovation

The analysis of teachers' feedback regarding the use of the web-based learning innovation revealed that their overall satisfaction with its usability and effectiveness was rated at the highest level. This result suggests that the application met the functional needs and pedagogical expectations of its users. One likely reason for this positive response is that the application was designed to be intuitive and accessible, allowing teachers to integrate it easily into their instructional routines.

This finding is consistent with the principles of network-based instructional design as outlined by Teeranathanakul and Kiatkamon (1998). These scholars proposed a five-step process for developing online instructional materials, consisting of: 1) Analysis – Identifying learner characteristics and instructional needs; 2) Design – Planning lesson structures, learning activities, and user interfaces; 3) Development – Creating digital content and functional components; 4) Implementation – Delivering and integrating lessons into real-world contexts; 5) Evaluation – Assessing usability, learning outcomes, and overall effectiveness.

The application in this study was developed in alignment with this model, enabling the researcher to create a tool that is both pedagogically sound and technologically efficient. The high level of teacher satisfaction thus reflects the structured and research-informed approach taken in the application's development.

### 3. Students' Opinions on the Use of the Web-Based Learning Innovation

Analysis of the responses from students with reading difficulties indicated that their satisfaction with the interactive features of the web-based learning innovation was rated at the highest level. This suggests that the application successfully fostered engagement and active participation, which are critical factors in supporting learners with special educational needs.

These findings align with the study conducted by Samutsri (2018), which examined the development of interactive multimedia designed to enhance emotional intelligence in Year 6 students. Samutsri's research found that interactive multimedia improved emotional intelligence by 68.36%, demonstrating the effectiveness of interactive digital tools in enhancing cognitive and emotional capacities in young learners.

Based on the present study's findings, it may be concluded that the web-based learning innovation not only supported reading development but also created a learning environment that was accessible, engaging, and effective. The flexibility of the application—allowing students to learn anytime and anywhere—further contributed to its value as a sustainable and realistic model for reading intervention in real-world educational contexts. The tool provided students with autonomy and motivation, promoting both skill development and independent learning.

### **Recommendations**

#### ***Recommendations for Practical Application***

1. Developing the web application learning innovation for promoting reading ability in upper elementary school students with reading difficulties, this time it is only a basic web application. This requires developing web applications to have more capabilities, such as more space to store data to support the increase in diverse data. Including making work more convenient, easy to understand, and communicating messages between users more effectively.
2. Developing the web application learning innovation for promoting reading ability in upper elementary school students with reading difficulties, there is still a complex sequence of presentation and usage steps that should be revised to make them easy to understand to avoid problems and obstacles to put web applications to use with maximum efficiency.
3. Promote greater use of technology in teaching because the use of technology in teaching can increase learning efficiency more than normal learning. It also helps students become more interested and understand the content.

#### ***Recommendations for Future Research***

1. Developing an interactive e-book web application combining augmented reality (AR) technology for students with reading problems.
2. Developing a web application that has a learning format using games. (Gamification) for students who have reading problems.

### **AI Assistance Declaration**

This manuscript was prepared with the assistance of ChatGPT (GPT-4), developed by OpenAI, which was used solely for the purposes of language translation (Thai to English) and proofreading. The AI tool helped refine grammar, vocabulary, and sentence structure to ensure clarity and coherence in the English-language sections of the manuscript. All content, including ideas, analysis, and conclusions, were entirely created and verified by the author.

## References

- Arayawinyu, P. (2001). *Children with learning disabilities = Learning disabilities* (2nd ed.). Waen Kaew.
- Chinsri, W., & Wasukree, S. (2015). Web application development for analyzing multiple choice exams. *Valaya Alongkorn Research and Development Journal Under Royal Patronage*, 10(1), 1–17.
- Donnelly, C. (2020). 7 ways mobile-based education apps are changing how students learn. *Entrance Consulting*. <https://www.entranceconsulting.com/7-ways-mobile-based-education-apps-are-changing-how-students-learn/>
- Education Council. (2019). *Characteristics of Thai children in the 21st century: Needs for manpower in the 4.0 era, principles 3RS*. <http://www.krusmart.com/student-3rs8cs/>
- Gooch, D., Vasalou, A., Benton, L., & Khaled, R. (2016). Using gamification to motivate students with dyslexia. In *CHI 2016: Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 969–980). <https://doi.org/10.1145/2858036.2858231>
- Konglun, S., & Runawat, A. (2016). Application development on the Android operating system: Aesop's fables in 2 languages. In *Proceedings of the 2nd National Academic Conference on Technology and Innovation Management* (pp. 318–325). Maha Sarakham Rajabhat University, Thailand.
- Korsuwan, K. (2010). *Teaching children with mild disabilities*. Srinakharinwirot University.
- Lichanporn, S. (2013). *Development of an activity-based learning model using educational applications on mobile communication devices to promote discipline in upper primary school students* (Master's thesis). Chulalongkorn University, Bangkok, Thailand.
- Malaiwong, K., & Punawat, W. (1989). *Programming design techniques*. SE-EDUCATION.
- Office of the Basic Education Commission. (2012). *Training manual for creating learning media for tablets*. Ministry of Education.
- Poondet, C., & Lertphonkulrat, T. (2016). Guidelines for organizing learning with the concept of gamification. *Journal of Education Naresuan University*, 18(3), 331–339.
- Rajanukul Institute. (2012). *Children with LD: A guide for teachers*. Beyond Publishing.
- Samutsri, W. (2018). *The development of interactive multimedia to promote emotional intelligence for grade 6 students* (Master's thesis, Faculty of Informatics, Mahasarakham University).
- Simões, J., Redondo, R. D., & Vilas, A. F. (2013). A social gamification framework for a K-6 learning platform. *Computers in Human Behavior*, 29(2), 345–353. <https://doi.org/10.1016/j.chb.2012.06.007>

- Sitra, O., Katsigiannakis, V., Karagiannidis, C., & Mavropoulou, S. (2017). The effect of badges on the engagement of students with special educational needs: A case study. *Education and Information Technologies*, 22(6), 3037–3046. <https://doi.org/10.1007/s10639-016-9566-5>
- Sriwanyong, S. (2009). Development of a model for enhancing reading skills in English vocabulary for students in grades 2–3 who have reading disabilities. *Journal of Educational Sciences*, 10(1), 54–68.
- Steven, S., Charles, S., & Caitlin, B. (2018). Integrating apps into education. *Happe at Buffalo*. <https://ubwp.buffalo.edu/happe/home-page/integrating-apps-into-education/>
- Suwanno, P. (2020). Development of an application for learning the subject of educational research on the Android operating system for 4th year students at Yala Rajabhat University. *Journal of the Humanities-Social Sciences Group*, 3(1), 38–49.
- Teeranathanakul, P., & Kiatkomon, P. (1998). Creating IMMCAI package. *Journal of Industrial Education*, 1(2), 14–18.
- Udomphon, P., Srifa, P., & Kaenperm, J. (2016). Development of tablet applications for children with learning disabilities in mathematics. *Journal of Industrial Education, King Mongkut's University of Technology North Bangkok*, 7(2), 181–190.
- United States Department of Health & Human Services (USDHH). (2000). *Report of the National Reading Panel: Teaching children to read*. <https://www.nichd.nih.gov/sites/default/files/publications/pubs/nrp/Documents/report.pdf>
- Yonwilas, W. (2019). Creating motivation for learning with game applications. In *Proceedings of the 1st National Academic Conference of Kalasin University: Innovation in Science and Social Science for Sustainability*. [http://conference.ksu.ac.th/file/20191030\\_8176754794.pdf](http://conference.ksu.ac.th/file/20191030_8176754794.pdf)



## **Globalization and English Language Education: Comparative Study on Critical Success and Failure Factors of EFL in El Salvador and South Korea**

Jullianny Bayarone Batres González, Independent Scholar, South Korea

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Nowadays, English Language Education is a trending issue in many countries, as it has become a lingua franca for globalization. The proficiency in that foreign language is a basis for international cooperation and development. That is why many countries have been working for implementing different policies to enhance and improve English as a Foreign Language in schools. This paper provides an overview of the Critical Success and Failure Factors in EFL education in El Salvador and South Korea. The first chapter presents general information on English language education as part of the globalization process. The second and third chapters explain the different EFL education policies implemented in both El Salvador and South Korea in the past few decades. The fourth chapter analyzes the EFL programs of both countries based on the language policies suggested in the paper *Language-in-education policy and planning* by Kaplan and Baldauf in 2005. Finally, this paper concludes with a brief explanation about the EFL education in both countries based on the Critical Success Factors of English language education in South Korea.

*Keywords:* EFL education, English education, education

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

### Globalization and English Language Education

Aiming at globalization, many countries have been implementing different policies to seek development, especially in terms of education. Since globalization refers to bringing different nations together for economic and social development, it is necessary first to establish a common communication system between the countries. This is how English becomes an important source of communication and fundamental element in globalization (Alfehaid, 2014).

Despite English being the lingua franca for international communication (Kirkgöz, 2009), English proficiency actually varies from country to country and from person to person due to the differences in the quality of the teaching-learning process. Depending on the country, English can be taught as a second or foreign language, and the level of proficiency may vary depending on the support given to the teaching programs in each country.

In El Salvador, since the late 1990s, the government has created various programs to develop education, especially English as a Foreign Language (EFL) education, helping to improve the level of English proficiency in recent years. According to the English Proficiency Index (EPI) statistics, in 2024, the country ranked #55 out of 116 countries worldwide (Education First, 2024).

On the other hand, after the 1950s, Korea achieved significant economic development through the application of various policies, especially in education (Lee, 2008). Korea has implemented different programs to improve English education, such as EPiK (English Program in Korea) and TEE (Teaching English in English) (Han, 2010). In 2024, the EPI ranked Korea at #50 out of 116 countries (Education First, 2024).

### Objectives of the Study

This dissertation analyzes EFL education programs in El Salvador and Korea. For El Salvador, it mainly focuses on the COMPITE<sup>1</sup> program from the Plan 2021<sup>2</sup> implemented in 2004. The program (COMPITE) was created to enhance English language education in public high schools all across the country. For South Korea, it focuses on the EFL programs implemented by the government: EPiK and TEE, which sought to enhance the English communication in classrooms. This dissertation aims to illustrate the success and failure factors of COMPITE program's implementation in public high schools in El Salvador, as well as the EPiK and TEE programs in South Korea.

---

<sup>1</sup> COMPITE is a program to improve the English Education system in 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> grades, as well as at the high school level in public schools in El Salvador (MINED, 2005b).

<sup>2</sup> Plan 2021 [National Plan of Education 2021] is an initiative of the Government of El Salvador, under the coordination of Ministry of Education (MINED), to reinforce the national education system. Its main objective is to create new long-term policies and goals for the following years, as well as make short-term, medium-term and long-term commitments to achieve important outcomes in education by 2021, when the country celebrates 200 years of Independence (MINED, 2005b).



## Methodology

A qualitative analysis of secondary data was conducted to analyze the EFL programs in both countries. For El Salvador, official data was collected from various governmental and nongovernmental institutions, such as the Ministry of Education of El Salvador, USAID, Education First, and various academic journals. For Korea, official documents from the Ministry of Education of Korea, the National Institute for International Education, and the Korea Development Institute were collected.

### EFL Education in El Salvador

The Ministry of Education of El Salvador (MINED)<sup>3</sup> has been implementing different programs to enhance EFL education. Since 1995, the government has implemented an education reform called *Plan Decenal de Reforma Educativa (1995-2005)*<sup>4</sup>, which included English language education in the education process. In 2004, the government implemented *Plan 2021*, aiming to increase the abilities of students through: “a) English as a Foreign Language (EFL) Education, b) Technology access, c) Technical and technological specialization, d) High education, science and technology” (MINED, 2005b, p. 25). The plan included the program titled COMPITE, seeking “to transform the traditional methods to teach English in the National Education System” (MINED, 2005a, p.8).

### COMPITE Program

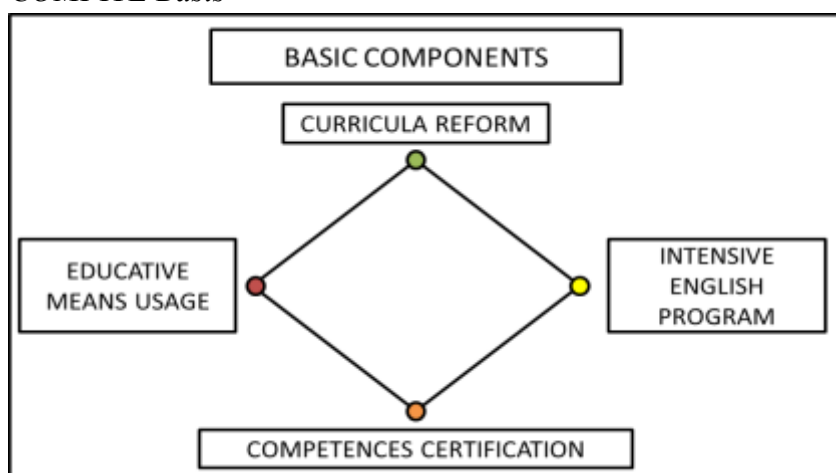
COMPITE aimed to “create opportunities for young people to learn English” through four basic components: curriculum reform, EFL intensive programs, English proficiency certification, and effective methodologies and resources (Figure 1) (MINED, 2005a, p.8). COMPITE was a new curriculum reform based on the successes and failures of previous EFL education initiatives. Consequently, the COMPITE action plan focused on four aspects: a) certifying teachers with pedagogical skills and English proficiency, b) enhancing the level of English proficiency in middle and high school students of public schools through intensive EFL programs, c) making use of technology and mass media in EFL education, and d) expanding English education to primary and elementary schools through TV programs.

---

<sup>3</sup> MINED is a governmental institution focus on “contributing to create responsible people, capable to be part of society in terms of culture, politics and economy; with critical thinking, values, in order to make an equal, democratic and developed country through an qualify education”. It seeks to become a “leading institution in the development of qualify education” (<http://www.mined.gob.sv/index.php/institucion/filosofia>).

<sup>4</sup> Decade Plan of Educational Reform 1995-2005.

**Figure 1**  
*COMPITE Basis*



Source. MINED, 2005a, p.9

MINED worked together with other national entities to accomplish these goals and help promote English language education across the country. *Escuela Americana*<sup>5</sup> was one of them and helped evaluate teachers' proficiency, providing them with special training to improve their language skills. Escuela Americana had experience in training students and teachers through the program *Escuela Americana Extensión (EAX)*, whose main goal was "to support the development of El Salvador through education" (Escuela Americana, 2013). In 2005 and 2008, EAX trained English teachers to improve their foreign language knowledge and skills and provided a wide range of courses to students and faculty, including English courses to improve the language proficiency as well as the *Teaching English as a Foreign Language (TEFL)* course for teachers.

MINED cooperated with ITCA-FEPADE<sup>6</sup> to provide EFL intensive courses to selected students. ITCA-FEPADE collaborated in the creation of the National English Center (NEC) "to increase the quantity of Salvadorian English speakers and improve their proficiency in that language" (MINED, 2006, p. 34). The program consisted of weekend intensive courses totaling 600 hours for selected students from public high schools, providing proficiency certification at the end of the course (MINED, 2005a). ITCA-FEPADE supported the program with human resources and methodologies, while MINED provided the infrastructure, equipment, and financial resources to run the NEC program. The program gave students the opportunity to participate in special weekend English courses to increase their opportunities in the labor market (MINED, 2006; MINED 2009a).

Moreover, MINED worked together with two important newspapers in the country: *El Diario de Hoy* and *La Prensa Gráfica*, to promote English learning in and outside schools by publishing educational English articles and providing teachers with extracurricular materials to improve their English teaching methodologies (MINED, 2006).

<sup>5</sup> Escuela Americana (American School) is a private institution accredited by AdvancEd and MINED. It seeks to help children develop their potential through a high-quality education. Its main goal is to make students capable of communicating effectively in English and Spanish.

([https://www.amschool.edu.sv/easite/eahistory.aspx?mnu\\_id=1&slc=10](https://www.amschool.edu.sv/easite/eahistory.aspx?mnu_id=1&slc=10))

<sup>6</sup> ITCA-FEPADE is a public institution with private administration that aims to prepare successful professionals through education, especially in engineering studies. ITCA was created by FEPADE, a private association that seek to promote education development in El Salvador. (<http://www.itca.edu.sv/index.php/nuestra-institucion>)

In 2006, FIDES<sup>7</sup> provided the copyrights for the TV show *Sesame English* to MINED, which was broadcast on national TV channel *CANAL 10*<sup>8</sup> (MINED, 2006). This coalition sought to bring English education to children, enhancing their motivation to study English (MINED, 2006), through a fun and engaging program, broadcast three times a week for one year. This project gave children and young people the opportunity to learn English outside the classroom (MINED, 2005a). The project was also implemented inside public schools. However, due to limited technological resources and equipment, MINED selected only 54 schools nationwide. MINED equipped schools with TVs and provided language and technology training to 61 teachers to improve the quality of English education and the use of technological equipment in classrooms.

According to some program reports, it had several irregularities. First, the analysis of the COMPITE program implementation shows that MINED focused its efforts on providing high-quality EFL education to only a few cities (San Salvador, Apopa, San Marcos, Soyapango, La Unión) (MINED, 2006), rather than expanding the program to the entire population.

Also, the total number of participants was a low percentage of the total population of public high schools in the country. For instance, according to the official report, in 2004 only 5,438 out of 417,561 students participated in the program, while in 2005, 7,034 out of 430,894 students participated (Table 1) (MINED, 2006). Additionally, MINED's 2008-2009 report indicated that only 3,584 students out of 461,828 (Table 2) participated in the NEC program (MINED, 2009b). Thus, less than the 2% of the population, respectively, were part of the program. In terms of faculty, 1,529 teachers received special training to improve their English proficiency, but only 23 TOEIC certifications were awarded (MINED, 2009b).

**Table 1**

*Rate of Enrollment From 2000 to 2008*

Rates of enrollment 2003-2006 in 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> year and High School				
	2003	2004	2005	2006
Public and Private School				
7 <sup>th</sup> - 9 <sup>th</sup>	320,813	332,000	337,509	339,884
High School	167,702	177,842	186,693	192,773
Public Schools (%)				
7 <sup>th</sup> - 9 <sup>th</sup>	87.4	87.8	87.9	87.6
High School	69.7	70.9	72.0	72.5

Source. MINED, 2009a

<sup>7</sup> FIDES (Fondo para Iniciativas del Desarrollo Educativo - Fund for Educational Development Initiatives in English) is a branch of FUNDEMAS, an association of enterprises that collaborate to strengthen the good practices in social responsibility in order to contribute to the competence and sustainable development of El Salvador. (<http://www.fundemas.org/quienes-somos/que-es-fundemas>)

<sup>8</sup> Canal 10 is the national TV channel in El Salvador, which seeks to become an icon of culture-sharing inside and outside the country, as well as to promote El Salvador's identity and the participation of the country's population. (<http://tves.sv/somos-tves/>)

**Table 2***Rates of Enrollment From 2009 to 2012*

Rates of enrollment 2009-2012 in 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> and High School Public School				
	2009	2010	2011	2012
7 <sup>th</sup>	126,233	131,871	132,502	132,674
8 <sup>th</sup>	106,137	112,081	115,609	117,178
9 <sup>th</sup>	88,821	96,813	100,995	104,280
TOTAL (a)	321,191	340,765	349,106	354,132
High School (1 <sup>st</sup> year)	68,016	66,581	72,662	78,696
High School (2 <sup>nd</sup> year)	49,170	52,148	54,074	61,349
High School (3 <sup>rd</sup> year)	23,022	24,086	24,034	25,559
High School (4 <sup>th</sup> year)	429	412	354	205
TOTAL (b)	140,637	143,227	151,124	165,809
<b>TOTAL (a + b)</b>	<b>461,828</b>	<b>483,992</b>	<b>500,230</b>	<b>519,941</b>

Source. MINED, 2012

However, based on other reports, the program benefited “more than 23 thousand students from 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, high school, and vocational school<sup>9</sup>” (MINED, 2009a, p. 66). The statistics show a clear disparity between the results of the implementation and evaluation of the COMPITE program (Table 3). These disparities in the national reports make the information about the implementation of the COMPITE program confusing and unreliable.

**Table 3***Rates of Participation in COMPITE Programs From 2004 to 2009*

Rates of participation in COMPITE program from 2004 to 2009							
School Year & Program	2004	2005	2006	2007	2008	2009	TOTAL
Sesame English	--	2,427	2,724	--	--	--	--
7 <sup>th</sup> - 9 <sup>th</sup>	1,204	1,257	1,146	1,105	227	0	4,939
High School	0	2,291	2,096	1,451	2,903	857	9,598
Technical High School	0	1,429	3,150	4,426	0	0	9,005
NEC program	--	280	403	568	1,395	315 <sup>(1)</sup>	2,646
TOTAL <sup>(2)</sup>	1,204	5,257	6,795	7,550	4,525	1,172	26,503
<sup>(1)</sup> Until 2009							
<sup>(2)</sup> No including <i>Sesame English</i>							

Source. MINED, 2009a

Currently, El Salvador ranks 11<sup>th</sup> in English proficiency in Latin America (Figure 2) and 55<sup>th</sup> out of 116 countries worldwide (Education First, 2024). Comparing the EF EPI data, the level of English proficiency in El Salvador has increased in recent years, moving from “very low proficiency” in 2016 to “moderate proficiency” in 2024.

<sup>9</sup> Vocational school refers to post-high school studies, consisting of 3 years of education, which replaces college studies because it is easier and faster to obtain a diploma and find job opportunities after completion.

**Figure 2***EF EPI Rankings in Latin America (Education First, 2024)*

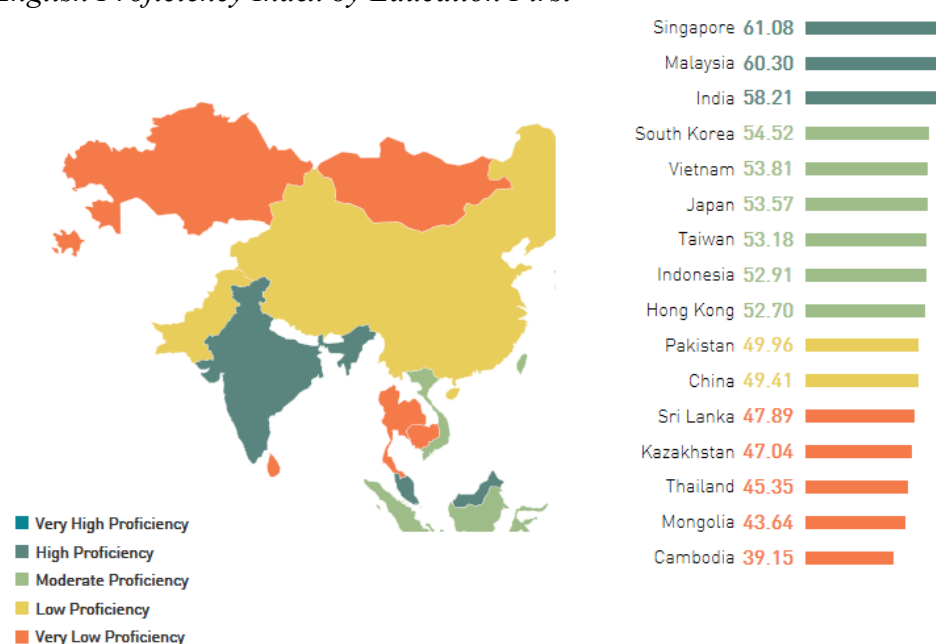
MINED (2005b) stated that “learning a second language gives more possibilities for people to learn and to communicate, as well as provides the opportunity to be more competitive at work and to become multicultural in relationships with people from different countries around the world” (p. 26). In 2009, MINED created various projects to enhance the quality of education. However, these were more focused on IT education rather than EFL education. There is, however, not enough research on the education programs in El Salvador: “there is not enough information and knowledge about English education in the public schools of El Salvador. [...] There is no research, analysis, experience systematization, or debates about that” (Martínez, 2009, p. 41). Thus, it is not possible to detail the outcomes of the COMPITE program and other recent initiatives over the years.

### English as a Foreign Language (EFL) Education in South Korea

South Korea has become a role model for many developing countries because of its rapid economic growth and development. “Korea’s miraculous development is due to the establishment and effective enforcement of its strategies for national development [...] During this process, Korea’s education and the educational policies [...] have contributed greatly to the cause” (KEDI, 2008, p. 10). By prioritizing education, Korea laid the foundations for significant development in a short time.

As English became the global language, Korea also implemented diverse policies to enhance English language education, positioning the country in 27<sup>th</sup> place out of 70 countries, and 4<sup>th</sup> place on the Asian continent, in the English Proficiency Index (EPI) by Education First in 2015 (Figure 3). Since 1950, various reforms in EFL education have been emphasized using methods such as grammar-translation, audio-lingual and communicative approaches. However, with the 6<sup>th</sup> curriculum, the Ministry of Education, in collaboration with the Korea Institute for Curriculum and Evaluation (KICE), aimed to revolutionize English education by focusing more “on the development of communicative competences in Korean students” (Chang, 2009, p. 87).

**Figure 3**  
*English Proficiency Index by Education First*



Source. <http://www.ef.edu/epi/>

Following this, the 7<sup>th</sup> curriculum reform was an innovative step for EFL education, introducing the proficiency-based language program, which allows “students to learn according to their own abilities and interests” (Chang, 2009, p. 88). This last reform had five major goals: “(i) to focus on daily and practical English; (ii) to enhance English proficiency; (iii) to create an activity and task-oriented learning environment; (iv) to clarify the achievement standards; and (v) to provide appropriate English learning conditions” (Ministry of Education and Human Resources Development, 1998; Kang, 2007; Lee, 2010 p. 7). The 6<sup>th</sup> and 7<sup>th</sup> curriculum reforms were critical steps toward transforming and improving EFL education in South Korea.

Chang (2009) stated that if the main goal of Korea is “to function effectively as a nation in the era of globalization, Korean people must be able to communicate effectively in English” (p. 94). For this reason, both reforms included various projects aimed at all levels of the national education system, enabling students to participate actively and improve their English skills. Two of the most relevant projects from these reforms were: (1) the inclusion of English in elementary schools, and (2) the hiring of native English speakers.

The Ministry of Education of Korea has been implementing a variety of programs in order to improve English education and “to enhance students’ communication competences” in the foreign language (Chang, 2012, p. 3). Two of the most representative programs in the last 30 years are the English Program in Korea (EPiK), launched in 1995, and Teaching English in English (TEE), introduced in 1997 (Yook, 2010).

### English Program in Korea (EPiK)

The English Program in Korea (EPiK), previously known as the Korea English Teacher Training Assistant (KORETTA), was introduced by the Ministry of Education in the mid-1990s. The main objective was to hire native English speakers as teachers “to improve the

English speaking abilities of students and teachers in Korea, and to reform English teaching methodologies” (Jeon, 2009 in Vaish, 2010, p. 169). Originally, the program was implemented in the early years of school, but in 2010, it was expanded to senior elementary and middle schools.

According to Jeon Min-hyon (2009) “EPiK program is an example of Korea’s active response to the globalization process through which Korea not only accommodates external demands but also strategically pursues national interests through equipping its citizens with the command of English and improving its image in the world” (as cited in Vaish, 2010, p. 161). Through EPiK, Korea aimed to open society to a more international environment. The presence of English in Korean schools demonstrated that the country was treating “English language as a global language and Native English speakers as an ideal language teacher” (Jeon, 2009, as cited in Vaish, 2010, p. 175).

Despite benefiting students, Jeon Mi-hyon (2009), in her work *Globalization and South Korea’s EPiK (English Program in Korea)*, explained the discontent of several teachers. One of the interviewees expressed that there was low communication and cooperation between co-teachers in lesson planning and classroom execution: “Co-teachers go. ‘Great teachers! You have great ideas. But you’re here only one hour a week. We are here until sixty-two years old. No, thanks’” (Jeon, 2009, as cited in Vaish, 2010, p. 172). Another participant mentioned the shortage of materials covered during the working period, claiming that she only taught a quarter of a lesson unit, while the co-teacher completed the rest (Jeon, 2009, as cited in Vaish, 2010). The researcher concluded that EPiK teachers often feel like “performing monkeys,” giving about 40 minutes of class per day and having little or no influence on improving students’ English learning (Jeon, 2009, as cited in Vaish, 2010).

Moreover, EPiK teachers also complained about dealing with the typical “Korean adolescent” attitude, such as using the phone during class, coming without books and pencils, sleeping in class, looking in mirrors, etc. (Jeon, 2009, as cited in Vaish, 2010). Despite the EPiK program being designed to enhance English language education and provide the same quality of instruction that parents and children expect when studying abroad and attending private institutes, EPiK participants reported that their role did not extend beyond the label of “native English speaker teacher,” the international work experience, and economical benefits it provided.

### Teaching English in English (TEE)

Teaching English in English (TEE), also known as Teaching English Through English (TETE), was a program focused on teaching EFL in an entirely English-speaking environment to improve the communicative skills. In Korea, TEE “is one of the government-driven policies to improve students’ communicative competences” (Lee, 2010, p. iv). It was introduced to the Korea English education system in 1997, as part of the *Segyewha*<sup>10</sup> (globalization) policy, introduced by the former President Youngsam Kim in 1994 (Lee, 2010).

---

<sup>10</sup> *Segyehwa* is a policy created by Korean Government in 1995. Its objective was to enhance the country’s competitiveness and integrate it into the globalization process. Following significant events such as the Asian Games (1986) and Olympic Games (1988), Korea sought to improve its global image, and develop its economy and education. It included the 6<sup>th</sup> Curriculum Reform, which focused on enhancing students’ communication skills through the improvement of English language education (Jeon, 2009).

As with the EPiK program, the main goal of TEE was to create an “English-only class” to reinforce students’ communicative skills. The policy “encourages Korean EFL teachers to use English as a medium of instruction and, if possible, to use English only in class” (Yook, 2010, p. 25). However, this policy was not fully realized due to the lack of confidence among teachers and broader societal trends in Korea that interfered with its implementation.

Kim (2009) expressed that “educational methods for English in English in Korea do not seem to work very effectively unless English input is widespread in English classrooms” (p. 132). In his paper *Teacher and Student Perceptions of New English Language Education Policy*, Kim (2009) explained that the implementation of an English-only program will not succeed unless both teachers’ and students’ language proficiency is sufficiently high, and the high expectations of the education system do not interfere with the process. Furthermore, social trends in Korea make people eager to learn the language but afraid to communicate in it. As Cho (2014) noted, “if they cannot prove their English abilities, they will be left behind and not have any chance to stand out in South Korea” (p. 5). This situation seriously affects the self-confidence of students and teachers, hindering the implementation of TEE in the classrooms.

### Comparison of El Salvador’s and Korea’s EFL Education

In the paper *Language-in-education Policy and Planning*, Kaplan and Baldauf (2005) explained that a language policy is composed of seven important agendas: “(1) access policy; (2) personnel policy; (3) curriculum policy; (4) methodology and materials policy; (5) resourcing policy; (6) community policy; and (7) evaluation policy” (as cited in Butler, 2009, pp. 3-4). Based on these language policies, EFL programs in El Salvador and South Korea can be analyzed as follows (Table 4):

**Table 4**

*Comparative Chart of Language Policies in El Salvador and Korea*

Kaplan & Baldauf’s Language Policies						
Kaplan & Baldauf’s Language Policies	EL SALVADOR			SOUTH KOREA		
	Low	Medium	High	Low	Medium	High
Access Policy (what, to whom, and when)	X					X
Personnel Policy (teachers)		X			X	
Curriculum Policy (objectives)		X			X	
Methodology and materials Policy		X			X	
Resourcing Policy	X					X
Community Policy			X		X	
Evaluation Policy (assessments and evaluation)		X			X	

Language policy in both, El Salvador and South Korea, differs in three key aspects: access, resources, and community. First, the access policy reflects a significant gap between the two countries. In El Salvador, the main reason for low accessibility is that the COMPITE program was only implemented in a few cities across the country, while in Korea, EPiK and TEE were implemented nationwide. With full coverage, EFL education in Korea has contributed “to a reduction in social inequality and an increase in upward mobility” (Lee, 2001, p.2).



Regarding the resourcing policy, Korea had sufficient resources, provided by the government and other entities, to effectively carry out its programs. On the other hand, El Salvador faced limited monetary and non-monetary resources, which affected the promotion, expansion, and sustainability of the program.

In terms of community policy, Korea made good use of resources to promote English education. In contrast, while the COMPITE program in El Salvador carried out several projects making good use of media and offering extracurricular activities, the level of community engagement in El Salvador was comparatively low.

On the other hand, the personnel policy, curriculum policy, methodology and materials policy, and evaluation policy demonstrated some similarities between both countries. Despite the socio-economic development gap, the implementation of COMPITE in El Salvador, and TEE and EPiK in Korea, resulted in medium-level language policies in both nations, as suggested by Kaplan and Baldauf (2005). To better understand these similarities, these policies can be divided into four sections: human resources, curriculum, pedagogy, and assessment.

### **Human Resources**

Both countries have made significant efforts to improve the quality of EFL teachers and, by extension, the quality of EFL education. However, both nations faced challenges regarding the quality of human resources, which impacted the effectiveness of EFL education.

A positive aspect of Korea's EFL education was the adoption of native English speakers through the EPiK program, which added significant value by providing students with opportunities to practice the language in real-time. However, Korean English teachers faced challenges due to a lack of continuous professional development (Choi & Lee, 2008). According to Kim (2009) "it seems that there is no need for candidates to have English education majors, but rather only be able to speak English." In his work *Teacher and Student perceptions of new English Language Education Policy*, he noted that many Korean students in education majors were trained to become English teachers, despite their low English proficiency (Kim, 2009).

In El Salvador, the quality of English education was low due to teachers' insufficient proficiency and pedagogical skills. McGuire (1996), in her work *Language Planning and Policy and the ELT Profession in Selected Central America Countries*, noted that "public school teachers commonly are required to teach English whether or not they want or are able to" (p. 175). During the COMPITE program, the Salvadoran government implemented various training initiatives to improve teachers' skills and administered English test to assess their language abilities. However, with the discontinuation of the program, these efforts were terminated, limiting further improvement in teacher qualifications.

### **Curriculum**

Regarding curriculum policy, both countries' EFL education programs share the same primary objective: improving EFL education to ensure participation in a globalized world. However, that objective is difficult to achieve if EFL education does not fully address the four language competences. "English education in Korea has been intensively focused on reading, grammar, listening and vocabulary [...] public schools and private institutes in

Korea have not been concentrated on English speaking skills” (Cho, 2014, p. 42). In other words, most EFL classes in Korea were focused on absorbing the language rather than reproducing it.

In El Salvador, the low proficiency in English hindered both teachers’ and students’ ability to speak freely in the language. Fear of making mistakes or the prevailing social trends impacted students and teachers, limiting the development of communicative skills and the speaking competences.

### **Pedagogy**

In terms of methodology and materials policy, both Korea and El Salvador had good EFL programs, though both countries faced challenges in implementing effective methodologies and utilizing appropriate materials.

In Korea, teachers predominantly used materials focused on grammar understanding, reading and listening skills (Cho, 2014, p. 4), often neglecting speaking skills. Similarly, during the COMPITE program in El Salvador, the focus on IT and media usage took precedence over updating textbooks and methodologies to better address all four language competences.

On the other hand, both countries made good use of technology and media to teach EFL in public schools. For instance, Korea used ICT to develop listening, reading, writing, pronunciation and grammar skills, employing internet resources, e-books, and PowerPoint presentations (Choi & Lee, 2008, p. 14). In El Salvador, the use of computer and the national transmission of the T.V. show *Sesame English* reflected the innovative approach to EFL education.

### **Assessment**

The evaluation policy in both countries reached a medium level in terms of the language policy, indicating that the assessment and evaluation system were functional but needed improvement in certain areas.

English language tests are a significant requirement in many countries. “English test scores play a large part in college entrance and access to employment in white-collar jobs” (Jeon, 2009, in Vaish, 2010, pp. 162-163). Despite having English testing methods, improvements are needed in these systems to achieve a higher level of evaluation.

Korean EFL assessments mainly focus on memorizing words and grammar points, rather than enhancing students’ language abilities through essay writing and free conversations. On the other hand, El Salvador’s EFL evaluation system was not standardized. Teachers had the autonomy to design their own tests. While El Salvador also offers international exams like TOEFL and IETLS, the cost barrier prevents many students from taking these tests.

### **Conclusions**

Both Korea and El Salvador have implemented diverse programs to improve EFL education, utilizing technological equipment, media, and human resources to provide quality of education to students. While these programs have succeeded in many areas during

implementation, they have also faced several challenges that became critical obstacles in achieving the desired outcomes.

In case of El Salvador, the MINED reformed EFL education through the COMPITE program. The Critical Success Factors of this program include the implementation of proficiency tests for teachers and training courses aimed at improving their teaching and language skills. Additionally, the provision of extracurricular classes for high school students was instrumental in enhancing their language knowledge and proficiency. The transmission of *Sesame English* through national broadcast was also a significant element, making English language content accessible to the entire population.

However, El Salvador's EFL education also had several Critical Failure Factors. For example, the extracurricular English classes were offered only to select students in few cities, limiting the program's reach. Another major limitation was the absence of a standardized proficiency test. Without such a test, it was difficult to evaluate students' language proficiency accurately or assess whether the program achieved the intended results. This lack of evaluation made it challenging to track progress and inform future reforms in EFL education.

For Korea, the Critical Success Factors included the effective use of both human and economic resources. The adoption of native English-speaking teachers through the EPiK program was pivotal for students' motivation and for easing the economic burden on families. The program allowed students to interact with native speakers without the need to study abroad, which greatly enhanced their motivation to practice the language and develop their communication skills.

However, there were also Critical Failure Factors in Korea's approach. One significant issue was the lack of autonomy of EPiK teachers in the class planning. EPiK teachers had limited or no control over the teaching and learning process, and their role was confined to assist Korean teachers during lessons rather than leading them. This lack of autonomy hindered their ability to improve students' English communicative skills effectively.

Regarding Teaching English in English, the concept of an "English-only" classroom can only succeed if the teacher uses English exclusively, with little to no reliance on the students' mother tongue. However, the implementation of this policy faced difficulties when lacked confidence in using English themselves due to low proficiency. This led to a negative impact on students, as neither the teachers nor students were able to produce the language as intended.

### **Acknowledgements**

First and foremost, I would like to thank God for the opportunity and wisdom to successfully complete this new challenge in my life.

To my beloved family and friends, thank you for your unwavering support and love despite the distance. Your encouragement has been invaluable in helping me follow my dreams.

Special thanks to my academic advisor, who, with kindness and patience, guided me throughout the beginning stages of this research back in 2016. I also wish to extend my

gratitude to my coworkers for their supporting and help in completing this dissertation. Wholeheartedly thanks.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

During the preparation of this work, the author declares that ChatGPT software was used in order to check grammar structures and possible mistyped words. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

## References

- Ahn, H. J. (2012, January 31). Some thoughts on NEAT. *The Korea Times*.  
[http://www.koreatimes.co.kr/www/news/opinion/2012/08/162\\_103839.html](http://www.koreatimes.co.kr/www/news/opinion/2012/08/162_103839.html)
- Alfehaid, A. F. (2014). The positive and negative effects of globalization on English language teaching and learning. *Arab World English Journal*, 5(2), 103–109.  
<http://www.researchgate.net/publication/263618439>
- Butler, Y. G. (2009). Issues in the assessment and evaluation of English language education at the elementary school level: implications for policies in South Korea, Taiwan, and Japan. *The Journal of Asia TEFL*, 6(2), 1–31.
- Chang, B. M. (2009). Korea's English education policy innovations to lead the nation into the globalized world. *Journal of Pan-Pacific Association of Applied Linguistic*, 13(1), 83–97.
- Chang, K. S. (2012). Communication-oriented English education policy and curriculum reform. *Journal of the Korea English Education Society*, 11(1), 3–22.
- Cho, J. K. (2014). *Understanding the importance of English education in South Korea and exploring the reasons why South Korean students come to a university in the Midwest* (Master's theses). Graduate College at the University of Nebraska.  
<http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1174&context=cehsedad>  
 diss
- Choi, I. C. (2008). The impact of EFL testing on EFL education in Korea. *Language Testing*, 25(1), 39–62.
- Choi, Y. H. & Lee, H. W. (2008). Current trends and issues in English language education in Asia, *The Journal of Asia TEFL*, 5(2), 1–34.
- Crystal, D. (2003). *English as a global language*, Second Edition. Cambridge University Press.
- Dusthimer, C., & Gillett, R. (1999). The history of ELT in Korea, In G. Crocetti (Ed.), *The KORESOL handbook: Teaching English in Korea* (pp. 1–12). Moonyedang.
- Education First. (2016). *Rank of English Proficiency in Latin America by 2015*.  
<http://www.ef.com/wwes/epi/>
- Education First. (2024). *2024 English EF Proficiency Index*. <http://www.ef.com/wwen/epi/>
- Escuela Americana. (2013). *Historia* [History].  
<http://www.eaextension.edu.sv/index.php?page=historia>
- Han, M. S. (2010). Hangukyeongeogyoyooklhui jeongchaekgwa banghyang [Policy and current situation of Korean English education]. In *2010 neyon woneomin yeongeobojogyosa gyojangdan jikmuyeonsoo* [2010 News of Native Assistant Teacher Training Research]. National Institute for International Education (NIIED).

- Jeon, M. H. (2009). Globalization and South Korea's EPIK (English program in Korea). In Vaish, V. (2010). *The impact of globalization process on language*. Continuum International Publishing Group.
- Kim, H. J. (2009). Teacher and students perceptions of new English language education policy. *Yeongeol Yeongmunhak Yoengu*, 51(3), 125–144.
- Kirkgöz, Y. (2009). Globalization and English language policy in Turkey. *Education Policy*, 23(5), 663–684.
- Lee, J. H., Jeong, H., & Hong, S. C. (2014). Is Korea number one in human capital accumulation? Education bubble formation and its labor market evidence. *KDI School of Public Policy and Management Paper No. 14-03*.  
[http://www.kdi.re.kr/upload/10152/Paper\\_1.pdf](http://www.kdi.re.kr/upload/10152/Paper_1.pdf)
- Lee, J. S. (2001). Education policy in the Republic of Korea: building block or stumbling block? *WBI Working Paper.*, World Bank.  
<http://siteresources.worldbank.org/WBI/Resources/wbi37164.pdf>
- Lee, K. O. (2010). *Korean English teachers' perceptions of the "Teaching English in English" policy* (Master dissertation), Ball State University.  
[http://cardinalscholar.bsu.edu/bitstream/handle/123456789/193279/leek\\_2010-1\\_body.pdf;jsessionid=64BF55F0D5B8A7BD873BF9D065B14134?sequence=1](http://cardinalscholar.bsu.edu/bitstream/handle/123456789/193279/leek_2010-1_body.pdf;jsessionid=64BF55F0D5B8A7BD873BF9D065B14134?sequence=1)
- Lee, S. J. (2008). Understanding Korean educational policy. *National Development Strategy and Education Policy, 1*. Korean Educational Development Institute.
- Mancia, P. C. (2013, November 15). El Salvador within the lowest rank of English education, *El Diario de Hoy*. <http://www.elsalvador.com/articulo/negocios/salvador-los-paises-con-niveles-mas-bajos-ingles-46628>
- Martínez, N. (2009). Por qué los estudiantes de las escuelas públicas no aprenden inglés. [Why students of public schools do not learn English]. *Diálogos Revista de Educación*. Instituto de Investigación y Formación Pedagógica, Universidad Don Bosco, 3(4). <http://www.udb.edu.sv/dialogos/PDF/revistasDIALOGOS4FINAL.pdf>
- McGuire, P. L. (1996). Language planning and policy and the ELT profession in selected Central American countries. *Teachers of English to Speakers of Other Languages, Inc (TESOL)*, 30(3), 606–611.
- Ministerio de Educación MINED. (2005b). *Plan nacional de educación 2021: metas y políticas para construir el país que queremos* [National plan of education 2021: goals and policies to build the country that we want], Ministry of Education of El Salvador.
- Ministerio de Educación MINED, (2005a). *COMPITE*, Ministry of Education of El Salvador.
- Ministerio de Educación MINED, (2006). *Primer aniversario plan nacional de educación 2021 (marzo 2005-marzo 2006)* [First anniversary of national plan of education 2021 (march 2005-march 2006)], Ministry of Education of El Salvador.

Ministerio de Educación MINED, (2009b). *Memoria de Labores 2008-2009 [Achievement history 2008-2009]*, Ministry of Education of El Salvador.

Ministerio de Educación MINED, (2009a). *Informe analítico del plan 2021, educando para el país que queremos [Analytical report of plan 2021, education for the country that we want]*: Ministry of Education of El Salvador.

Ministerio de Educación MINED, (2012). *Detalle de matrícula por sector y niveles educativos/grados, del censo 2009 al 2012 correspondiente al sistema tradicional y educación especial. Gerencia de Monitoreo, Evaluación y Estadística [Enrollment detail per sector and education levels, census from 2009 to 2012 of traditional and system and special education. Monitoring, Evaluation and Statistics Bureau]*, Ministry of Education of El Salvador.  
<https://www.google.co.kr/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwj-tonfx77OAhVJspQKHfTxAo0QFggcMAA&url=https%3A%2F%2Fapi.gobiernoabierto.gob.sv%2Fdocuments%2F9224%2Fdownload&usg=AFQjCNFhn5elCxaf-1iynrIciZLpSTiliQ&sig2=JzHMQJ7wn3b-V90b32S5qA>

Yook, C. M. (2010). *Korean teacher's beliefs about English language education and their impacts upon the Ministry of Education-initiated reforms* (Dissertation), Georgia State University. [http://scholarworks.gsu.edu/alesl\\_diss/14](http://scholarworks.gsu.edu/alesl_diss/14)

**Contact email:** [jullibatres@gmail.com](mailto:jullibatres@gmail.com)





## **The Challenges in Catering the Needs of Students With Autism Spectrum Disorder in Indonesian Schools**

Najwa Said, Monash University, Australia

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This paper explores the challenges faced by Indonesian schools in supporting students with Autism Spectrum Disorder (ASD) through a narrative literature review framed by the Social Model of Disability. Despite national efforts to promote inclusive education, significant barriers remain: (1) insufficient support for educators, (2) inadequate government funding and operational guidance, and (3) widespread societal stigma. Teachers often lack the necessary training and resources to manage the diverse learning styles and behaviours of students with ASD, leading to increased stress and diminished outcomes for both educators and learners. Limited financial support further restricts the development of inclusive facilities, assistive technologies, and specialised programs aligned with inclusive curricula. Compounding these challenges is a lack of community awareness, resulting in misconceptions and harmful stereotypes of students with ASD in mainstream education. Synthesising current literature, this review highlights the need for targeted teacher training, greater government commitment to inclusive curriculum development, and broader community engagement. Addressing these systemic barriers is essential to creating equitable educational opportunities for students with ASD in Indonesia and advancing a more inclusive and socially responsive school system.

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Inclusive education has become a key principle in global education reform, ensuring that all learners, regardless of ability, have equitable access to quality education. In Indonesia, inclusive education has gained momentum, yet many students with disabilities, particularly those with Autism Spectrum Disorder (ASD), continue to face systemic exclusion (Riany et al., 2016; Sheehy et al., 2020). Despite policy commitments, real-world implementation remains uneven and often inadequate.

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition characterised by varying degrees of difficulty in social communication, interaction, and restrictive or repetitive patterns of behaviour (Hodges et al., 2020, p. 55; Kistoro et al., 2021; Riany et al., 2016). Autism prevalence estimates vary significantly across countries and time periods, with international figures ranging from 0.67% to 1%, while in Indonesia, estimates suggest 1.14% of the population may be affected (Sheehy et al., 2019). Sidjaja et al. (2017) and Daulay et al. (2025) reported that one in 833 children born between 1984 and 1991 had an ASD diagnosis, which rose to 1 in 50 children by 2013. As of 2017, only 30% of Indonesia's 1.6 million children with special needs received education, with just 18% enrolled in inclusive settings (Wibowo et al., 2022).

In response, Indonesia's constitutional mandate for special education is outlined in Law No. 20 of 2003 on the National Education System, which affirms in Article 5(2) that individual with physical, emotional, mental, intellectual, or social disabilities have the right to receive appropriate educational support (Ediyanto et al., 2017; Kistoro et al., 2021). However, despite the policy to implement inclusive education, misconceptions persist, leading to the exclusion of autistic children who are often believed to require separate educational systems. The education system in Indonesia is divided into regular, inclusive, and special schools, each serving different student populations (Sheehy et al., 2020; Wibowo et al., 2022). Regular schools often restrict admission to students without behavioural difficulties and with typical cognitive and mobility functions, while students with more complex needs, such as those with unique communication and sensory impairments, are typically placed in "Sekolah Luar Biasa" (special schools), which focus on specific disability types (Sheehy et al., 2019). This is mainly due to the rooted systemic barriers, stigmatisation, and low awareness in the Education community. Barriers and segregation in Indonesian schools persist due to gaps in teacher preparedness, rigid curriculum design, inadequate inclusive strategies, and limited infrastructure (Latif & Paramita, 2023).

Identifying the challenges faced by students with autism in educational settings is essential to ensuring that all children receive equitable educational opportunities. As a response to these challenges, inclusive education seeks to eliminate social, economic, and ability-based distinctions among students, creating an environment where autistic children can learn and thrive alongside their neurotypical peers (Purbani, 2013). This narrative literature review explores the barriers to inclusion for students with Autism Spectrum Disorder (ASD) in Indonesian schools, focusing on three key areas: (1) the role of educators and the barriers they face, (2) the government's role and commitment to inclusive education, and (3) societal attitudes and the persistence of stigma.

## Methodology

This paper adopts a narrative literature review approach to explore the barriers to inclusive education for students with Autism Spectrum Disorder (ASD) in Indonesia. The review is guided by the Social Model of Disability as a theoretical framework to critically examine the institutional, environmental, and attitudinal barriers that hinder inclusion. Relevant literature was identified through a purposive selection of peer-reviewed journal, books, and other credible sources published between 2000 and 2025. Sources were selected based on their relevance to the research focus, particularly studies addressing inclusive education, autism in the Indonesian context, teacher preparedness, policy implementation, and social attitudes.

Rather than aiming for exhaustive coverage, this review prioritises depth of analysis over breadth, drawing on key themes across the literature to structure the discussion. The selected studies were thematically grouped into three major areas of inquiry: (1) the role and barriers faced by educators, (2) government commitment and policy challenges, and (3) societal attitudes and stigma. These themes were critically analysed through the lens of the Social Model of Disability to understand how systemic and cultural structures contribute to the exclusion of autistic students from mainstream educational settings in Indonesia.

## Social Model of Disability

The Social Model redefines disability not as an individual deficit, but as a consequence of societal failure to accommodate people with impairments (Oliver, 1983). In contrast to the medical model, which locates the problem within the individual, the Social Model positions disability as arising from attitudinal, institutional, and environmental barriers that restrict participation and access (Goering, 2015; Graham, 2024; Oliver, 2023). This shift in perspective is particularly relevant when considering the experiences of autistic students, whose challenges often stem not from their neurodivergence but from environments structured around neurotypical norms (Thacher, 2024). Attitudinal barriers include the persistence of deficit-based views that portray autistic students as problematic or in need of fixing, rather than recognising their rights and potential (Oliver, 2023). Institutional barriers manifest in rigid school policies and professional practices that prioritise standardised approaches and bureaucratic limitations over inclusive, student-centred support (Oliver, 2023). Environmental barriers refer to inaccessible learning environments, such as sensory-overloading classrooms or a lack of visual supports, which can significantly hinder autistic students' engagement (Oliver, 2023). By using the Social Model, this paper shifts the analytical focus from perceived student deficits to the systemic and structural conditions that shape their educational experiences, advocating for inclusive reforms that support dignity, autonomy, and full participation.

## Literature Review

### Educators' Role and Barriers

Teachers in Indonesia are expected to play a central role in implementing inclusive education by employing adaptive pedagogy, building deep understandings of student needs, and engaging in continuous professional development. This expectation is legally grounded in Indonesian Law No. 14/2005 on Teachers and Lecturers, which defines teachers as professional educators responsible for guiding, instructing, and evaluating students across all formal education levels (Fildzah, 2020). In practice, inclusive teaching requires educators to

adapt instructional materials to align with students' cognitive, emotional, and sensory profiles, employ strategies based on natural learning systems, and develop accessible media that can support all learners, including those with autism and other disabilities (Rasmitadila et al., 2022). Teachers must also identify diverse learning characteristics, foster strong student relationships, and apply inclusive methods such as scaffolding, modelling, and collaborative learning (Kurniawati, 2021; Ummah et al., 2024). In addition to academic differentiation, teachers are expected to address non-academic development through culturally relevant content, including religious education tailored to students' beliefs (Kistoro et al., 2021). These expectations reflect a comprehensive vision of inclusive practice in Indonesia that relies on teachers being responsive, reflective, and equipped to meet the varied needs of every learner.

In classrooms serving students with Autism Spectrum Disorder (ASD), several teaching methods have been implemented by Indonesian teachers, such as Discrete Trial Training (DTT) and differentiated instruction (DI) to accommodate complex behavioural, cognitive, and sensory needs (Padmadewi & Artini, 2017). This often involves designing Individualised Education Plans (IEPs), using co-teaching models such as shadow or parallel teaching, and implementing visual-based strategies aligned with structured routines (Padmadewi & Artini, 2017). Moreover, DI is widely applicable in every educational level, including higher education, where it can help to reduce anxiety by simplifying texts, adjusting workloads, and using tools like "green cards" to help ASD students anticipate class activities (Sandra & Kurniawati, 2020). Additional approaches, such as the Picture Exchange Communication System (PECS) and Applied Behaviour Analysis (ABA), have proven effective in supporting communication and behavioural development through repetition and one-on-one interaction (Kistoro et al., 2021). While these strategies aim to promote equity, participation, and academic success, their application is often hindered by limited resources and systemic inconsistencies, making inclusive implementation difficult to scale and sustain.

Although several inclusive pedagogies have been introduced, the practical application of inclusive frameworks remains a significant challenge for many Indonesian educators. Evidence suggests that the lack of specific competencies and training related to autism leaves many teachers ill-prepared for inclusive practice (Fildzah, 2020). This experience often leads to low confidence and difficulties addressing the cognitive and behavioural needs of students with ASD (Junaidi, 2020; Sheehy et al., 2019). Moreover, with class sizes of up to 35 students and limited physical space, collaborations between general teachers and special education teachers are lacking, resulting in fragmented or minimal support (Kantavong et al., 2017; Kurniawati, 2021; Latif & Paramita, 2023). These pressures contribute to withdrawal or passivity, as some teachers assume that inclusive teaching is the sole responsibility of specialist staff or believe it is unfeasible under current conditions (Ummah et al., 2024). Consequently, frameworks like IEPs are often viewed as aspirational but impractical, reinforcing systemic exclusion of students with autism from full classroom participation.

From the perspective of the Social Model of Disability, these challenges do not arise from the characteristics of students with autism but from the societal barriers that prevent their full inclusion. The absence of mandatory autism-related training, the lack of assistive technology, inadequate infrastructure, and unrealistic workload expectations all represent institutional and environmental barriers that hinder the development of inclusive learning environments (Fildzah, 2020; Latif & Paramita, 2023; Rasmitadila et al., 2022). While only 15.1% of Indonesian teachers are certified in special education, most others rely on informal learning networks such as *Kelompok Kerja Guru* (KKG), which lack expert guidance (Kantavong et

al., 2017; Utami, 2025). Teachers also face logistical challenges, including limited time for planning, overcrowded classrooms, and inconsistent collaboration with support staff (Kistoro et al., 2021). These conditions reinforce reliance on individual empathy rather than structured, evidence-based methods (Utami, 2025). Nonetheless, research consistently shows that Indonesian teachers hold broadly positive attitudes toward inclusion, viewing it as morally important and emotionally rewarding (Kurniawati et al., 2012). This suggests a strong foundation upon which inclusive reform can be built if it is accompanied by adequate policy support, investment in teacher capacity, and the removal of structural barriers that currently prevent inclusive education from being a practical reality.

## **Government's Role and Policy Challenges**

Government commitment is crucial to the successful implementation of inclusive education in Indonesia due to the complex challenges faced by schools, which cannot often resolve issues independently and are left without long-term solutions (Rasmitadila et al., 2023). Framed through the lens of the Social Model of Disability, the government's role becomes essential in eliminating institutional barriers that exclude students with disabilities from full participation in education. A key area requiring government attention is curriculum reform and financial support for schools. Current curricula and assessment models are inflexible and do not accommodate the diverse needs of students with disabilities, often forcing them to follow standards that do not reflect their learning profiles (Latif & Paramita, 2023). Additionally, inclusive education relies on adequate facilities, infrastructure, and strong collaboration between schools, families, and external agencies, all of which depend on strategic government investment and policy coordination to be effectively established and maintained (Latif & Paramita, 2023).

The Indonesian government has demonstrated its commitment to inclusive education through legal frameworks, funding for infrastructure, and curriculum reform. This commitment is evident in the extensive legislative and policy frameworks such as the 1945 Constitution (Article 31), Law No. 20/2003 on National Education, Law No. 8/2016 on Persons with Disabilities, and Permendiknas No. 70/2009, all of which guarantee the right of students with disabilities to access quality education and mandate inclusive classroom practices, training, and accessible learning environments (Damri et al., 2023; Rasmitadila et al., 2023). Moreover, financial support has been provided in the form of grants worth 50 million rupiah for training, infrastructure development, administrative resources, and the dissemination of inclusive education guidelines (Mulawarman et al., 2022; Yusuf & Yeager, 2011). These efforts are complemented by the appointment of Special Guidance Teachers and the provision of teaching aids and training for general education teachers in pilot schools (Kurniawati, 2021). In terms of curriculum, the government introduced differentiated learning through *Kurikulum Merdeka* in 2020 to better accommodate diverse student needs, including students with Autism (Utami, 2025). Additionally, training through the Centre for Development and Empowerment of Teachers and Education Personnel (PPPPTK TK & PLB) further supports inclusive pedagogy (Ediyanto et al., 2017). Overall, these coordinated legal, financial, and pedagogical strategies reflect a growing national commitment to building a more inclusive education system, although challenges in consistent implementation and teacher training remain.

Despite government efforts to support inclusive education, the reality of implementation across Indonesian schools remains fragmented, under-resourced, and often ineffective for students with Autism. While national policies and funding frameworks have been introduced,

research shows that 75% of schools still consider themselves far from inclusive, and only half have attempted to adjust their curriculum to meet student needs (Yusuf & Yeager, 2011). This gap is largely due to institutional barriers, including unclear policies, delayed fund disbursement, and limited technical guidance from the government, which leave schools and teachers to shoulder the responsibility independently (Latif & Paramita, 2023). Inclusive education is often treated as a school-led initiative rather than a systemic mandate (Damri et al., 2023), with insufficient operational support to meet the cognitive, behavioural, and sensory needs of autistic students. Environmental barriers also persist with many schools lacking resource rooms, adapted media, and quiet sensory-friendly spaces that are essential for autistic learners (Ummah et al., 2024; Yusuf & Yeager, 2011). These barriers reflect a broader failure to design schools inclusively, positioning exclusion as a result of inaccessible systems rather than student deficits.

Based on the Social Model of Disability, these challenges reveal how the schooling system disables students through structural exclusion. Institutional barriers include inadequate teacher training, the absence of dedicated institutions for continuous professional development, and a rigid reliance on standardised curricula that are merely simplified rather than meaningfully differentiated (Ummah et al., 2024). These practices marginalise autistic students by failing to accommodate diverse learning profiles. *Environmental barriers*, such as overcrowded classrooms, lack of assistive technology, and the physical inaccessibility of school facilities, further hinder participation (Latif & Paramita, 2023; Rasmitadila et al., 2022). Geographical and socioeconomic disparities compound the issue, with urban schools tend to have more resources and trained staff than rural ones, and regional gaps in infrastructure and funding create unequal conditions for inclusive education (Rasmitadila et al., 2023; Utami, 2025). Ultimately, these combined barriers undermine the implementation of inclusive policies and reinforce the marginalisation of autistic students (Damri et al., 2023).

### **Societal Attitude and Stigma**

Societal attitude towards students with Autism in Indonesia functions as *an attitudinal barrier*, a core concept within the Social Model of Disability, which locates the problem of disability not in the individual, but in the prejudiced attitudes, norms, and social expectations that exclude and marginalise those with impairments (Graham, 2024; Oliver, 1983). These attitudinal barriers are especially evident in how autism is misunderstood and stigmatised across many Indonesian communities. Little et al. (2022) highlight a case study in an Indonesian primary school where children with disabilities, though enrolled in an inclusive setting, were labelled as “inclusion children,” excluded from group work, and experienced emotional distress and public shame. This exclusion reflects broader societal attitudes rooted in misinformation and a poor understanding of autism. The widespread use of derogatory terms like “madman” or “mental handicap” reflects the persistence of these beliefs in the education system (Tri Handoyo et al., 2021).

Cultural beliefs in Indonesia play a significant role in shaping societal attitudes toward autism, which negatively influences how children with autism and their families are treated. Riany et al. (2016) argue that cultural understandings of autism influence parenting through the level of community support or censure that parents receive, which in turn affects the strategies they adopt to meet their child’s needs. In many Indonesian communities, particularly in rural areas, autism is not well understood and is often associated with spiritual causes such as karma, curses, or parental wrongdoing (Riany et al., 2016; Sheehy et al.,

2020). These misconceptions are deeply embedded in cultural traditions that link disability to past misdeeds, including broken taboos during pregnancy or immoral behaviour such as extramarital affairs (Riany et al., 2016). As a result, families may be blamed and socially excluded, leading to isolation, internalised guilt, and limited support for both the child and caregivers (Daulay et al., 2025; Sheehy et al., 2020). This cultural context helps explain why families may still follow traditional behavioural guidelines during pregnancy and believe that a child with autism is a form of divine punishment or a test from God (Daulay et al., 2025).

Although inclusive education policies have been introduced, societal acceptance remains low, especially toward developmental disabilities. Sipahutar (2019) found that only 20.9% of Indonesians support the inclusion of children with developmental disabilities like autism, compared to those with physical disabilities. This indicates that autism is still widely misunderstood, making students with ASD more vulnerable to bullying and peer rejection in schools (Purbani, 2013). Educators may view the inclusion of autistic students as inefficient due to the challenges of addressing their diverse learning needs (Sipahutar, 2019).

Consequently, students with autism are often bullied, excluded, and denied adequate support, while teachers struggle to meet their needs due to a lack of understanding and empathy (Mulia et al., 2022). Because of the persistent stigma, families often choose to hide their children rather than send them to school out of fear of stigma and mistreatment (Riany et al., 2016). This environment of exclusion intensifies the emotional burden on caregivers, the behavioural challenges and social rejection faced by children with ASD significantly raise maternal stress, leading to depression, anxiety, and exhaustion (Daulay et al., 2025). These barriers to inclusion are not only systemic but also deeply intertwined with cultural beliefs in Indonesia, which continue to shape negative perceptions and societal responses toward autism. The persistence of stigma and cultural misconceptions about autism, therefore, creates a hostile environment where both children and their families face ongoing marginalisation, highlighting the urgent need for culturally sensitive education and community-wide attitudinal change.

## **Discussion**

Based on the investigation and guided by the Social Model of Disability, two crucial recommendations emerge for Indonesian schools to address the barriers faced by students with autism. These barriers include: (1) insufficient support for educators, (2) inadequate government funding and operational guidance, and (3) widespread societal stigma. In response, two key recommendations emerged by focusing on the implementation of comprehensive professional learning for teachers and nation-wide support to enable inclusive practices for students with autism.

Firstly, there is a critical need to strengthen training and professional development within school communities to improve understanding and support for students with Autism Spectrum Disorder (ASD). In Indonesia, many educators lack adequate knowledge about autism, which negatively influences teaching practices and interactions with autistic students (Kurniawati, 2021). A national survey revealed that 42% of teachers explicitly requested training to improve their skills in behaviour management and the creation of autism-friendly environments (Sheehy et al., 2020). This demand stems from the fact that many Indonesian teachers lack familiarity with fundamental interventions such as Applied Behaviour Analysis (ABA) or the Picture Exchange Communication System (PECS) (Sheehy et al., 2020). Moreover, Damri et al. (2023) emphasised the need to address the absence of dedicated

institutions that provide specialised training for teachers in inclusive education. To tackle these challenges, comprehensive and sustained training programs must be implemented, focusing specifically on autism-related competencies. These should include modules on identifying and understanding ASD characteristics, implementing evidence-based interventions such as ABA and PECS, adapting classroom environments to sensory and communication needs, and managing challenging behaviours in a respectful and inclusive manner (Damri et al., 2023). Additionally, training should be delivered through practical workshops, school-based coaching, and collaboration with autism specialists to ensure that educators can apply inclusive strategies confidently in real classroom settings. When school communities have appropriate knowledge and tools, they are better positioned to foster inclusive environments and reduce stigma through informed and compassionate practice.

Secondly, policymakers and the Ministry of Education must increase funding and provide consistent, accessible support for inclusive education initiatives. While inclusive education policies exist at the legislative level, many schools face challenges in translating these policies into practice due to a lack of clear operational guidance (Damri et al., 2023). This gap between policy and implementation highlights the need for targeted investment in infrastructure and the systems that enable inclusive practice. This includes allocating financial resources for specialised teacher training, hiring additional support staff, and equipping schools with tools such as fidget toys, visual supports, and therapy rooms. However, as Latif and Paramita (2023) note, delays in the disbursement of government funds often hinder implementation efforts, creating inequities in access to inclusive education. In addition to funding, current policies and assessment standards must be revised to reflect the diverse needs of autistic students, thereby reducing the burden on both educators and learners. Ainscow et al. (2000) emphasise the importance of sustained governmental commitment to funding and policy implementation, which can help overcome barriers to facilities, resources, and teacher capacity. When schools are motivated to enrol more children with autism, communities are increasingly exposed to neurodiverse learners, an essential factor in reducing stigma and fostering empathy. As Sipahutar (2019) suggests, familiarity with inclusive education, whether through policy, media, or training, is linked to more positive societal attitudes. Thus, government-led initiatives play a dual role in strengthening school readiness and reshaping public perceptions of autism and inclusion in the long term.

## **Conclusion**

This paper has explored the barriers to inclusive education for students with Autism Spectrum Disorder (ASD) in Indonesia using the Social Model of Disability, which locates disability not within the individual but within the systemic, institutional, and attitudinal structures that exclude (Graham, 2024; Oliver, 1983). Despite progressive legal frameworks, the implementation of inclusive education remains fragmented, with many schools lacking operational guidance, timely funding, and adequate resources (Damri et al., 2023; Latif & Paramita, 2023). Teachers face large class sizes, minimal collaboration with special educators, and insufficient training in autism-specific strategies, leaving them ill-prepared to support neurodiverse learners (Kurniawati, 2021; Sheehy et al., 2020). Cultural stigma further compounds these issues, as autism is often misunderstood or attributed to supernatural causes, leading to social exclusion and emotional distress for both students and families (Daulay et al., 2025; Riany et al., 2016; Sipahutar, 2019). To address these challenges, two key strategies are recommended: first, the development of sustained, autism-focused professional development for educators—including training on Applied Behaviour Analysis (ABA), PECS, and sensory-responsive teaching methods (Handayani & Paramita, 2020); and



second, increased government investment in infrastructure and inclusive curriculum reform, coupled with public awareness campaigns to shift societal attitudes (Ainscow et al., 2000). As familiarity with inclusive education correlates with more positive views (Sipahutar, 2019), these combined efforts can transform current exclusionary practices into environments that uphold equity, dignity, and full participation for autistic learners in Indonesian schools.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

I used ChatGPT (<https://chat.openai.com/>) to assist with paraphrasing, improving academic tone, and restructuring specific sections of this paper, such as the theoretical framework and literature synthesis. AI support was incorporated across approximately 3–5 iterative drafts during the writing process. I modified the outputs by integrating academic references, refining arguments, and rewording content to ensure clarity, originality, and alignment with academic writing conventions. All critical thinking, source evaluation, and final decisions were made independently by me.

## References

- Ainscow, M., Farrell, P., & Tweddle, D. (2000). Developing policies for inclusive education: A study of the role of local education authorities. *International Journal of Inclusive Education*, 4(3), 211–229. <https://doi.org/10.1080/13603110050059150>
- Damri, D., Indra, R., Tsaputra, A., Ediyanto, E., & Jatiningsiwi, T. G. (2023). Leadership evaluation and effective learning in an inclusive high school in Padang, Indonesia. *Cogent Education*, 10(2). <https://doi.org/10.1080/2331186X.2023.2282807>
- Daulay, N., Daulay, H., & Rohman, F. (2025). Religious coping of Muslim mothers of children with autism spectrum disorder in Indonesia. *Journal of Disability & Religion*, 29(1), 33–50. <https://doi.org/10.1080/23312521.2024.2372021>
- Ediyanto, E., Atika, I. N., Kawai, N., & Prabowo, E. (2017). Inclusive education in Indonesia from the perspective of widyaiswara in center for development and empowerment of teachers and education personnel of kindergartens and special education. *Indonesian Journal of Disability Studies*, 4(2), 104–116. <https://doi.org/10.21776/ub.ijds.2017.4.2.3>
- Fildzah, Y. (2020). Comparative study of competency and certification of special education teachers in Indonesia and another various country. *Indonesian Journal of Disability Studies*, 7(1), 40–49. <https://doi.org/10.21776/ub.IJDS.2019.007.01.5>
- Goering, S. (2015). Rethinking disability: The social model of disability and chronic disease. *Current Reviews in Musculoskeletal Medicine*, 8(2), 134–138. <https://doi.org/10.1007/s12178-015-9273-z>
- Graham, L. J. (Ed.). (2024). *Inclusive education for the 21st century: Theory, policy and practice* (2nd ed.). Routledge. <https://doi.org/10.4324/9781003350897>
- Handayani, M. M., & Paramita, P. P. (2020). Stigma and knowledge about autism spectrum disorder among parents and professionals in Indonesia. In *Proceedings of the 3rd International Conference on Psychology in Health, Educational, Social, and Organizational Settings* (pp. 97–100). <https://doi.org/10.5220/0008585800970100>
- Hodges, H., Fealko, C., & Soares, N. (2020). Autism spectrum disorder: Definition, epidemiology, causes, and clinical evaluation. *Translational Pediatrics*, 9(Suppl 1), S55–S65. <https://doi.org/10.21037/tp.2019.09.09>
- Junaidi, A. (2020). Teachers' attitudes toward inclusive education in East Java, Indonesia. *Journal of ICSAR*, 4(1), 1–4. <https://journal2.um.ac.id/index.php/icsar/article/view/10588>
- Kantavong, P., Sujarwanto, Rerkjaree, S., & Budiyanoto. (2017). A comparative study of teacher's opinions relating to inclusive classrooms in Indonesia and Thailand. *Kasetsart Journal of Social Sciences*, 38(3), 291–296. <https://doi.org/10.1016/j.kjss.2016.05.005>

- Kistoro, C. A. H., Setiawan, C., Latipah, E., & Putranta, H. (2021). Teacher's experiences in character education for autistic children. *International Journal of Evaluation and Research in Education (IJERE)*, 10(1), 65. <https://doi.org/10.11591/ijere.v10i1.20743>
- Kurniawati, F. (2021). Exploring teachers' inclusive education strategies in rural Indonesian primary schools. *Educational Research*, 63(2), 1–14. <https://doi.org/10.1080/00131881.2021.1915698>
- Kurniawati, F., Minnaert, A., Mangunsong, F., & Ahmed, W. (2012). Empirical study on primary school teachers' attitudes towards inclusive education in Jakarta, Indonesia. *Procedia: Social and Behavioral Sciences*, 69, 1430–1436. <https://doi.org/10.1016/j.sbspro.2012.12.082>
- Latif, H. N. M., & Paramita, P. P. (2023). Constraints and strategies for inclusive education in Indonesia at the primary school level: A literature review. *IJIP: Indonesian Journal of Islamic Psychology*, 5(2), 134–147. <https://doi.org/10.18326/ijip.v5i2.71>
- Little, C., deLeeuw, R. R., Andriana, E., Zanuttini, J., & David, E. (2022). Social inclusion through the eyes of the student: Perspectives from students with disabilities on friendship and acceptance. *International Journal of Disability, Development, and Education*, 69(6), 2074–2093. <https://doi.org/10.1080/1034912X.2020.1837352>
- Mulawarman, W. G., Hudiyono, Y., Nurlaili, Komariyah, L., Suryaningsi, Warman, & Thaba, A. (2022). How is accessibility of children with special needs to get included education in inclusive elementary school; questioning management of inclusive education in Indonesia. *Webology*, 19(2), 1351–1366. <https://www.proquest.com/scholarly-journals/how-is-accessibility-children-with-special-needs/docview/2695105135/se-2>
- Mulia, A. L., Yusuf, M., & Subagya, S. (2022). Bullying behavior of regular students toward students with special needs (Autism Spectrum Disorders). *International Journal of Multicultural and Multireligious Understanding*, 9(4), 255–265. <http://doi.org/10.18415/ijmmu.v9i4.3666>
- Oliver, M. (1983). *Social work with disabled people*. Macmillan. <https://doi.org/10.1007/978-1-349-86058-6>
- Oliver, M. (2023). The social model of disability. In *Social work* (pp. 137–140). Routledge.
- Padmadewi, N. N., & Artini, L. P. (2017). Teaching English to a student with autism spectrum disorder in regular classroom in Indonesia. *International Journal of Instruction*, 10(3), 159–176. <https://doi.org/10.12973/iji.2017.10311a>
- Purbani, W. (2013). Equity in the classroom: The system and improvement of inclusive schools in Yogyakarta, Indonesia (A case study). *US-China Education Review*, 3(7), 507–518. <https://doi.org/10.1177/1744629517717613>

- Rasmitadila, R., Humaira, M. A., Laeli, S., Rachmadtullah, R., & Jauhari, M. N. (2023). The education stakeholders' perspective of a mentoring programme for inclusive elementary schools in Indonesia: Mutual of need and input, and mentoring support system. *Education 3–13*, ahead-of-print. <https://doi.org/10.1080/03004279.2023.2219277>
- Rasmitadila, R., Widyasari, W., Teguh, P., & Ayu Anggraini, P. (2022). Challenges in the implementation of instructional strategy model based on the brain natural learning systems for inclusive classroom. *Psychology and Education Journal*, 53, 112–128. <https://doi.org/10.20319/pijtel.2022.53.112128>
- Riany, Y. E., Cuskelly, M., & Meredith, P. (2016). Cultural beliefs about autism in Indonesia. *International Journal of Disability, Development and Education*, 63(6), 623–640. <https://doi.org/10.1080/1034912X.2016.1142069>
- Roberts, J., & Webster, A. (2022). Including students with autism in schools: A whole school approach to improve outcomes for students with autism. *International Journal of Inclusive Education*, 26(7), 701–718. <https://doi.org/10.1080/13603116.2020.1712622>
- Sandra, L. A., & Kurniawati, L. A. (2020). Differentiated instructions in teaching English for students with autism spectrum disorder. *JET (Journal of English Teaching) Adi Buana*, 5(1), 41–53. <https://doi.org/10.36456/jet.v5.n01.2020.2274>
- Sheehy, K., Kaye, H., & Rofiaha, K. (2020). Indonesian educators' knowledge and beliefs about teaching children with autism. *Athens Journal of Education*, 7(1), 77–98. <https://doi.org/10.30958/aje.7-1-4>
- Sheehy, K., Budiyanto, Kaye, H., & Rofiah, K. (2019). Indonesian teachers' epistemological beliefs and inclusive education. *Journal of Intellectual Disabilities*, 23(1), 39–56. <https://doi.org/10.1177/1744629517717613>
- Sidjaja, F. F., Newcombe, P. A., Irwanto, & Sofronoff, K. (2017). The diagnosis of autism spectrum disorder in urban Indonesia: A brief report. *International Journal of Disability, Development, and Education*, 64(1), 33–44. <https://doi.org/10.1080/1034912X.2016.1162768>
- Sipahutar, R. (2019). Public attitude towards inclusion of children with special needs in mainstream classes in Indonesia. In *3rd International Conference on Special Education* (pp. 286–293). Atlantis Press. <https://www.atlantispress.com/article/125928832>
- Thacher, D. (2024). Policing a neurodiverse world: Lessons from the social model of disability. *Policing: A Journal of Policy and Practice*, 18. <https://doi.org/10.1093/police/paae012>
- Tri Handoyo, R., Ali, A., Scior, K., & Hassiotis, A. (2021). Attitudes of key professionals towards people with intellectual disabilities and their inclusion in society: A qualitative study in an Indonesian context. *Transcultural Psychiatry*, 58(3), 379–391. <https://doi.org/10.1177/1363461520909>

- Ummah, U. S., Tahar, M. M., & Yasin, M. H. B. M. (2024). Driving factors of inclusive education for primary school in Indonesia. *Pegem Journal of Education and Instruction*, 14(2), 86. <https://doi.org/10.47750/pegegog.14.02.10>
- Utami, N. A. B. (2025). Exploring physical education teachers' perspectives on inclusive education in Bandung, Indonesia. *International Journal of Inclusive Education*, 1–15. <https://doi.org/10.1080/13603116.2025.2490591>
- Wibowo, A. M., Fakhruddin, F., Sutarto, J., & Prihatin, T. (2022). The curriculum of inclusion education in madrasah in Indonesia. *Webology*, 19(2), 1309–1324.
- Yusuf, M., & Yeager, J. L. (2011). The implementation of inclusive education for students with special needs in Indonesia. *Excellence in Higher Education*, 2(1), 1–10. <https://doi.org/10.5195/ehe.2011.27>

**Contact email:** njwsaid18@gmail.com



## **Developing an Instructional Package Entitled “My Emotions” to Promote Emotional Perception in Students With Autism**

Aporn Saardaium, Srinakharinwirot University, Thailand

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This study investigated the effectiveness of the instructional package entitled “My Emotions” in enhancing the emotional perception skills of children with autism, using the 80/80 criterion for instructional efficiency. The study adopted a one-group pretest–posttest design and involved 15 students with autism from Grades 1 to 3 at the Special Learning Centre for Students with Special Needs, Demonstration School of Ramkhamhaeng University. Participants were purposively sampled. The instruments employed were (1) the instructional package “My Emotions” and (2) an emotional perception assessment tool. The intervention was implemented twice per week, 40 minutes per session, over four weeks, totaling eight sessions. Data were analysed using the medians, instructional efficiency indices, and Wilcoxon signed rank test. The results demonstrated that the package achieved an effectiveness score of 84.67/85.33, which exceeded the 80/80 benchmark. Furthermore, a statistically significant improvement in emotional perception skills was observed following the intervention ( $p < .05$ ), with posttest scores being higher than pretest scores. These findings suggest that the instructional package “My Emotions” has potential as an effective educational tool to support the development of emotional understanding in young children with autism.

*Keywords:* children with special needs, autism, perception of emotion

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Emotional development plays a fundamental role in the holistic growth of all children, including those with autism spectrum disorder (ASD). Children who experience healthy emotional development tend to perform better in learning, communication, and various aspects of daily life. In the context of autism, the ability to perceive and interpret emotions—both one's own and those of others—is strongly associated with enhanced language development, social communication, and self-awareness. Nevertheless, a considerable number of children with autism face significant challenges in recognizing emotions, especially those conveyed through facial expressions. These difficulties are often linked to deficits in abstract thinking and an underdeveloped theory of mind (Limshila, 2002), which may lead to social isolation and hinder peer interaction.

Several studies have emphasized that teaching emotional recognition to children with autism is most effective when grounded in the use of concrete and visually supported instructional methods. While human facial expressions have been traditionally used as learning stimuli, research suggests that alternative visual formats—such as cartoon characters, emoticons, and virtual avatars—can be more engaging and accessible, particularly for children who struggle with direct eye contact (Cross et al., 2019; Gordon et al., 2014; Tanaka et al., 2012). In addition, providing emotional learning through illustrated situational contexts has been found to improve comprehension by linking emotions to causes and guiding appropriate behavioral responses (Akmanoglu, 2015; Axe & Evans, 2012).

In light of these findings, the present study aims to develop an instructional package entitled "*My Emotions*", specifically designed to enhance the perception of four fundamental emotions—happiness, sadness, anger, and fear—among children with autism. The package integrates cartoon-based facial expressions and context-driven scenarios to support emotional recognition and promote more effective social engagement.

## Research Objectives

1. To evaluate the effectiveness of the instructional package "*My Emotions*" in enhancing emotional perception skills among children with autism, based on the 80/80 efficiency criterion.
2. To compare the emotional perception abilities of children with autism before and after using the "*My Emotions*" instructional package.

## Literature Review

The literature reviewed in this study highlights the multifaceted challenges faced by children with Autism Spectrum Disorder (ASD) (Akmanoglu, 2015; Axe & Evans, 2012; Cross et al., 2019; Gordon et al., 2014; Tanaka et al., 2012), particularly in the domain of emotional development. Emotional perception—the ability to recognize and respond appropriately to one's own and others' emotions—is a critical component of social interaction and communication. However, children with autism often exhibit delays or deficits in this area due to cognitive limitations such as underdeveloped theory of mind and difficulties in abstract thinking.

Research has consistently shown that these children benefit from instructional approaches that incorporate visual and contextual supports. Cartoon images, emoticons, and animated



facial expressions are more accessible and less intimidating than real-life photographs, especially for children who struggle with direct eye contact. Moreover, situational illustrations that connect emotions to causes and appropriate responses can significantly improve understanding and expression.

Instructional packages designed for children with special needs must be structured, visually engaging, and tailored to their cognitive profiles. Successful interventions often include repetition, consistency, and learner-centered strategies that support gradual skill acquisition. Despite these findings, there remains a need for culturally relevant and age-appropriate tools that integrate these elements into a cohesive instructional framework.

In response to these gaps, the present study proposes the development of an instructional package titled “*My Emotions*,” aimed at enhancing the perception of four basic emotions—happiness, sadness, anger, and fear—among children with autism. By integrating cartoon-based facial expressions and scenario-driven illustrations, this package seeks to promote emotional understanding and improve the quality of social interactions in this population.

### Target Group

The target participants for this study were 15 students with autism enrolled in Grades 1–3 at the Demonstration School of Ramkhamhaeng University (Primary Division), Special Education Program. Participants were selected using purposive sampling based on specific inclusion criteria: (1) children diagnosed with autism, (2) aged between 6–10 years, (3) able to communicate using spoken language, and (4) able to attend to learning activities for at least 15–20 minutes continuously.

### Variables

- **Independent Variable:** The instructional package “*My Emotions*.”
- **Dependent Variable:** Emotional perception skills of children with autism.

### Research Design and Data Collection

This study utilized a quasi-experimental design, specifically the One Group Pretest-Posttest Design. The procedure involved the following steps:

1. Permission was obtained from the school director and relevant stakeholders.
2. A pretest was administered using the emotional perception test to assess participants' baseline emotional recognition skills.
3. The instructional package “*My Emotions*” was implemented over four weeks, with sessions held twice a week, lasting 40 minutes per session, for a total of 8 sessions.
4. At the end of the intervention, a posttest (the emotional perception test) was administered to evaluate learning outcomes.

### Research Instruments

#### Instructional Package: “My Emotions”

The package was developed based on a review of relevant literature and consisted of visual materials, lesson plans, and learning activities. It was designed to teach four basic emotions—happiness, sadness, anger, and fear—using cartoon illustrations and situational contexts. The

instructional package was evaluated by experts across four dimensions: content accuracy, multimedia design, language appropriateness, and usability. The results indicated a high level of quality across all dimensions (overall mean score = 4.63):

- Content Quality: 4.63
- Multimedia Design: 4.68
- Language Use: 4.70
- Usability: 4.52

### **Emotional Perception Tests (Pretest and Posttest)**

A multiple-choice test (30 items, 3-option format) were developed to assess emotional perception before and after the intervention. The test was validated for content using the Index of Item-Objective Congruence (IOC), with IOC values ranging from 0.67 to 1.00. After expert review and revisions, the test was piloted with 9 non-participant students to analyze test efficiency (E1/E2), resulting in values of 83.89/80.37.

The final version was refined to 20 items based on item difficulty and discrimination indices:

- Pretest: Difficulty (p) ranged from 0.33–0.67, Discrimination (r) ranged from 0.40–0.60
- Posttest: Difficulty (p) ranged from 0.67–1.00, Discrimination (r) ranged from 0.40–0.80

Reliability was assessed using the Kuder-Richardson Formula 20 (KR-20):

- Pretest Reliability: 0.81
- Posttest Reliability: 0.86

### **Data Analysis**

The data in this study were analyzed using the following statistical methods:

#### **Instrument Quality Analysis**

#### ***Content of the Instructional Package “Teaching Children to Understand Emotions” on Improving Emotional Perception Abilities Among Children With Autism***

The findings are summarized as follows:

#### **Effectiveness of the Instructional Package**

Table 1 presents the analysis of the instructional package’s effectiveness based on students’ scores during and after the lessons.

**Table 1**

*Effectiveness of the Instructional Package “Teaching Children to Understand Emotions” on Emotional Perception Skills*

Phase	Total Score	Mean Score	Percentage
During Instruction (E1)	40	33.87	84.67%
After Instruction (E2)	20	17.07	85.33%

As shown in Table 1, the average score during instruction (E1) was 33.87 out of 40, equivalent to 84.67%, and the average post-instruction score (E2) was 17.07 out of 20, equivalent to 85.33%. Therefore, the instructional package achieved an effectiveness score of 84.67/85.33, which meets the predefined 80/80 criterion.

### Comparison of Emotional Perception Abilities Before and After the Intervention

Table 2 shows the comparison between pre- and post-instruction scores using the Wilcoxon Signed-Ranks Test.

**Table 2**

*Comparison of Emotional Perception Scores Before and After Using the Instructional Package*

Student	Pre-test (X)	Post-test (Y)	Difference (D)	Rank	Sign
1	9	16	7	8	+
2	10	17	7	8	+
3	11	19	8	13.5	+
4	12	18	6	2.5	+
5	10	17	7	8	+
6	12	19	7	8	+
7	8	16	8	13.5	+
8	11	18	7	8	+
9	9	17	8	13.5	+
10	10	18	8	13.5	+
11	13	19	6	2.5	+
12	8	15	7	8	+
13	9	16	7	8	+
14	10	16	6	2.5	+
15	9	15	6	2.5	+

The results show that all 15 children scored higher on the post-test compared to the pre-test, yielding a total positive rank ( $T^+$ ) of 120 and no negative ranks ( $T^- = 0$ ). This indicates a statistically significant difference at the .05 level, suggesting that the instructional package had a positive effect on the emotional perception abilities of children with autism.

### Discussion

The findings indicated that the instructional package “Teaching Children to Understand Emotions” achieved an effectiveness score of 84.67/85.33, which met the predetermined criterion of 80/80 and supported the research hypothesis. This effectiveness can be attributed to the systematic development of the instructional package. It was created based on a comprehensive review of relevant literature and designed following established instructional development steps (Chaiyong Promwong, 1994, pp.102–105). The package underwent quality evaluation by experts in four key areas: (1) content, (2) multimedia materials, (3) language, and (4) usability. Revisions were made according to expert recommendations. Furthermore, the package was piloted with a group of autistic children in grades 1–3 who shared similar characteristics with the target group. This trial was used to verify content appropriateness, language clarity, instructional media, and time allocation, after which the package was further refined. These systematic and validated processes contributed to the

overall effectiveness and practical applicability of the instructional package. When comparing emotional perception abilities before and after the use of the instructional package, a statistically significant difference was found at the .05 level. Scores were higher after using the package. This improvement can be attributed to the learning format, which aligns with the natural learning style of children with autism. The e-learning format incorporated illustrated visuals, voice narration, and creative activities that enhanced learners' engagement and created a joyful learning environment. Particularly, the illustrations and creative scenarios—simulations of real-life situations—were highly effective, as visual and hands-on learning are considered optimal for children with autism (Somporn, 2008, p.25). The researcher also used concrete images of facial expressions and contextual scenarios, organized into four lessons that focused on key emotional concepts: happiness, sadness, anger, and fear (Akmanoglu, 2015; Axe & Evans, 2012; Hathaithip, 2015). The use of cartoon-style illustrations (Crosset al., 2019) helped reduce resistance to eye contact, a common challenge in autistic learners, thereby increasing their attention and supporting their learning process.

These results are consistent with the findings of Boonsom (2007), who studied emotional perception in autistic children taught using comic books. His study showed that emotional perception scores increased by more than 60 percent after the intervention, with post-test scores significantly higher than pre-test scores. Similarly, the use of the “Teaching Children to Understand Emotions” package resulted in an improvement in the emotional perception abilities of autistic children compared to their abilities prior to the intervention.

## **Conclusion and Recommendations**

### **Recommendations for Practical Application**

1. The researcher should collaborate and communicate with parents to clearly explain the objectives and instructional content of the “*Teaching Children to Understand Emotions*” package. This ensures alignment between the researcher and parents in providing consistent support for the learners.
2. The “*Teaching Children to Understand Emotions*” instructional package can be adapted for supplementary instruction among typically developing students to enhance their emotional perception abilities.

### **Recommendations for Future Research**

1. Future studies should control for confounding variables by categorizing sample scores based on factors such as age or grade level. This stratification would increase the credibility of the experimental results.
2. Comparative studies should be conducted to evaluate learning outcomes between students taught using the instructional package and those taught through traditional methods.
3. Future instructional content should expand beyond basic emotions (happiness, sadness, anger, and fear) to include more complex emotions such as surprise, embarrassment, excitement, and love.

### **AI Assistance Declaration**

This manuscript was prepared with the assistance of ChatGPT (GPT-4), developed by OpenAI, which was used solely for the purposes of language translation (Thai to English) and proofreading. The AI tool helped refine grammar, vocabulary, and sentence structure to ensure clarity and coherence in the English-language sections of the manuscript. All content, including ideas, analysis, and conclusions, were entirely created and verified by the author.

## References

- Akmanoglu, N. (2015). Effectiveness of teaching naming facial expression to children with autism via video modeling. *Educational Sciences: Theory & Practice*, 15(2).
- Axe, J. B., & Evans, C. J. (2012). Using video modeling to teach children with PDD-NOS to respond to facial expressions. *Research in Autism Spectrum Disorders*, 6(3), 1176–1185.
- Boonsom, D. (2007). *The study of emotional perception ability in autistic children taught through cartoon books* [Master's thesis, Srinakharinwirot University].
- Boonchom, S. (2000). *Basic research*. Suwiriyan.
- Chaibong, P. (1994). *Teaching technology and media for primary education: Units 8–15*. Sukhothai Thammathirat Open University.
- Cross, L., Farha, M., & Atherton, G. (2019). The animal in me: Enhancing emotion recognition in adolescents with autism using animal filters. *Journal of Autism and Developmental Disorders*, 49(11), 4482–4487.
- Darane, U. (2002). *How to know if a child is at risk of autism*. In Workshop materials: Teachers, Doctors, and Parents: The Dimensions of Autistic Potential Development. Kasetsart University.
- Gordon, I., Pierce, M. D., Bartlett, M. S., & Tanaka, J. W. (2014). Training facial expression production in children on the autism spectrum. *Journal of Autism and Developmental Disorders*, 44(10), 2486–2498.
- Hathaitip, N. (2015, May–August). Direct instruction with video media to improve emotional perception ability in autistic children. *Veridian E-Journal, Silpakorn University*, 8(2), 2701–2712. <https://tdc.thailis.or.th>
- Luan, S., & Angkana, S. (2000). *Educational research techniques* (3rd ed.). Suwiriyan.
- Nipha, S. (1990). *Nonparametric statistics* (2nd ed.). OS Printing House.
- Penkae, L. (2002). *Manual for training and caring for autistic children for parents*. Yuwaprasart Waithayopatum Hospital.
- Phichit, R. (2002). *Principles of educational measurement and evaluation* (2nd ed.). House of Kermist.
- Somporn, W. (2008). *Producing visual support media for learning in autistic individuals at home and in the community*. Klang Nana Wittaya.

Tanaka, J. W., Wolf, J. M., Klaiman, C., Koenig, K., Cockburn, J., Herlihy, L., Brown, C., Stahl, S. S., South, M., McPartland, J. C., Kaiser, M. D., & Schultz, R. T. (2012). The perception and identification of facial emotions in individuals with autism spectrum disorders using the Let's Face It! Emotion Skills Battery. *Journal of Child Psychology and Psychiatry*, 53(12), 1259–1267.

**Contact email:** aporns@g.swu.ac.th





## **Storytelling in Higher Education: A Strategy to Understand Bullying and Cyberbullying**

Glenis Bibiana Alvarez Quiroz, Universidad de Córdoba, Colombia  
Julio José Rangel Vellojín, Universidad de Córdoba, Colombia  
Miguel Ángel Palomino Hawasly, Universidad de Córdoba, Colombia

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Storytelling is defined as a captivating narrative that recounts events with a final message aimed at conveying a lesson or concept. This technique stands out as a key tool for addressing complex issues such as bullying and cyberbullying, which have severe emotional, psychological, and social impacts on victims. In this study, conducted at the University of Córdoba, Colombia, a storytelling platform was designed to collect and highlight the experiences of university students affected by these problems. The proposal included the development of a software application that presents the vision of cyberbullying through digital narratives created by the young participants themselves. The methodology combined the principles of applied research with evolutionary software development models. Additionally, an epistemological approach centered on the “knowing subject” was adopted, along with a qualitative perspective, using techniques such as digital narratives, focus groups, and interviews for data collection. Data analysis was carried out through content analysis techniques. The expected impact lies in the consolidation of a robust and scalable software system capable of managing multiple digital formats and enabling young people to share their experiences with cyberbullying. This development addresses the regional need to implement innovative strategies for generating, optimizing, and applying knowledge, contributing to the transformation of educational.

*Keywords:* storytelling, higher education, bullying

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Digital storytelling has emerged as a powerful pedagogical strategy in higher education to approach sensitive and complex topics. Among these, bullying and cyberbullying stand out as practices with serious emotional, psychological, and social consequences for their victims. These forms of digital aggression are becoming increasingly prevalent due to the widespread and often unregulated use of social media, messaging apps, and other virtual communication tools. Cyberbullying, in particular, refers to the use of digital technologies to intimidate, harass, or harm others through repeated aggressive behavior in online environments (López et al., 2019).

In Latin America, scientific research on cyberbullying and related phenomena remains limited and often lacks methodological rigor. Existing studies suggest that Colombia is one of the countries with the highest rates of bullying. According to Zych et al. (2015), 63% of Colombian students report being involved in bullying, a figure that exceeds the Latin American average of 51.1% and is significantly higher than the 29.2% reported across Europe and the United States. Furthermore, data from the international NGO Bullying Without Borders reported 78 confirmed bullying cases in Monteria, Córdoba alone (Miglino, 2021).

In this context, the present study proposes the design and implementation of a digital storytelling platform aimed at understanding the impact of bullying and cyberbullying among university students. By collecting and showcasing digital narratives authored by the students themselves, the project seeks to provide insights into how young people experience and interpret technology-mediated aggression. This research is guided by the following question: How does a software system allow for understanding the perspectives on cyberbullying through the digital narratives of students at the University of Córdoba?

## Theoretical Framework

Storytelling refers to the act of telling a story, an essential human activity through which individuals give meaning to their experiences, connect with others, and project themselves into the future (Davis, 2004; Walsh, 2010). In educational settings, storytelling has gained importance not only as a pedagogical technique but also as a form of inquiry that enables the exploration of social realities from the perspective of those who live them.

Digital storytelling, in particular, allows young people to express themselves using their own language and preferred media. As Greenhalgh and Koehler (2021) and Hu et al. (2023) affirm, digital narratives offer youth the opportunity to create and share content that reflects their identities, concerns, and social contexts. This aligns with broader trends in digital culture, where young users are not merely consumers but also active producers of content, including photos, videos, blogs, wikis, and social media (O'Reilly, 2005; Prensky, 2001).

In the context of bullying and cyberbullying, storytelling serves as a transformative practice that enables the expression of trauma and the construction of meaning from painful experiences. The digital format, furthermore, introduces opportunities for visibility, community support, and reflexive engagement. Storytelling thus becomes both a strategy for personal empowerment and a means of generating knowledge grounded in lived experience.

## Methodology

This study adopted an applied research approach aimed at solving problems related to the production, circulation, and use of digital educational tools, particularly those addressing technology-mediated violence among university students (Doyle et al., 2016). To achieve this, the project combined qualitative research techniques with software development strategies, creating an interdisciplinary methodological design.

The software platform was developed following an evolutionary software development model, which enabled the construction of iterative prototypes. Each prototype was tested and validated, allowing for incremental improvements and the integration of functional features throughout the development cycle. This process ensured the alignment of the technological solution with the real needs and experiences of the student participants.

From a qualitative perspective, the study aimed to explore and understand how students perceive and experience bullying and cyberbullying within digital environments. This approach allowed the researchers to examine cultural patterns, behaviors, and the symbolic meanings students assigned to their experiences (Londoño et al., 2018).

The data collection techniques included semi-structured interviews, focus groups, and digital storytelling, enabling participants to narrate their experiences using their own voice and preferred digital formats. As Greenhalgh and Koehler (2021) suggest, digital narratives provide youth with the means to express themselves creatively and critically, often using media formats that resonate with their everyday communication practices. Today's youth are active producers of digital content—photos, videos, blogs, social media posts—making storytelling a powerful, native form of expression (O'Reilly, 2005; Prensky, 2001).

To interpret the digital stories and interview material, content analysis was employed as the principal analytical strategy. This method allowed for the identification of patterns, emerging categories, and thematic clusters that reveal how students understand and make sense of cyberbullying and related phenomena (López et al., 2019).

## Results

### The Digital Platform

The digital platform designed in this project was developed under a client-server architecture using specialized frameworks for each layer. On the client side, Nuxt.js was used to create a dynamic interface that allows users to explore different formats—video, podcast, and infographic—related to bullying and cyberbullying. The structure is organized into four main components: Layouts (which define the visual structure for each content type), Components (which dynamically render multimedia resources), Pages (which route and display specific sections), and Store (which manages local client data, including user session information).

Upon logging in, users can access thematic content categorized under bullying and cyberbullying. Each topic is available in three multimedia formats to support different user preferences and promote accessibility. When a user selects a content type, the system makes a JSON request to the server, which responds with the appropriate resources.

The homepage of the platform features a vibrant, user-friendly design. At the top, a colorful navigation menu allows quick access to content categories. A central illustration depicts a young person affected by digital harassment, accompanied by icons and emotion symbols to reinforce the thematic focus. This visual storytelling approach is combined with a brief descriptive overlay, helping to immediately communicate the site's educational objective (see **Figure 1**).

**Figure 1**  
*Home Page of the Site*



Each content category—bullying or cyberbullying—presents its information through video, podcast, and infographic, enhancing multimodal access and facilitating engagement for users with varied preferences (see **Figure 2**).

**Figure 2**  
*Presentation Formats for Cyberbullying Cases*



## Student Narratives

The qualitative analysis of student narratives revealed nuanced insights into how university students understand and experience cyberbullying. These were grouped into key categories and subcategories that emerged from recurring patterns and thematic analysis.

**Table 1**

*Cyberbullying Categories*

Category	Subcategory
Cyberbullying	What is cyberbullying?
	Characteristics
	Means of execution
	Psychological impact
	Video games
	Role of the observer
	Platform of execution

*Source.* Own elaboration

## Conceptualization of Cyberbullying

Students often defined cyberbullying as a form of aggression that takes place through digital channels such as social networks, chats, or mobile apps. One participant explained: “Cyberbullying is a kind of harassment that happens online through offensive messages, posting unauthorized images, or spreading lies about someone” (Narrative HIVJR). This aligns with definitions found in the literature, which describe cyberbullying as a continuous form of digital aggression intended to cause harm (Hinduja & Patchin, 2019; López et al., 2019).

Cyberbullying tends to be persistent and invasive, often targeting personal traits and exploiting the anonymity of the digital space. Students also described how it differs from traditional bullying due to its extended reach and the permanence of shared content (Souza et al., 2022).

## Means of Execution

Participants identified multiple digital channels used to execute cyberbullying, including social media platforms, messaging apps, and online games. One student shared: “When I started using social networks, strangers would take my profile photos to compare and make hurtful comments” (Interview MIXAE). This highlights how cyberbullying leverages accessible digital tools to harass victims in both public and private spaces (Álvarez-Quiroz et al., 2023; Kowalski et al., 2014).

## Psychological Impact

Emotional and psychological consequences were recurrent themes. One student recalled: “Because of my teeth, people would give me nicknames and share it on WhatsApp. That made me really insecure and anxious” (Narrative MIXSP). Another shared: “I experienced cyberbullying. It was awful. I felt constantly down and didn’t want to be around others”

(Narrative MXLL). These accounts align with findings that cyberbullying can lead to depression, anxiety, suicidal ideation, and social withdrawal (Hu et al., 2023; Wade & Beran, 2018).

### **Cyberbullying in Video Games**

Gaming environments were described as frequent scenarios for online harassment. Students described toxic behavior through chat features, targeting of players based on gender or identity, and hostile competitiveness. One student observed: “I’ve seen lots of harassment online, especially towards women or in games where competition is high” (Narrative HIIIMA). Research supports that such interactions can have lasting psychological effects and alter the gaming experience (Kowert et al., 2019; Reitman et al., 2020).

### **Role of the Observer**

Witnesses to cyberbullying play a complex role. A student shared: “Back in school, I saw how classmates bullied one of our peers, both online and physically” (Narrative HXYM). Another recounted: “In my school, classmates planned through Facebook to target a peer with nasty comments” (Narrative MVLT). The way observers respond—by acting, ignoring, or supporting—can shape the outcome for the victim and either perpetuate or reduce harm (Bastiaenssens et al., 2019; Macaulay et al., 2022).

Observers reported encountering cyberbullying on platforms like Facebook, WhatsApp, and gaming spaces. Some mentioned feeling helpless or unsure of how to intervene. These findings suggest the need to address digital citizenship and empower witnesses with strategies for safe and ethical response (Troll et al., 2021).

These narratives reveal the pervasiveness of cyberbullying in students’ lives and the emotional weight it carries. They emphasize the value of digital storytelling not only as a method of expression but as a pedagogical tool to reflect, educate, and propose institutional action grounded in lived experience.

### **Conclusion**

The findings of this study demonstrate the significant psychological and social toll that cyberbullying has on university students. Manifested primarily through social media and other digital platforms, cyberbullying causes emotional distress, including anxiety, depression, and diminished self-esteem.

The use of digital storytelling proved to be a powerful tool not only for collecting narratives but also for encouraging reflection and agency among students. The multimodal nature of the platform allowed participants to express their experiences through various formats—video, podcast, and infographics—enhancing both accessibility and emotional resonance.

The observations made by bystanders in cyberbullying cases reveal their essential role in either perpetuating or mitigating the impact of digital aggression. Empowering observers to take active, supportive roles could significantly change the dynamics of such incidents.

Additionally, the results underscore the importance of implementing proactive institutional policies that address digital violence in higher education settings. This includes strengthening

educational programs that promote responsible technology use, developing clear protocols for reporting and supporting victims, and fostering a culture of respect and empathy online.

The study advocates for continued exploration of digital storytelling as a transformative educational methodology. Future research could further evaluate its effectiveness in behavior change and in fostering resilience and emotional literacy among students.

### **Acknowledgements**

Thanks to the University of Córdoba and the BIMADINO research group affiliated with the Department of Educational Informatics, Faculty of Education and Humanities.

## References

- Álvarez-Quiroz, G. B., Guerrero, M. F., Algarín, S. P., Zamudio, R. D., & Sánchez, N. (2023). Relación entre bullying, cyberbullying y autoestima: Prevalencia y factores asociados en adolescentes de Colombia. *Zona Próxima* [Relationship between bullying, cyberbullying, and self-esteem: Prevalence and associated factors among Colombian adolescents. *Next Zone*] 38(1), 88–109. <https://doi.org/10.14482/zp.38.329.137>
- Bastiaenssens, T., Vandebosch, H., & De Bourdeaudhuij, I. (2019). Bystander behavior in cyberbullying: A systematic review. *Aggression and Violent Behavior*, 47, 101281.
- Davis, A. (2004). Digital storytelling in an urban middle school. *THEN Journal: Technology, Humanities, Education, and Narrative* 1(1), 1–16. <http://thenjournal.org/feature/61/>
- Doyle, L., Brady, A., & Byrne, G. (2016). An overview of mixed methods research – revisited. *Journal of Research in Nursing*, 21(8) (2016), 623–635. <https://doi.org/10.1177/1744987116674257>
- Greenhalgh, S., & Koehler, M. J. (2021). Fostering historical empathy through digital storytelling. *Journal of Digital Learning in Teacher Education*, 37(3), 117–129. <https://doi.org/10.1080/21532974.2021.1891111>
- Hinduja, S., & Patchin, J. W. (2019). *Bullying today: Bullet points and best practices*. Sage Publications.
- Hu, Y., Clancy, E. M., & Klettke, B. (2023). Understanding the vicious circle: Relationships between non-consensual sexting and cyberbullying perpetration. *Sexes*, 4, 155–166. <https://doi.org/10.3390/sexes4010013>
- Kowalski, R. M., Giumetti, G. W., Schroeder, A. N., & Lattanner, M. R. (2014). Bullying in the digital age: A critical review and meta-analysis of cyberbullying research among youth. *Psychology of Popular Media Culture*, 3(4), 270–310.
- Kowert, R., Quandt, T., & Festl, R. (2019). Cyberbullying in online gaming. *Journal of Gaming & Virtual Worlds*, 11(1), 3–18.
- Londoño, D., Olave, J., Jaimes, J., & Losada, N. (2018). Lógicas, enfoques y epistemologías sobre educación y pedagogía [Logics, approaches, and epistemologies in education and pedagogy]. En Centro de Estudios Avanzados en Niñez y Juventud, Universidad de Manizales (Cinde), *Educación y pedagogía: trayectos recorridos* (96–155). Universidad de Manizales.
- López, R., Rodríguez, J., & Correa, M. (2019). Ciberacoso escolar: Experiencias y propuestas de jóvenes universitarios [Cyberbullying: Experiences and proposals of young university students]. RIED. *Revista Iberoamericana de Educación a Distancia*, 22(2), 75–89. <https://doi.org/10.5944/ried.22.2.23541>



- Macaulay, P., Betts, L., Stiller, J., & Kellezi, B. (2022). Bystander responses to cyberbullying: The role of perceived severity, publicity, anonymity, type of cyberbullying, and victim response. *Computers in Human Behavior*, 131, 107238. <https://doi.org/10.1016/j.chb.2022.107238>
- Miglino, J. (2021). Estadísticas de Bullying en Colombia 2020/2021 [Bullying Statistics in Colombia 2020/2021]. <https://bullyingsinfronteras.blogspot.com/>
- O'Reilly, T. (2005). What Is Web 2.0. Design Patterns and Business Models for the Next Generation of Software. <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>
- Prensky, M. (2001). *Nativos digitales, inmigrantes digitales* [Digital natives, digital immigrants]. *Horizon*, 9(5), 1–2. <http://horizon.unc.edu/>
- Reitman, D., Buzi, R., & Yahav, I. (2020). Cyberbullying in online gaming: A systematic review. *Computers in Human Behavior*, 111, 106375. <https://doi.org/10.1016/j.chb.2020.106375>
- Souza, S. B., Ferreira, P. F., Veiga, A. M., & Falla, D. (2022). La dinámica del ciberacoso en estudiantes universitarios: Efectos moderadores del género y la cultura [The dynamics of cyberbullying among college students: Moderating effects of gender and culture]. *Multidisciplinary Journal of Educational Research*, 12(3). <https://doi.org/10.17583/remie.8999>
- Troll, E., Malte, F., & Loschelder, D. (2021). How students' self-control and smartphone-use explain their academic performance. *Computers in Human Behavior*, 117, 823–831. <https://doi.org/10.1016/j.chb.2020.106624>
- Wade, N., & Beran, D. (2018). Sexting, cyberbullying, and online grooming: A review of the literature. *Journal of Adolescent Health*, 62(1), 10–11. <https://doi.org/10.1016/j.avb.2023.101889>
- Walsh, M. (2010). Multimodal literacy: What does it mean for classroom practice? *Australian Journal of Language and Literacy*, 33(3), 211–239.
- Zych, I., Ortega, G., & Del Rey, R. (2015). Scientific research on bullying and cyberbullying: Where have we been and where are we going. *Aggression and Violent Behavior*, 24, 188–198. <https://doi.org/10.1016/j.avb.2015.05.015>

**Contact email:** gbalvarez@correo.unicordoba.edu.co



## **Factors Affecting Routine to Research (R2R) Production of Supporting Staff: Case Study of Mahidol University International College**

Sasithon Panyanak, Mahidol University International College, Thailand

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Academic work contains various types, such as research, academic articles, books that serve both public and private sectors. Typically, academic staff in higher education are the primary producers of such works, which they use for teaching or to share knowledge within the academic community. However, universities in Thailand, the support staff is getting more opportunity to contribute the academic work which is related to their job description. It called Routine to Research or R2R. Though these academic works are beneficial to their career path; they can use for academic promotion, few people succeed. Therefore, this research aims to investigate the Factors Affecting Routine to Research (R2R) Production of Supporting Staff at a Thai University International College. The research instrument is a questionnaire using a five- point Likert scale focusing on the Internal Factors and External Factors. An accidental random sample is employed to select the participants to complete the survey from 126 staff members. Later, the data is analyzed by the statistical program. The results show that the Supporting Staff think that producing research takes time, requires initiative and creativity. On the other hand, they think that the organization should create an environment that promotes research production and should provide funding and organize activities to provide knowledge. In addition, it would be better to expand the findings by focusing on a specific case study which could highlight strategies or outcomes that may be generalized the deeper insights.

*Keywords:* factor, routine to research (R2R), supporting staff

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

In Thailand, not only academic staff but also support staff are encouraged to do the academic works. The work produced by support staff is called Routine to Research (R2R). It refers to the process of transforming daily routine work into research outputs. This type of work arises from problems, limitations, obstacles, or challenges encountered in everyday tasks. They have to study, analyze, or investigate in order to improve and develop their routine tasks that are repetitive, complicated, and tedious into more effective work processes. After completing their studies, they can apply the results to improve their work. Additionally, they can present their academic work at the conference or publish it in an academic journal, which can later be used as part of their application for academic position for their career advancement.

At Mahidol University International College, we acknowledge the importance of academic work for support staff, and provide the support and assistance in terms of knowledge and funding. This includes organizing training activities focused on producing academic work, mentoring projects for research consultation, and providing funding for research initiatives that lead to tangible academic outputs.

However, the data shows that from July 2019 to July 2024, the average number of academic works produced by the support staff each year is about eight (Mahidol University, International College, Research Promotion and Management Office, 2024).

Therefore, the researcher intends to study the factors affecting the production of Routine to Research (R2R) by support staff at the International College of Mahidol University, along with the obstacles they face and suggestions for improvement in order to gather insights that can help enhance engagement and find the solution to increase the production of academic work among support staff.

## Literature Review

### **Routine to Research (R2R)**

#### ***Definition of Routine to Research (R2R)***

Routine to Research (R2R) was coined by Prof. Vicharn Panich, M.D. in 2004. It refers to the process of transforming daily routine work into research outputs. It involves taking challenges or problems encountered in everyday tasks and developing them into research projects. R2R serves as a tool for human development, aimed at advancing work practices and propelling the organization towards becoming a learning organization (Chaikongkiat & Kumkong, 2017, pp. 250–270).

#### ***Components of Routine to Research (R2R)***

Nuangchalerm (2015) stated that the components of routine to research (R2R) can be described into four components: research question, researcher, research outcome, and its implication.

This means the routine to research (R2R) should emerge from the researcher's regular duties and aim to improve or develop those tasks conducted by the person who directly responsible for the routine task and must also serve as the principal investigator in the research. While the

research outcomes must be measurable and reflect the impact, and the findings should be applicable to improve work processes and service delivery in the specific context of each organization.

Otherwise, the creation of Routine to Research (R2R) aims to generate new ideas and solutions that benefit the individual, colleagues, and the organization. The goal is to improve and develop routine tasks that are repetitive, complicated, and tedious into more effective work processes. The Routine to research (R2R) process includes defining challenges, creating solutions, developing prototypes, testing them, evaluating outcomes, and continuously improving the practices to ensure practical application.

## **Factors**

### ***Characteristics of Factors***

Wonganutoj (1992) discussed the factors influencing individual work behavior, stating that individual differences inevitably affect job performance. Each person possesses unique characteristics and qualities that influence their work behavior differently, including: Aptitude, Personality Traits, Physical Characteristics, Interests and Motivation, Age, Gender, and Life Stage, Education, and Experience.

### ***Factors in Career Path Development***

Hoppock (1935, as cited in Pimolsiri, 2012, p. 15) stated that human have both physical and psychological needs such as food, clothing, and the need for acceptance and recognition from others. These diverse needs influence one's career choices. An individual becomes aware of their own needs through self-understanding, life experiences, external information, and satisfaction derived from their chosen occupation.

Kecharanan (2006, pp. 159–160) identified several key factors related to career development. These include: the development of resources through experience, support for capable, competent, and committed personnel, aligning human resources with suitable roles, fostering morale and motivation, and preparing for change.

### ***Theories Related to Factors***

Herzberg proposed the Two-Factor Theory, which is relevant to job performance. This theory summarizes two key factors that relate to individual preferences for work:

**Motivational Factors.** Motivational factors are directly related to the job and serve to encourage individuals to enjoy and take pride in their work. These factors stimulate satisfaction and enhance work effectiveness, including:

- **Achievement:** an individual's ability to complete tasks to the best of their ability, solve problems, and prevent potential issues. The successful completion of work leads to feelings of satisfaction and pride in those accomplishments.
- **Recognition:** this involves receiving acknowledgment and respect from supervisors, peers, and others seeking advice. Recognition can take various forms, such as praise, congratulations, encouragement, or any expression that indicates appreciation for an individual's capabilities upon achieving success.

- **The Work Itself:** this pertains to the nature of the work being engaging, requiring creativity and initiative, and providing challenges that motivate individuals to take action. It also includes jobs that can be performed independently from start to finish.
- **Responsibility:** the satisfaction derived from being assigned new responsibilities and having full authority over those responsibilities without close supervision or control.
- **Advancement:** this signifies promotions and upward mobility within the organization, as well as opportunities for further education and training to acquire additional knowledge.

**Hygiene Factors.** Hygiene factors are those that support the existing motivation to work. If these factors are not aligned with the needs of individuals within the organization, it can lead to job dissatisfaction. These factors originate externally to the individual and include:

- **Salary:** the salary and the possibility of salary increments within the organization that are satisfactory to employees.
- **Possibility of Growth:** this not only includes promotions within the organization but also encompasses opportunities for professional skill advancement.
- **Interpersonal Relations:** this pertains to the quality of relationships between supervisors, subordinates, and peers, indicating effective communication and mutual understanding.
- **Status:** the recognition and respect associated with a particular profession, indicating its honor and dignity in society.
- **Company Policy and Administration:** this relates to the management and administrative practices within the organization and how effectively communication is conducted internally.
- **Working Conditions:** the physical environment of the workplace, such as lighting, noise, air quality, working hours, and the availability of tools and equipment.
- **Personal Life:** this relates to the overall feelings an individual has towards the organization based on their work experience.
- **Job Security:** an individual's feelings regarding job stability and the sustainability of their profession or the organization.
- **Supervision-Technical:** the ability of supervisors to manage and oversee operations effectively, including fairness in administration.

From Herzberg's Two-Factor Theory, it can be concluded that both motivational factors and hygiene factors are interrelated elements that significantly influence employee performance. Motivational factors enhance job satisfaction and drive employees to perform better through achievements, recognition, engaging work, responsibility, and opportunities for advancement. While Hygiene factor are essential for preventing dissatisfaction. They include aspects such as salary, opportunities for growth, interpersonal relationships, job status, company policies, working conditions, personal life balance, job security, and the effectiveness of supervision.

Together, these factors create a work environment that can either foster or hinder employee motivation and performance.

## **Research Objectives**

1. To study the factors that affect the production of routine to research (R2R) by support staff at the International College of Mahidol University.
2. To examine the problems and obstacles affecting the production of routine to research (R2R) by support staff at the International College of Mahidol University.

## **Hypothesis of the Study**

1. The support staff who differ in age has a different factor that affect the production of routine to research (R2R).
2. The support staff who differ in educational level has a different factor that affect the production of routine to research (R2R).
3. The support staff who differ in working experience has a different factor that affect the production of routine to research (R2R).

## **Methodology**

### **Respondents**

In this research, a sample size of 156 individuals was selected using accidental sampling. To mitigate the risk of drop-out, the researcher increased the sample size by 10%, resulting in a total of 172 participants.

### **Research Instrument**

The research instrument was a questionnaire with closed-ended using a five- point Likert scale and open-ended questions. In order to answer the research questions, the questionnaire was developed to investigate the factors affecting routine to research (R2R) production. The questionnaire items were developed by the researcher for this study, and has been approved by Mahidol University Central Institutional Review Board.

### **Data Collection**

The participants were selected by an accidental random sample to complete the survey during October 2024. The data were collected from 126 participants, which met the expected response rate for the questionnaires. The questionnaires were distributed using a self-administered method, with an anticipated average response rate of 60–70%. This response rate is considered to be very good (Berdie et al., 1986).

### **Data Analysis**

The respondents were required to complete the questionnaires and submit them after finishing. Once all the questionnaires had been collected, the data were entered into a database and analyzed using a statistical program. The analysis included general information and questions related to factors influencing the production of routine to research (R2R). Open-ended questions seeking suggestions, issues, or obstacles affecting the production of R2R were summarized using content analysis.

## Findings

The findings presented below represent the Factors Affecting Routine to Research (R2R) Production of Supporting Staff at Mahidol University International College. This study employed a quantitative research approach. Data were collected through a questionnaire from a sample of 126 participants.

The researcher employed statistical methods to analyze the data and present the findings in the following order:

- Part 1: Personal Information
- Part 2: The evaluation of the factors affecting routine to research (R2R) Production
- Part 3: Hypothesis test results
- Part 4: Open-ended questions

### *Part 1: Personal Information*

**Table 1**  
*Frequency and Percentage of Affiliation*

Affiliation	Frequency	Percentage
The Office of the Dean (secretary)	10	7.90
Finance & Accounting Section	11	8.70
Procurement Section	8	6.30
Human Resources Section	11	8.70
Planning Monitoring & Evaluation Section	5	4.00
Research Promotion and Management Section	3	2.40
Admissions and Registrar Section	12	9.50
Educational Affairs Section	15	11.90
Library Section	4	3.20
International Affairs Section	5	4.00
Central Administration Section	7	5.60
Student Affairs Section	8	6.30
Information Technology Section	5	4.00
Educational Technology Section	4	3.20
Corporate Communications Section	3	2.40
Strategy and Academic Development Group	3	2.40
Academic Services Group	5	4.00
Operation and Environment Section	7	5.60
<b>Total</b>	<b>126</b>	<b>100.00</b>

As shown in Table 1, the majority of the respondents (15 individuals, or 11.90%) worked in Educational Affairs Section. This was followed by 12 individuals (9.50%) worked in Admissions and Registrar Section. The Finance & Accounting Section, as well as Human Resources Section, each had 11 employees (8.70%). While the smallest groups were Research Promotion and Management Section, Corporate Communications Section, and Strategy and Academic Development Group, each with 3 employees (2.40%).



**Table 2***Frequency and Percentage of Gender*

Gender	Frequency	Percentage
Male	28	22.20
Female	98	77.80
Total	126	100.00

As shown in Table 2, the majority of the respondents were female (98 individuals, or 77.80%), while 28 individuals (22.20%) were male.

**Table 3***Frequency and Percentage of Age*

Age	Frequency	Percentage
25 and 34 years	29	23.00
35 and 44 years	49	38.90
45 and 54 years	40	31.70
54 years and above	7	5.60
not respond	1	0.80
<b>Total</b>	<b>126</b>	<b>100.00</b>

As shown in Table 3, the majority of the respondents were aged between 35 and 44 years (49 individuals, or 38.90%). This was followed by 40 individuals (31.70%) aged between 45 and 54 years. Next, 29 individuals (23.00%) were aged between 25 and 34 years. There were 7 individuals (5.60%) aged 55 years and above. The smallest group consisted of those who did not respond to this question (1 individual, or 0.80%).

**Table 4***Frequency and Percentage of Educational Level*

Educational level	Frequency	Percentage
Below bachelor's degree	4	3.20
Bachelor's degree	63	50.00
Master's degree	56	44.40
not respond	3	2.40
Total	126	100.00

As shown in Table 4, the majority of the respondents held a bachelor's degree (63 individuals, or 50.00%). This was followed by 56 individuals (44.40%) who held a master's degree. Meanwhile, 4 individuals (3.20%) had an education level below a bachelor's degree, and the smallest group consisted of those who did not respond to this question (3 individuals, or 2.40%).

**Table 5***Frequency and Percentage of Work Experience*

Work Experience	Frequency	Percentage
1 - 5 years	31	24.60
6 - 10 years	18	14.30
more than 10 years	75	59.50
not respond	2	1.60
Total	126	100.00

As shown in Table 5, the majority of the respondents had worked at the International College for more than 10 years (75 individuals, or 59.50%). The next largest group had 1 - 5 years of experience (31 individuals, or 24.60%), followed by those who had worked for 6 - 10 years (18 individuals, or 14.30%). The smallest group consisted of respondents who did not answer this question (2 individuals, or 1.60%).

**Table 6**

*Frequency and Percentage of Academic Position*

Academic position	Frequency	Percentage
Senior Professional Level	8	6.30
None	118	93.70
<b>Total</b>	<b>126</b>	<b>100.00</b>

As shown in Table 6, the majority of the respondents did not hold any academic positions (118 individuals, or 93.70%), while 8 individuals (6.30%) were classified as Senior Professional Level.

***Part 2: The Evaluation of the Factors Affecting Routine to Research (R2R) Production of Supporting Staff at Mahidol University International College***

**Table 7**

*Descriptive for Overall the Components of the Research Productivity (R2R) Among Support Staff at Mahidol University International College*

Factors	$\bar{x}$	S.D.	Level
Internal factors	3.74	0.62	high
External factors	3.63	0.68	high
Average	<b>3.68</b>	<b>0.60</b>	high

According to Table 7, the overall result shows that the research productivity (R2R) among support staff at Mahidol University International College was high level (mean = 3.68, S.D. = 0.60). Internal factors obtained the highest mean score (mean = 3.74, S.D. = 0.62) followed by external factors (mean = 3.63, S.D. = 0.68).

**Table 8**

*Descriptive for the Routine to Research (R2R) Production Among Support Staff at Mahidol University International College in Term of Internal Factors*

Factors	$\bar{X}$	S.D.	Level
I think that producing routine to research (R2R) is an interesting task.	3.95	0.88	high
I think that producing routine to research (R2R) is a challenging task.	4.08	0.93	high
I think that producing routine to research (R2R) is an important task	3.64	0.96	high
I think that producing routine to research (R2R) is a necessary task.	3.33	1.00	moderate
I think that producing routine to research (R2R) is a way to use personal knowledge and abilities.	3.98	0.89	high
I think that producing routine to research (R2R) takes time.	4.57	0.69	highest
I think that producing routine to research (R2R) requires initiative and creativity.	4.23	0.80	highest
I think that producing routine to research (R2R) is admirable and pleasing.	4.10	0.89	high
I think that producing routine to research (R2R) is commendable and respectable.	3.90	0.96	high
I think that I have sufficient knowledge and understanding to produce routine to research (R2R).	3.15	0.91	moderate
I think that I am ready to produce routine to research (R2R).	2.80	0.98	moderate
I think that I have enough resources if needed for producing routine to research (R2R).	3.15	1.08	moderate
Average	3.74	0.62	high

According to Table 8, the overall results show that the level of routine to research (R2R) production among support staff at Mahidol University International College, in terms of internal factors, was high (mean = 3.74, S.D. = 0.62).

When considering each item individually, the statement ‘I think that producing routine to research (R2R) takes time’ received the highest mean score (mean = 4.57), followed by ‘I think that producing routine to research (R2R) requires initiative and creativity’ (mean = 4.23). However, the lowest-rated item was ‘I think that I am ready to produce routine to research (R2R)’ (mean = 2.80).

**Table 9**

*Descriptive for the Routine to Research (R2R) Production Among Support Staff at Mahidol University International College in Term of External Factors*

Factors	$\bar{X}$	S.D.	Level
I think that producing routine to research (R2R) is a professional advancement.	4.15	0.93	high
I think that producing routine to research (R2R) is job security.	3.45	1.23	high
I think that producing routine to research (R2R) is an opportunity for salary advancement.	3.71	1.12	high
I think that producing routine to research (R2R) is an opportunity for promotion.	3.53	1.17	high
I think that the regular tasks I am responsible for have interesting topics for routine to research (R2R) production.	3.72	0.98	high
I think that the regular tasks I am responsible for have beneficial topics for routine to research (R2R) production.	3.83	0.93	high
I think that producing routine to research (R2R) should be assigned by a supervisor.	2.48	1.21	low
I think that producing routine to research (R2R) should come from the policies or strategies of the organization.	2.82	1.26	moderate
I think that the organization should provide funding for routine to research (R2R) production.	4.01	0.98	high
I think that the organization should organize activities to provide knowledge for producing routine to research (R2R).	4.00	0.92	high
I think that the organization should create an environment that promotes routine to research (R2R) production.	4.05	1.02	high
Average	3.63	0.68	high

According to Table 9, the overall results show that the level of routine to research (R2R) production among support staff at Mahidol University International College, in terms of external factors, was high (mean = 3.63, S.D. = 0.68).

When considering each item individually, the statement “I think that producing routine to research (R2R) is a professional advancement” received the highest mean score (mean = 4.15), followed by “I think that the organization should create an environment that promotes routine to research (R2R) production” (mean = 4.05). Conversely, the lowest-rated item was “I think that producing routine to research (R2R) should be assigned by a supervisor” (mean = 2.48).

### ***Part 3: Hypothesis Test Results***

Hypothesis 1: The support staff who differ in age has a different factor that affect the production of routine to research (R2R).

**Table 10**

*One-Way Anova Between the Age and the Routine to Research (R2R) Production Among Support Staff at Mahidol University International College*

Factors	Age	Sum of Squares	df	Mean Square	F	Sig.
Internal factors	Between Groups	1.323	3	.441	1.134	.338
	Within Groups	47.037	121	.389		
	Total	48.360	124			
External factors	Between Groups	2.208	3	.736	1.571	.200
	Within Groups	56.675	121	.468		
	Total	58.883	124			
Routine to research (R2R) production	Between Groups	.963	3	.321	.881	.453
	Within Groups	44.069	121	.364		
	Total	45.032	124			

\*Significant at level 0.05

Table 10 shows that there is no statistically significant difference at the 0.05 level in overall of routine to research (R2R) production and internal factors and external factors among supporting staff from different age at Mahidol University International College.

Hypothesis 2: The support staff who differ in educational level has a different factor that affect the production of routine to research (R2R).

**Table 11**

*One-Way Anova Between the Educational Level and the Routine to Research (R2R) Production Among Support Staff at Mahidol University International College*

Factors	Educational level	Sum of Squares	df	Mean Square	F	Sig.
Internal factors	Between Groups	3.958	2	1.979	5.557	.005*
	Within Groups	42.730	120	.356		
	Total	46.688	122			
External factors	Between Groups	2.716	2	1.358	2.956	.056
	Within Groups	55.127	120	.459		
	Total	57.843	122			
Routine to research (R2R) production	Between Groups	3.254	2	1.627	4.824	.010*
	Within Groups	40.479	120	.337		
	Total	43.733	122			

\*Significant at level 0.05

Table 11 indicates a significant difference at the 0.05 level in the overall of routine to research (R2R) production among supporting staff with varying educational levels at Mahidol University International College. When examining the specific dimensions, a significant difference was found at the 0.05 level in the internal factors dimension, but not in the external factors dimension.

Hypothesis 3: The support staff who differ in work experience has a different factor that affect the production of routine to research (R2R).

**Table 12**

*One-Way Anova Between the Work Experience and the Routine to Research (R2R) Production Among Support Staff at Mahidol University International College*

Factors	Work Experience	Sum of Squares	df	Mean Square	F	Sig.
Internal factors	Between Groups	1.444	2	.722	1.862	.160
	Within Groups	46.911	121	.388		
	Total	48.355	123			
External factors	Between Groups	.055	2	.027	.056	.945
	Within Groups	58.744	121	.485		
	Total	58.799	123			
Routine to research (R2R) production	Between Groups	.342	2	.171	.463	.630
	Within Groups	44.657	121	.369		
	Total	44.999	123			

\*Significant at level 0.05

Table 12 shows that there is no statistically significant difference at the 0.05 level in overall of routine to research (R2R) production and internal factors and external factors among supporting staff from different work experience at Mahidol University International College.

#### ***Part 4: Open-Ended Questions***

The open-ended questions asking the opinion towards the production of routine to research (R2R) used content analysis to summarize the answers from the 93 respondents. The results showed as follows:

Most of the respondents agreed with doing routine to research (R2R) is beneficial as it helps improve regular work and enhances work efficiency. It helps develop knowledge and expertise in the tasks performed, promotes career growth, and professional development. It provides an opportunity to learn and innovate new approaches to improve work, as well as contributes to organizational development and process improvements.

However, there are limitations and challenges in doing routine to research (R2R) due to the time it requires, which can lead to fatigue and discouragement, as it must be done outside of regular working hours. The research process is complex and complicated, which makes some people feel discouraged.

Another issue is the lack of continuous support from the organization. There is a shortage of guidance and mentoring, as well as insufficient support from supervisors and colleagues in the research process. Supervisors may not prioritize research, seeing it as a personal matter. There is also a lack of mentors or experienced individuals to provide advice and assistance. It is challenging to find experts who can help review research work. Furthermore, there are limitations related to regulations and processes.

The current R2R procedures and frameworks are considered overly complex, and regulations may hinder research production. The process of obtaining IRB approval is complicated and time-consuming, involving extensive paperwork and requiring considerable time and information.

Personal issues related to the mindset and the initiation of research are also challenges. These include a lack of inspiration and interest in starting routine to research (R2R) projects. There is also a lack of understanding of the research process itself. Research topics need to be current, interesting, and relevant to present-day issues to inspire motivation.

### **Discussion**

From the results, the researcher found that support staff at Mahidol University International College, shared common views on the factors influencing the production of routine to research (R2R) production, both internal and external factors, with an average level considered high. This shows that both individual factors and environmental factors have a significant impact on the production of routine to research (R2R).

Support staff at Mahidol University International College, believe that conducting routine to research (R2R) requires time, which may be due to their regular work responsibilities and duties, making it difficult to allocate time properly. This is in line with the research by Boonkum and Sukasathit (2023), which studied the needs, motivations, obstacles, and support for the development of routine work into research (R2R). Their study found that most staff wanted to do R2R but were unable to manage their time effectively due to heavy work and family responsibilities.

At the same time, support staff at the Mahidol University International College, feel they are not yet fully prepared to produce routine to research (R2R). This may be due to factors such as skills, knowledge, experience, work environment, and the guidelines they need to follow. These factors lead to feelings of the research process being complicated, which affects their motivation to start. Similarly, the research by Prawichaya Nutthakornkul and Jaruk Nutthakornkul (2016) on the factors affecting barriers to research method of social technology faculty teachers of Rajamangala University of Technology, Isan, found that the research process was influenced by a lack of research experience, the inability to find suitable tools, and a lack of understanding of the research steps, including the difficulty of finding the required documents.

Furthermore, support staff at the Mahidol University International College, recognize that producing routine to research (R2R) is a step forward in their professional development. This indicates that producing routine to research (R2R) is viewed positively as it improves regular work processes, which can then lead to career advancement, including academic positions and higher compensation. The institution should foster an environment that encourages routine to research (R2R) production by supporting the organization of training and seminars related to research methods, as well as providing sufficient time and resources to make it easier for staff to carry out their research. This aligns with the study by Ruen-saeng and Sakkornsuk (2016), which examined the challenges, obstacles, and promotion strategies for research projects at Thammasat Chaloem Phra Kiat Hospital. They recommended promoting the establishment of research mentorship systems for new researchers and continuous training and seminars.

### **Conclusion**

The support staff at Mahidol University International College shared common views on both internal and external factors influencing the production of routine to research (R2R), with the average level of agreement considered high. This indicates that both individual and

environmental factors significantly impact the production of routine to research (R2R). While considering each factor in detail, an interesting issue is that the staff feels they do not have sufficient knowledge and understanding to produce routine to research (R2R).

Furthermore, the hypothesis suggests that educational level affects internal factors, indicating that the support staff may not be ready to engage in routine to research (R2R) due to limitations in their educational background.

Therefore, the college should prioritize organizing activities such as training sessions and seminars that provide knowledge on producing routine to research (R2R). Additionally, creating networks to assist and provide consultation on research work that is easily accessible will allow the staff to receive information quickly and efficiently.

### **Acknowledgements**

The author would like to sincerely thank Mahidol University International College for the opportunity and support to conduct this research.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

The author confirms that ChatGPT (OpenAI) was the only AI tool used, and solely for language editing purposes. It was not used for any other purposes. All intellectual contributions represent my original work as the author.



## References

- Berdie, D. R., Anderson, J. F., & Niebuhr, M. A. (1986). *Questionnaires: Design and use*. Scarecrow Press.
- Boonkum, P., & Sukasathit, P. (2023). Khwām ṭxngkār ræng cūngcī xupṣṛrkḥ læa kār ṣṇāḥṣṇun kār phat'hnā ngān wicāy bæb R2R: Kṛṇī ṣṭkṣ'ā ṣṭhāḥanwicāy prachākr læa ṣāngkhm mḥāwithyālay mḥidl [Needs, motivation, obstacles, and support for developing routine work to research (R2R): A case study of the Population and Social Research Institute, Mahidol University]. *Academic Journal of Pakhomath*, 12(2), 67–80.
- Chaikongkiat, P., & Kumkong, M. (2017). Kār wicāy tām pkti: Kār khāp khelṭxn kār chí prayochṇ [Routine to Research: Driving to Utilization]. *The Southern College Network Journal of Nursing and Public Health*, 4(3), 250–270.
- Herzberg, F., Mausner, B., & Snyderman, B. B. (1957). *Job attitude: Review of research and opinion*. Psychological Service of Pittsburgh.
- Kecharanan, N. (2006). *Kār cādkār thrāphyākr bukhkhl* [Human Resource Management]. C.E.D. Education.
- Mahidol University, International College. (2024). Publication data. <https://muic.mahidol.ac.th/thai/about-2/history>
- Nahtakornkul, P., & Nahtakornkul, J. (2013). Thī pēn mātrḥān ṭx withī kār wicāy kḥxng khrū xācāy khṇa thekhnoloyī ṣāngkhm mḥāwithyālay thekhnoloyī rāch mngkhl xīsān [The Factors Affecting Barriers to Research Method of Social Technology Faculty Teachers of Rajamangala University of Technology, Isan]. *Phetchabun Rajabhat Journal*, 18(1), 1–15.
- Nuangchalerm, P. (2015). Kār phat'hnā ngān pracā hī pēn ngān wicāy [Routine to Research]. *Sarakham Journal*, 6(1), 32–38.
- Pimolsiri, S. (2012). Pācāy khwām kāwḥṇā nī xāchīph thī keiywḥxng kḥ kār mī ṣṇn ṛwm kḥxng phṇāngān nī brīs'āth [Career advancement factors related to employee engagement in a private company] (Master's thesis). Srinakharinwirot University.
- Ruen-saeng, N., & Sakkornsuk, W. (2016). Pācāy khwām kāwḥṇā nī xāchīph thī keiywḥxng kḥ kār mī ṣṇn ṛwm kḥxng phṇāngān nī xngkhkr payḥā xupṣṛrkḥ læa nāwṭhāng kār ṣṇg ṣerim kār dānein ngān khorngkār wicāy kḥxng phūṛāb thun rong phyābāl ṭhrmṣāstrī ḥelimplrakeīrti [Problems, obstacles, and promotion strategies for research projects of the grant recipients at Thammasat Hospital]. *Vajira Journal of Research and Development in the Royal Court*, 11(3), 207–218.
- Wonganutroj, P. (1992). *Citwithyā kār cādkār thrāphyākr bukhkhl* [Psychology of personnel management]. Pimdee Publishing.

**Contact email:** sasithon.pan@mahidol.ac.th



## **Designing AI-Driven Storytelling to Enhance Language Skills in Early Childhood Education: A Research Framework**

Konstantina Tastsis, Palladio School, Greece  
Panagiotis Karamalis, Palladio School, Greece

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This study explores the integration of a custom AI storytelling application, *StorySpark*, into early childhood education to support language development in children aged 4–6. Using a quasi-experimental approach, the study compares an experimental group using the app with a control group. *StorySpark* encourages vocabulary enrichment, creative expression, and interactive engagement through dialogue-based storytelling. Preliminary findings from the initial implementation phase indicate high levels of participation and linguistic interaction, suggesting strong potential for fostering narrative skills. Although statistical analysis is pending, the study offers promising insights into the pedagogical use of AI in inclusive, developmentally appropriate language learning environments.

*Keywords:* artificial intelligence, early childhood education, preschool language development, storytelling, narrative skills, educational technology

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Language development in preschool-aged children plays a crucial role both cognitively and socially. At this stage, children begin to comprehend and organize their environment through language, using it not only as a means of communication but also as a tool to express their thoughts, emotions, and intentions. Oral language forms the foundation for later literacy, critical thinking, and broader interaction with the world.

Recent research supports the view that early language experiences significantly influence children's academic trajectories and socioemotional development. For instance, Liu et al. (2024) emphasize that rich verbal interactions in early childhood are predictive of reading comprehension and self-regulation in later years. Moreover, Bleses et al. (2016) have shown that expressive vocabulary at the age of three can reliably predict academic achievement a decade later. Language is not only a vehicle of expression but also a cognitive tool that enables children to reflect, plan, and reason about their experiences (Rowe, 2020; Silva & Cain, 2015).

Therefore, supporting oral language in the preschool years is essential not just for linguistic purposes, but for empowering children's ability to connect with others, navigate social environments, and construct meaningful understandings of the world around them.

In recent years, the advancement of digital technologies and Artificial Intelligence (AI) has introduced new tools for early childhood education. AI-powered applications are being developed with the aim of enhancing children's learning through personalized, interactive experiences (Holmes et al., 2019; Zhang et al., 2024). These tools, particularly those focused on storytelling, provide dynamic environments where children can co-create narratives with the support of visual and verbal prompts.

This study explores the potential impact of such AI-based storytelling tools on preschool children's narrative abilities. Specifically, it investigates how the use of an AI application influences linguistic features such as lexical richness and story coherence, as well as the degree of children's emotional engagement and active participation in story construction (Hirsh-Pasek et al., 2015; Liu et al., 2024). In doing so, it contributes to the growing body of research on the educational application of AI in early childhood and highlights the importance of fostering meaningful linguistic interactions through developmentally appropriate technologies.

## Theoretical Background

### The Importance of Stimuli in Language Development

Language development plays a fundamental role in a child's overall growth during the early years of life. Language serves as a tool for thinking, communication, and understanding the surrounding world. The more advanced a child's verbal expression is, the more confident they become, enhancing their ability to participate in social interactions.

Cognitive stimuli that a child receives also contribute to the development of broader skills, such as social and emotional abilities. Vygotsky (1978) emphasized the role of social interaction in language development, highlighting that the cultural context and interaction with more knowledgeable individuals significantly shape learning. His concept of the Zone of

Proximal Development explains how children can develop language and cognitive skills with the support of more capable peers or adults.

As children are exposed to linguistic stimuli such as words and sentences, they internalize and organize them mentally. Continuous exposure strengthens the connections between these linguistic elements (Bruner, 1983). Environments that encourage conversation, storytelling, and play create ideal conditions for the rapid development of language skills (Lever & Sénéchal, 2011).

### **Narrative Discourse as a Tool for Language Development**

Narrative discourse is closely linked to language development. Through storytelling, children become familiar with the structure of language and develop skills such as rich vocabulary, understanding abstract concepts, grammar, and syntax. Exposure to fictional stories allows them to experiment with language (Pesco & Gagné, 2015).

Research shows that children who engage in storytelling and dialogue with adults improve both their comprehension and their ability to construct new information (Snow, 1983). Such interactions expose them to more structured speech, offering valuable opportunities for linguistic growth.

### **The Role of Technology and Artificial Intelligence in Language Development**

The rise of digital technology has transformed how children are exposed to and practice language. When properly integrated into educational environments, technological tools can support language development (Liu et al., 2024). Through meaningful activities, young children develop early literacy skills. Digital books designed for young readers often include images, sounds, interactive elements, and activities related to letters. These multimedia features enhance children's comprehension and expression (Jack & Higgins, 2019). Additionally, software applications that promote storytelling give children opportunities to experiment with language and strengthen their narrative abilities (Hirsh-Pasek et al., 2015).

Nevertheless, the integration of technology in education has sparked debate about its potential impact on critical thinking and the possibility of delaying language development (Youvan, 2024). Easy access to information may lead to superficial learning and a lack of evaluative thinking. Children are often captivated by visual stimuli, spending extensive time in front of screens. This extended screen time can reduce their opportunities to engage in conversation with adults and peers, limiting exposure to verbal stimuli and negatively affecting vocabulary development.

The use of Artificial Intelligence (AI) in education remains a relatively new field (Parliament, 2021). Current research on the effects of AI in learning is still limited (Daskalaki et al., 2024; Lo, 2023), and many educators face challenges incorporating such tools into their teaching practice (Göçen & Aydemir, 2020).

AI has the potential to revolutionize education by replicating human cognitive functions such as learning, decision-making, problem-solving, and creativity (Parliament, 2021). It incorporates technologies like Machine Learning, Deep Learning, and Natural Language Processing. For example, machine learning systems analyze students' academic data and generate personalized educational content based on their strengths and weaknesses. Deep

learning enables the creation of advanced tools, such as automated assessment systems that provide feedback on assignments (Zhang et al., 2024). Natural Language Processing supports the development of intelligent assistants and chatbots that can respond to students' questions in real time and explain concepts.

Digital tools that allow children to create and illustrate their own stories are increasingly available. Notable examples include Animated Drawings and Storynest.ai. With the guidance of AI, children are trained to construct stories with a beginning, middle, and end, including unexpected events, character traits, and narrative conventions typical of different formats (book, short story, film script, etc.). Being able to narrate and simultaneously visualize the creation of a story motivates and inspires children to engage with storytelling. In a classroom setting, such activities also foster collaborative learning.

## Method

### Participants

The final sample consisted of 50 preschool children (23 girls, 46.9%), aged between 4 and 6 years ( $M = 5.1$ ,  $SD = 0.6$ ). All participants were enrolled in a private kindergarten in southern Athens. Based on classroom records, over 80% of the children had previously participated in story-related activities through traditional methods. Informed consent was obtained from all parents, and all children completed the full intervention period without attrition. Prior to the intervention, informed consent was obtained from parents, children, and educators, ensuring ethical compliance and voluntary participation.

The intervention took place during scheduled, teacher-led classroom activities, with small group sessions comprising approximately 16 children each. Notably, the children had prior exposure to story creation using traditional methods, such as oral storytelling, picture-based narration, and teacher-facilitated retellings.

Following the completion of the AI-assisted storytelling sessions, the children were given a printed questionnaire. The purpose of the questionnaire was to gather insights into their experience with the application, focusing on dimensions such as enjoyment, engagement, and their willingness to use the tool again. This feedback was valuable for evaluating the child-centered appeal and educational potential of the application.

### Intervention Phases

The intervention spanned a period of six weeks and was structured into two distinct phases, each with its own pedagogical focus and implementation goals.

#### *Weeks 1–2: Introductory Activities*

The first phase was dedicated to familiarizing children with the digital environment and the core features of the *StorySpark* application. Activities during this period were designed to be playful, exploratory, and supportive of gradual adaptation to the AI interface. Children engaged in:

- Navigating the application through trial-and-error exploration,
- Listening to sample stories generated by the app,

- Participating in guided discussions based on images, story openings, and character prompts.

This phase emphasizes building confidence, curiosity, and a basic understanding of narrative elements (beginning, middle, end) in preparation for more active story creation. It also allowed educators to scaffold the children's interaction with the application while observing their natural reactions and verbal responses.

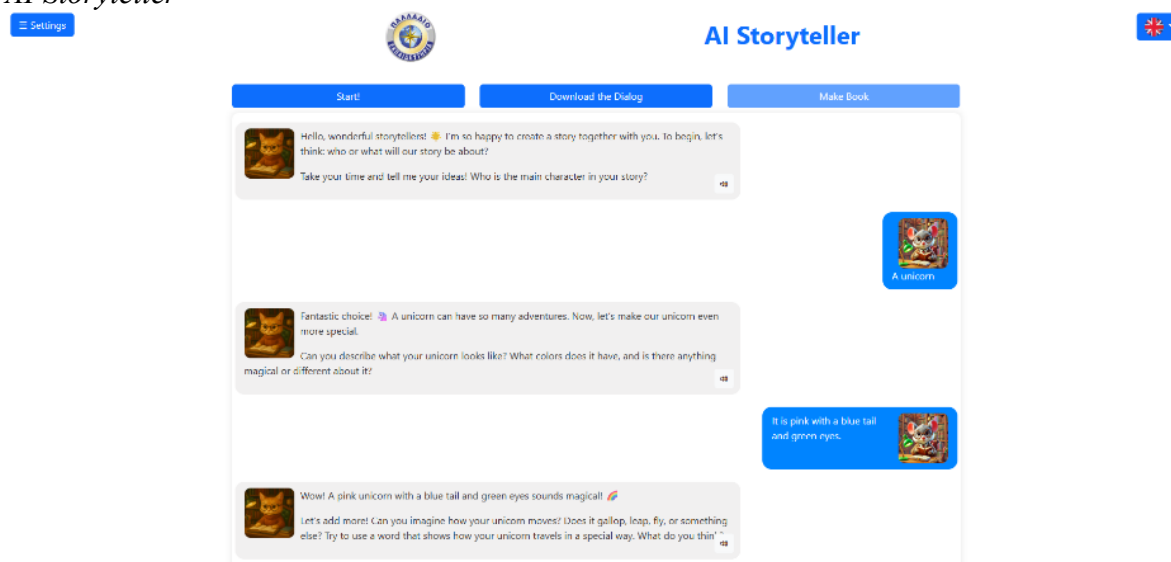
### ***Weeks 3–6: Guided Story Creation***

The second phase focused on structured story production using the AI application. Children participated in two sessions per week, each lasting approximately 45 minutes. During these sessions:

- Children co-constructed stories by interacting with the app, selecting visual elements, proposing plot developments, and choosing characters.
- The app offered prompts and visual suggestions while encouraging children to express ideas through spoken language.
- Educators facilitated the process when necessary, providing support without intervening in the children's narrative choices.

This phase aimed to foster narrative development, lexical enrichment, and increased participation. Each session concluded with oral sharing of the story and group reflection, contributing to collaborative learning and metalinguistic awareness.

**Figure 1**  
*AI Storyteller*



### **Data Collection Method**

To evaluate both the narrative performance and engagement levels of the participants, a combination of qualitative and quantitative data collection tools was employed. Two main instruments were used:

### ***Structured Observation Sheet***

A custom-designed observation sheet was created by the researcher to record children's narrative behavior during each session. The tool included predefined criteria organized into three thematic axes:

- Linguistic Indicators (e.g., variety of verbs, plot coherence, use of connectives),
- Emotional Response to Visual Stimuli (e.g., excitement, facial expression, spontaneous verbalization),
- Participation and Initiative (e.g., willingness to contribute ideas, involvement in decision-making).

Each criterion was rated using a standardized 3-point scale (0–2), allowing for systematic documentation of each child's performance and progression across sessions. Observations were conducted immediately after each session to ensure accuracy and minimize recall bias.

### ***Children's Post-intervention Questionnaire***

At the end of the intervention, children completed a short, age-appropriate printed questionnaire designed to capture their subjective impressions of the application. The questionnaire consisted of five items, each rated on a four-point Likert scale (Very Much – Not at All), addressing areas such as:

- Enjoyment of story creation
- Visual appeal of the illustrations
- Willingness to use the app again
- Level of fun during interaction
- Group storytelling experience

This tool aimed to assess the emotional engagement and perceived value of the activity from the children's perspective.

**Table 1**  
*Research Instruments*

Tool	Purpose	Components	Format
Structured Observation Sheet	To systematically assess children's narrative performance, emotional response, and participation during each session.	<ul style="list-style-type: none"> <li>- Linguistic indicators (e.g., verb variety, coherence, connectives)</li> <li>- Emotional response to images</li> <li>- Participation and initiative (rated on a 3-point scale)</li> </ul>	Researcher-designed structured form, filled after each session.
Children's Post-Intervention Questionnaire	To capture children's subjective impressions of the app and their emotional engagement with the storytelling experience.	<ul style="list-style-type: none"> <li>- 5 questions with 4-point Likert scale (Very Much – Not at All)</li> <li>- Topics: enjoyment, visuals, reuse intention, group experience</li> </ul>	Printed questionnaire, completed by children at the end of the intervention.



## **Data Analysis**

### **Quantitative Analysis**

To assess the linguistic and narrative development of the participants throughout the intervention, a descriptive statistical analysis was conducted using mean scores for each thematic indicator across all sessions.

The results revealed notable variation among the indicators. The highest mean scores were observed in:

- Lexical Richness ( $M = 1.58$ ),
- Plot Coherence ( $M = 1.00$ ),
- Initiative ( $M = 0.75$ ), and
- Verb Variety ( $M = 0.75$ ).

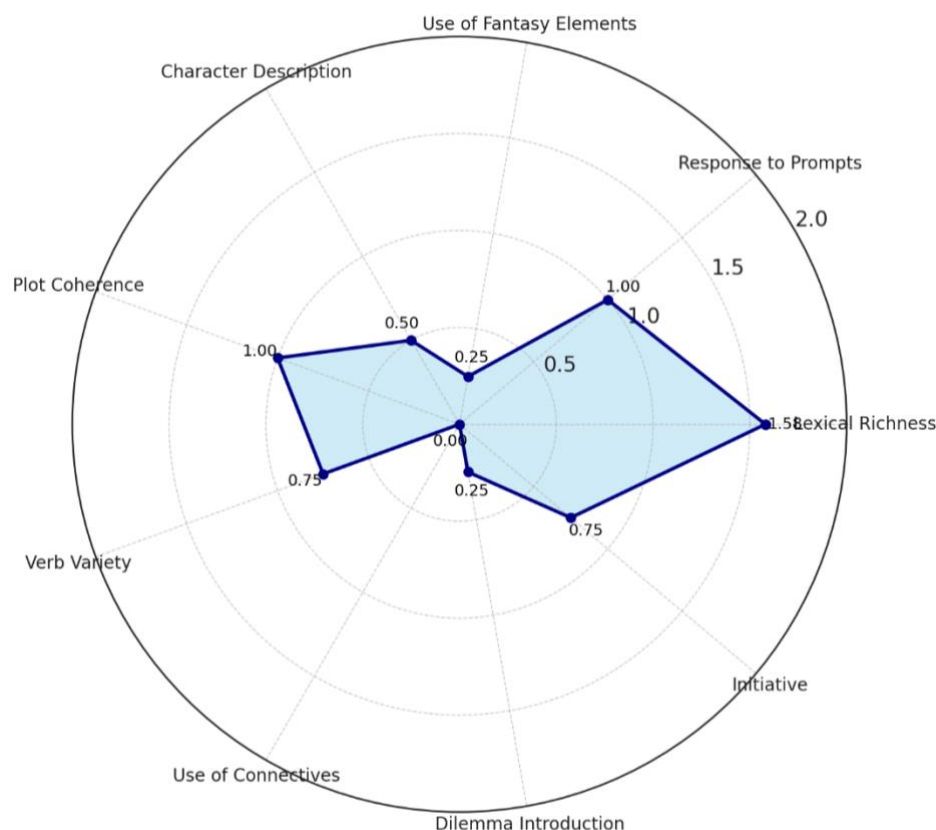
These findings suggest that the majority of children demonstrated an increasing ability to use diverse vocabulary and to construct coherent storylines while showing initiative in storytelling.

Conversely, lower averages were recorded for:

- Use of Fantasy Elements ( $M = 0.25$ ),
- Dilemma Introduction ( $M = 0.25$ ), and especially,
- Use of Connectives ( $M = 0.00$ ).

This indicates that while basic narrative elements were supported through the intervention, more complex linguistic features such as cohesive devices and imaginative expansions were less frequently present.

These results provide a baseline understanding of the children's overall linguistic performance and will be further interpreted through comparative and time-series analyses in the following sections.

**Figure 2***Average Scores per Thematic Indicator (Labeled Radar Chart)*

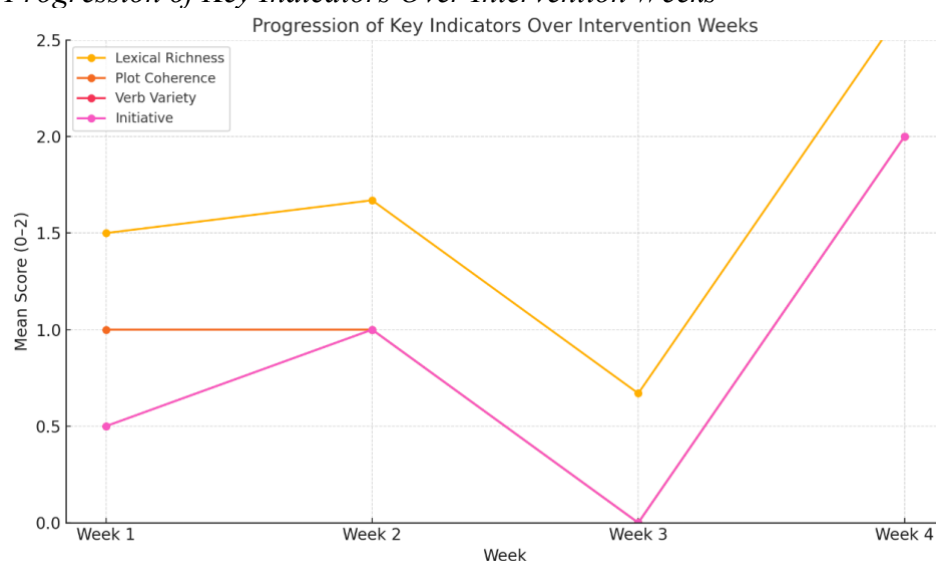
### Comparative Findings

To explore the progression of linguistic performance across the intervention period, mean scores for selected thematic indicators were calculated per week. The indicators analyzed were: Lexical Richness, Plot Coherence, Verb Variety, and Initiative.

The results demonstrate a clear upward trend from Week 1 to Week 4:

- Lexical Richness increased from 1.50 in Week 1 to 2.67 in Week 4.
- Plot Coherence remained stable during the first two weeks ( $M = 1.0$ ) and rose sharply to 2.0 by Week 4.
- Verb Variety and Initiative followed a similar trajectory, reaching their peak in the final week ( $M = 2.0$ ).

These findings suggest that children gradually improved their narrative structure and linguistic creativity as they became more familiar with the application. The initial dip in Week 3 may reflect a natural fluctuation or group-specific factors, but the final outcomes indicate that sustained engagement with the AI storytelling tool can foster meaningful linguistic development.

**Figure 3***Progression of Key Indicators Over Intervention Weeks***Correlation Analysis**

To examine how specific narrative dimensions interact, a Pearson correlation analysis was conducted among the thematic indicators recorded during the intervention. This analysis helps identify patterns of co-occurrence and shared development across linguistic behaviors.

The results revealed several strong and positive correlations:

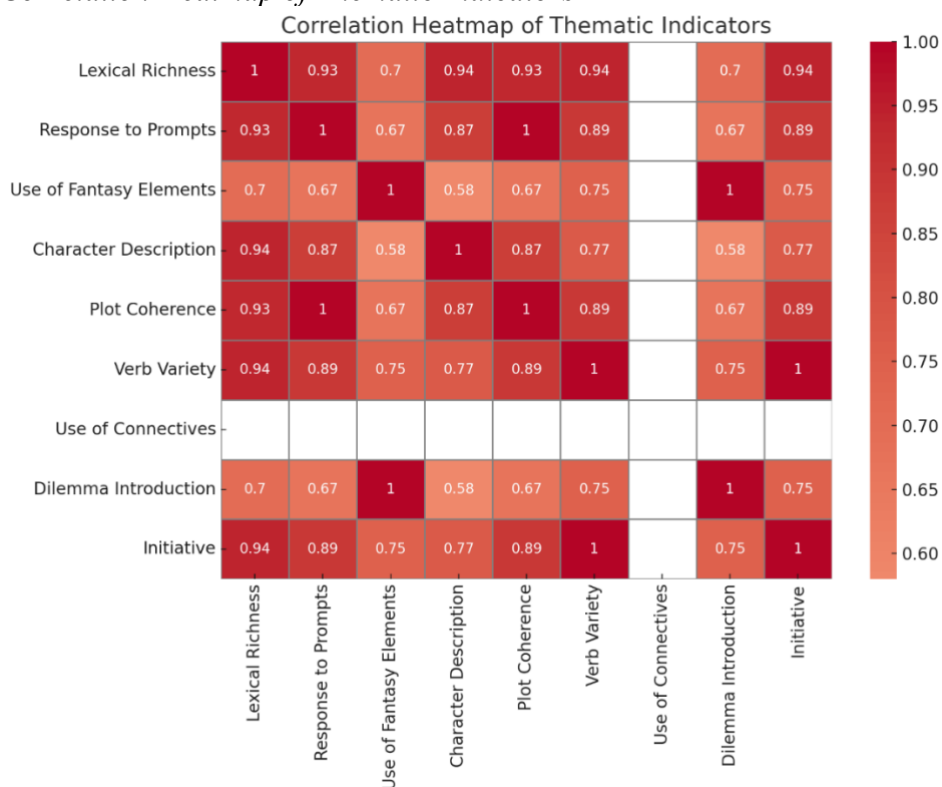
- Lexical Richness showed a very high correlation with:
  - Character Description ( $r = 0.94$ ),
  - Verb Variety ( $r = 0.94$ ),
  - Initiative ( $r = 0.94$ ), and
  - Plot Coherence ( $r = 0.93$ ).
- Response to Prompts was also strongly associated with:
  - Plot Coherence ( $r = 1.00$ ),
  - Initiative ( $r = 0.89$ ),
  - Character Description ( $r = 0.87$ ).

These findings suggest that children who used richer vocabulary also tended to build stronger plots, describe characters more effectively, and take more initiative during storytelling. The high correlation between plot coherence and response to prompts implies that sustained interaction with the application contributed to structured story development.

Interestingly, Use of Fantasy Elements had a moderate-to-strong correlation with several variables (e.g., *Lexical Richness*:  $r = 0.70$ ), indicating that imaginative content may enhance vocabulary use, though it appeared less frequently overall.

On the other hand, **Use of Connectives** could not be meaningfully analyzed due to the uniformly low values (mostly zeros), resulting in insufficient variance for correlation computation.

**Figure 4**  
*Correlation Heatmap of Thematic Indicators*



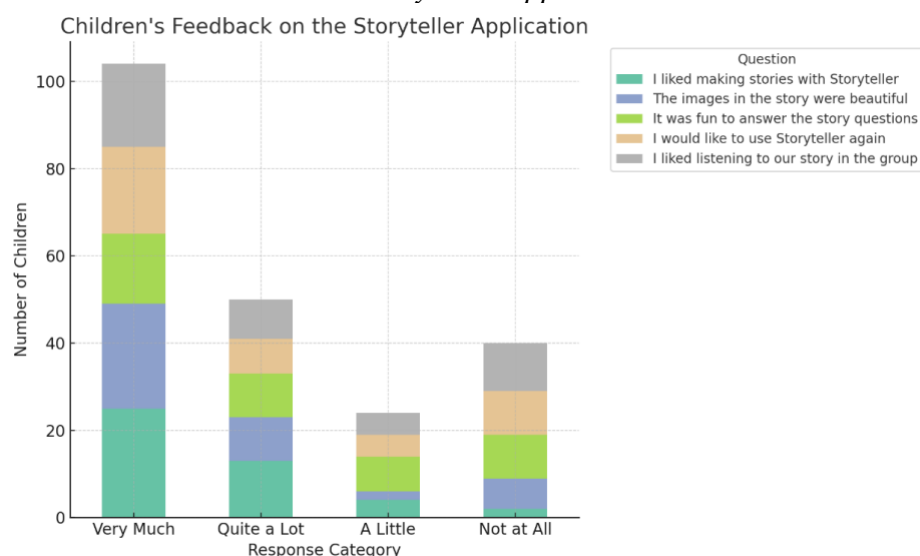
### Children's Perceptions of the AI Storytelling Experience

The children's feedback revealed overall positive experiences with the AI storytelling application:

- 50% (25 children) responded "Very much" when asked if they enjoyed creating stories.
- 48% found the story visuals very appealing, while only 14% responded negatively.
- Responses were more mixed regarding the interactivity of answering questions, with 32% "Very much," but also 10 children selecting "Not at all."
- Over 50% expressed a desire to use the application again in the future.
- Group storytelling was positively received by most, though 11 children were neutral or negative.

This data suggests high emotional engagement and enjoyment, with areas (like question answering) that may benefit from refinement.

**Figure 5**  
*Children's Feedback on the Storyteller Application*



## Discussion

The findings of this study suggest that the integration of an AI-powered storytelling application can positively influence the development of narrative and linguistic skills in preschool-aged children. Throughout the six-week intervention, participants exhibited improvements in key areas such as lexical richness, plot coherence, and storytelling initiative. These improvements were particularly evident in the final sessions, indicating that repeated interaction with the application reinforced the children's ability to construct coherent and expressive stories.

The data further revealed strong correlations between lexical variety and other narrative dimensions, such as character description and initiative, suggesting that vocabulary development plays a foundational role in overall narrative competence. Notably, although the use of fantasy elements and connectives remained relatively low, this may reflect the children's developmental stage or the limited timeframe of intervention.

Children's subjective feedback was largely positive. The majority expressed enjoyment in using the application, appreciation for its visual components, and a desire to reuse it. This emotional engagement likely contributed to their willingness to participate and experiment with language during storytelling sessions.

These results support the notion that AI-based tools, when designed with pedagogical intent, can provide meaningful opportunities for language practice, particularly when combined with teacher facilitation and peer interaction. The *StorySpark* application appears to offer a promising model for early childhood education, blending creative expression with structured linguistic development.

## Limitations of the Study

Despite the encouraging findings, several limitations must be acknowledged:

- **Short Intervention Period:** The intervention lasted only six weeks, which may not be sufficient for capturing long-term language development, particularly in more complex narrative structures (e.g., use of connectives or abstract vocabulary).
- **Limited Control Group Comparison:** Although a quasi-experimental approach was used, a detailed comparative analysis between traditional and AI-based storytelling methods was not fully developed in this phase.
- **No Pre-/Post-Test Standardization:** The study relied on structured observation and children's self-reported experience rather than standardized pre- and post-intervention tests, limiting the ability to quantify progress with high precision.
- **Technology Familiarity Bias:** Children who were more familiar with tablets or digital tools may have interacted more easily with the app, influencing both engagement and performance outcomes.

Future research should extend the intervention period, involve more diverse participant groups, and incorporate pre/post standardized language assessments. Additionally, integrating teacher interviews and parental feedback would provide a more holistic understanding of the tool's impact.

## Conclusion

This study explored the potential of an AI-powered storytelling application to support the narrative and linguistic development of preschool-aged children. The results indicate that the integration of digital tools such as *StorySpark* can foster key language competencies, particularly lexical richness, story structure, and narrative initiative—within a short-term, classroom-based intervention.

Children engaged actively with the application, demonstrating growing confidence in generating story content, responding to prompts, and expressing original ideas. Positive feedback from the participants highlighted not only the educational value of the tool, but also its capacity to generate emotional engagement and enjoyment—critical factors in early childhood learning.

While certain narrative features such as the use of connectives and fantasy elements remained underdeveloped, these may require extended exposure or additional scaffolding strategies. Nevertheless, the overall trend suggests that AI-supported narrative environments can offer children opportunities to experiment with language in meaningful and motivating ways.

Importantly, the success of such tools depends not only on their technical design but also on the pedagogical context in which they are used. Educators play a key role in guiding, observing, and reinforcing the linguistic opportunities that emerge during AI-supported storytelling.

In conclusion, *StorySpark* appears to be a promising digital resource for enhancing early language education. Future research should expand on these findings with longer interventions, diverse settings, and standardized outcome measures to further validate the effectiveness and scalability of AI in early childhood language development.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

This manuscript was prepared with the assistance of generative AI tools (ChatGPT) for language editing and initial drafting under the direction and critical revision of the authors. All content has been reviewed and verified by the authors.

## References

- Bleses, D., Makransky, G., Dale, P. S., Højen, A., & Ari, B. A. (2016). Early productive vocabulary predicts academic achievement 10 years later. *Applied Psycholinguistics*, 37(6), 1461–1476. <https://doi.org/10.1017/S0142716415000584>
- Bruner, J. S. (1983). *Child's talk: Learning to use language*. W. W. Norton.
- Daskalaki, E., Psaroudaki, K., & Fragopoulou, P. (2024). Navigating the future of education: Educators' insights on AI integration and challenges in Greece, Hungary, Latvia, Ireland, and Armenia. *arXiv*. <https://doi.org/10.48550/arXiv.2408.15686>
- Göçen, A., & Aydemir, F. (2020). Artificial intelligence in education and schools. *Research on Education and Media*, 12(1), 16–23. <https://doi.org/10.2478/rem-2020-0003>
- Hirsh-Pasek, K., Zosh, J. M., Golinkoff, R. M., Gray, J. H., Robb, M. B., & Kaufman, J. (2015). Putting education in 'educational' apps: Lessons from the science of learning. *Psychological Science in the Public Interest*, 16(1), 3–34. <https://doi.org/10.1177/1529100615569721>
- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
- Jack, C., & Higgins, S. (2019). Embedding educational technologies in early years education. *Research in Learning Technology*, 27. <https://doi.org/10.25304/rlt.v27.2033>
- Lever, R., & Sénéchal, M. (2011). Discussing stories: On how a dialogic reading intervention improves kindergartners' oral narrative construction. *Journal of Experimental Child Psychology*, 108(1), 1–24. <https://doi.org/10.1016/j.jecp.2010.07.002>
- Liu, S., Reynolds, B. L., & Thomas, N. (2024). The use of digital technologies to develop young children's language and literacy skills: A systematic review. *SAGE Open*, 14(1). <https://doi.org/10.1177/21582440241230850>
- Lo, C. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences*, 13(4), 410. <https://doi.org/10.3390/educsci13040410>
- Parliament, E. (2021). Artificial intelligence in education, culture and the audiovisual sector (2020/2027(INI)). *European Parliament*. <https://www.europarl.europa.eu/topics/en/article/20200827STO85804>
- Pesco, D., & Gagné, A. (2015). Scaffolding narrative skills: A meta-analysis of instruction in early education and development. *Early Education and Development*, 28(7), 773–793. <https://doi.org/10.1080/10409289.2015.1060800>
- Rowe, M. L. (2020). A matter of quantity and quality: The importance of child-directed speech in language development. *Perspectives on Psychological Science*, 15(4), 851–860. <https://doi.org/10.1177/1745691620904080>



- Silva, M., & Cain, K. (2015). The relations between lower- and higher-level oral language skills and their role in predicting early reading comprehension. *Journal of Educational Psychology*, 107(2), 321–331. <https://doi.org/10.1037/a0039557>
- Snow, C. E. (1983). Literacy and language: Relationships during the preschool years. *Harvard Educational Review*, 53(2), 165–189. <https://doi.org/10.17763/haer.53.2.t6177w39817w2861>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Youvan, D. (2024). The impact of screen time on early childhood development: A comprehensive review of health guidelines and research findings. *ResearchGate*. <https://doi.org/10.13140/RG.2.2.22151.41127>
- Zhang, F., Wang, X., & Zhang, X. (2024). Applications of deep learning method of artificial intelligence in education. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-024-12883-w>



## University Planning and Knowledge Management: Connections of Possible Strategies for Institutionalized Integration

Edileusa Medeiros Bezerra, Universidade do Estado da Bahia, Brazil  
Ana Maria Ferreira Menezes, Universidade do Estado da Bahia, Brazil

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

Knowledge management (KM) becomes a priority in the strategic planning (SP) of higher education institutions, as it strengthens adaptation to changes and identifies new knowledge needs. The SECI model by Nonaka and Takeuchi was considered to identify theoretical evidence of KM associated with the SP process. The descriptive research was conducted through a scope review considering the databases Eric, Web of Science, and Scopus, according to PRISMA-ScR, 2018. The descriptors were selected from the Institutional Development Plan (PDI-2023-2027) of the Universidade do Estado da Bahia, the regulatory framework of Brazil, and the elements which characterize SP in the literature. The results consolidate the main strategic areas applied in institutions, offering information on successful initiatives, sustainability, and institutional efficiency, integrated to KM processes. The content analysis highlights four categories: Tools and technologies, understood as digital platforms, evaluation systems, and artificial intelligence, which emerge as central elements in supporting organizational learning. KM was identified as strategic for aligning institutional objectives with organizational practices, promoting efficiency and innovation; Structural models, such as the Balanced Scorecard, were widely applied, highlighting their importance in translating strategic goals into concrete actions; challenges related to the fragmentation of models, resistance to adopting technological practices; impacts on increase in organizational learning capacity and strategic alignment, and in the promotion of innovative practices. It is concluded that the integration of technologies, planning, and KM strategies is relevant for transforming institutional practices, aligning them with innovation demands in the performance of universities.

*Keywords:* university planning, knowledge management, public institutions

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Strategic planning is widely recognized as an integrating tool that plays a fundamental role in promoting the integration and alignment of organizational goals and objectives, enabling various organizational divisions to engage and work toward common goals (Ketokivi & Castañer, 2004).

Conducting strategic planning with broad functional coverage increases the effectiveness of strategic planning and overall performance. In this way, there is a need for deep knowledge of the many functional areas, as well as an awareness of employees within the organization and their skills, in order to put guiding ideas into practice and face the challenges that change the system to rationally manage internal and external knowledge, organize learning processes that continuously change the structure and objectives of the organization (Shoham & Perry, 2008).

Research by Roys et al. (2023) also points to strategy formulation based on knowledge management (KM) as an opportunity to improve educational quality and the performance of university institutions, characterized by high levels of communication and information resulting from strategic management theories and technological transformations.

Another important benefit of strategic planning is its ability to anticipate and deal with risks and uncertainties that can arise from understanding the environment. By analyzing both the external and internal contexts, planning helps the organization identify possible challenges and create strategies to reduce risks. This condition makes the organization more resilient and better prepared to adapt to unexpected changes (Cheng, 2020; Dias et al., 2018; Inga et al., 2021).

However, it is important to find evidence that indicates how feasible, appropriate, relevant, and effective planning models are when used in public universities, especially those that can be adapted to different contexts. It is also necessary to consider conceptual approaches and innovative methods that involve different academic areas and are connected to university management. Understanding how these practices contribute to better overall performance is essential, especially since there are many tools and approaches available that can be used in the university environment according to necessary adaptations.

Planning cycles, which include processes from development to implementation and evaluation, can have their strategic performance assessed in universities based on criteria such as alignment with organizational vision, employee engagement, improvement plans, and performance evaluation. Knowledge management (KM), as emphasized by Roys et al. (2023), is essential for the creation of new knowledge, relying on the quality of human capital, information management, and the integration of appropriate tools. KM promotes continuous learning, innovation, experience sharing, and monitoring of initiative impacts, incorporating technologies to support knowledge management and improve the efficiency of teaching and learning processes (Baldé et al., 2018).

The extension and continuity of these common practices lead to theoretical implications regarding the association of the term “strategic” with planning literature in public higher education institutions (HEIs), as well as its relationship with the knowledge management required for continuous assessment integrated into strategies across all dimensions of institutional planning. This involves examining how knowledge assets are appropriately used

and how HEIs develop strategies to leverage institutional knowledge to enhance the efficiency of their activities.

In this regard, this scoping review aims to synthesize scientific evidence related to university planning processes, focusing on models applied in various public contexts within the academic literature, to address the following research question: How have public universities applied knowledge management strategies in relation to institutional development plans?

### **Methodology**

For this literature review, a scoping review methodology was used, encompassing five stages: identifying the research question; identifying studies through search strategies; study selection; mapping, grouping, summarizing, and reporting the results.

For the development of this review, the guidelines from the PRISMA-ScR checklist (PRISMA extension for Scoping Review) (Tricco et al., 2018) were followed, and to ensure the scientific rigor of this research, validation was conducted through peer review.

Authors employing the scoping review method for literature reviews recognize its importance for mapping the scientific literature on a topic, identifying key concepts, study characteristics, specific data, and evidence gaps. The scoping review method allows for a deeper understanding of the studied topic, highlights conclusions from the literature, and identifies knowledge areas that need further exploration (Galvão et al., 2021; Silva et al., 2022).

### **Data Sources**

The selection of studies, conducted between January 19<sup>th</sup> and March 7<sup>th</sup>, 2024, was performed across three databases, chosen according to their relevance, efficiency, and classification in the field of Education, ERIC (Education Resources Information Centre) SCOPUS (Elsevier), and Web of Science (Core Collection).

### **Search and Selection Strategy**

The criteria used to develop the search strategy were based on terms outlined in the Institutional Development Plan (PDI-2023-2027) of the Universidade do Estado da Bahia (2023) and on the conceptual framework of elements characterizing strategic planning in the literature (mission, vision, values, environmental analysis, objective and goal setting, integration, strategies, monitoring, and evaluation).

Guided by the PCC framework, the search strategy was structured as follows: P represents the population involved in university planning; C, the concept of the evidence; and the second C, the context of the strategies employed in public planning. The PCC elements, aligned with the objective of this study, informed the formulation of the guiding research question and the key themes of this scoping review, serving to define the eligibility criteria.

Descriptors were selected through consultation with the Thesaurus Brasileiro da Educação (Brased) and the ERIC Thesaurus, using synonyms that guide researchers toward the most appropriate terms or descriptors. The Boolean operators “OR” were used to combine similar descriptors, while “AND” was used to connect different search lines, combining them in the three selected databases, as illustrated in Figure 1.

**Table 1**  
*Database Search Strategy*

Database	Search Strategies
ERIC, SCOPUS (Elsevier), Web of Science	(educational strategies) <b>AND</b> (college governing) <b>OR</b> (participative decision) <b>OR</b> (college governing) <b>OR</b> (participative problem solving) <b>OR</b> (educational manager) <b>OR</b> (educational administration) <b>OR</b> (interdisciplinary approach) <b>OR</b> (communication strategies) <b>OR</b> (differentiated staffs) <b>OR</b> (reference groups) <b>OR</b> (strategic management) <b>OR</b> (vision statements) <b>OR</b> (change strategies) <b>OR</b> (educational planning) <b>OR</b> (educational strategies) <b>OR</b> (futures of Society) <b>OR</b> (science Society) <b>OR</b> (social integration) <b>OR</b> (ethnic integration) <b>OR</b> (social class integration) <b>AND</b> (educational administration) <b>OR</b> (educational institutions) <b>OR</b> (university administration) <b>OR</b> (public universities) <b>OR</b> (multicampus colleges) <b>OR</b> (organizational effectiveness) <b>OR</b> (information flow) <b>OR</b> (public higher education) <b>OR</b> (higher education) <b>OR</b> (public education) <b>AND</b> (university management)

Article selection occurred in two phases. In the initial phase, articles were chosen based on abstracts and keywords, applying the following inclusion criteria: abstracts addressing the topics of “public university planning,” “strategic planning,” “integration strategies and methods,” and “knowledge management.” Exclusion criteria in the abstract phase were applied to content that did not fit the scope of analysis or did not address the research topic or question.

In the second phase, the selected articles were read in full and assessed based on the following inclusion criteria: studies based in the context of public university planning, studies exploring the interfaces between Strategic Planning and Knowledge Management, as well as studies evaluating the integration of models and tools adopted for strategic management in the university context. Exclusion criteria included: abstracts not presenting results relevant to the research, articles focusing on themes and/or technology development, and articles with conclusions that were either unclear or unsupported. There were no exclusions based on publication date or language.

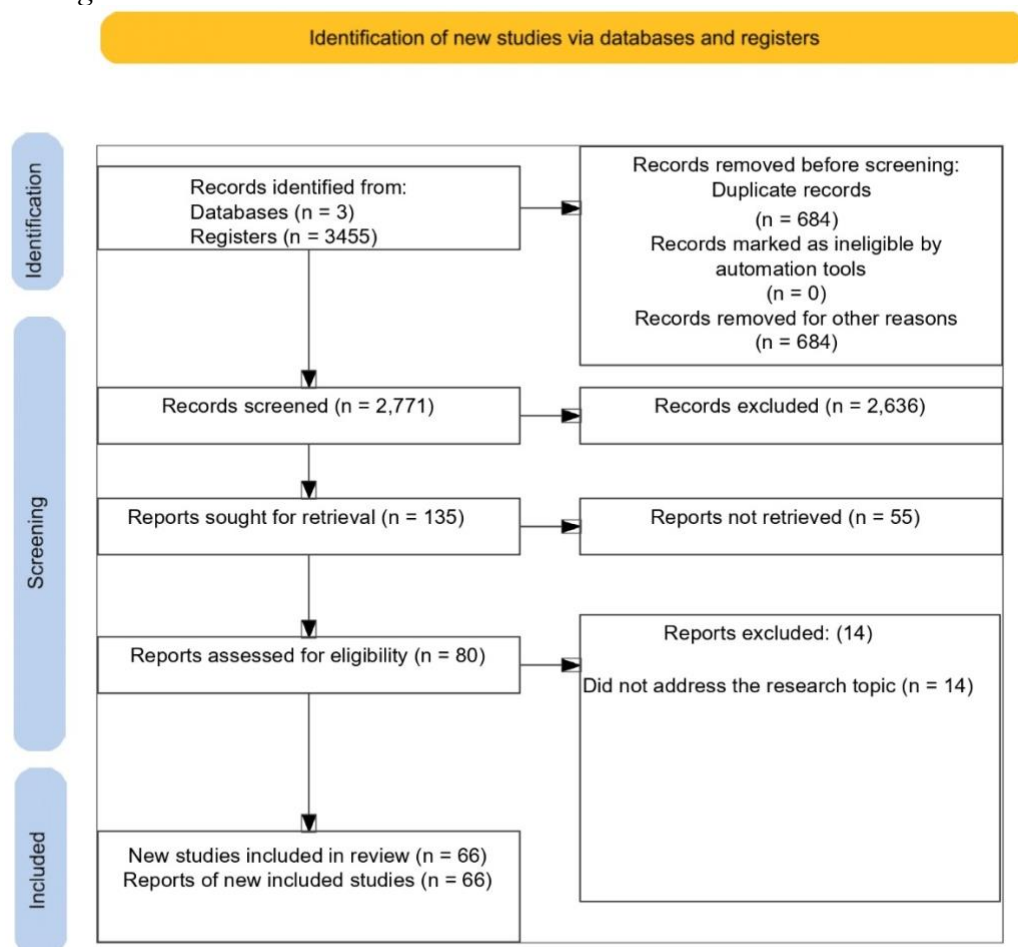
### **Data Analysis**

For the qualitative scoping review analysis, the articles were classified by research nature (case study and literature review), publication year, and the contexts analyzed. The main themes related to university planning were identified. Subsequently, the methods and strategies employed were analyzed. Finally, a detailed analysis was conducted to identify objects, strategic areas, theoretical approaches, and challenges for their implementation. Based on this data, a synthesis of the studies was carried out in a descriptive form, followed by a discussion correlating aspects through content analysis, i.e., by establishing emerging categories from the analyzed content.

## Results

We present the results of our research, which include detailed analyses and data visualizations. In this section, we will explore the main findings and evidence identified in the studies. The results will be presented in the form of tables and figures that will aid in understanding the conclusions. We begin by presenting, in Figure 1, the flowchart of the study selection process, followed by tables summarizing the characteristics of the studies included in the analysis, as well as a visual depiction of the geographic distribution of cases across different regions.

**Figure 1**  
*Fluxograma PRISMA*



The search strategies allowed the identification of 3,455 publications; after removing duplicates, 2,771 remained. Following the screening of titles and abstracts, 135 studies were selected for full-text reading. Of these, 55 articles were unavailable in full text and 14 were excluded. At the end of the process, 66 articles were retained for analysis, as presented in the general characteristics of the studies, profiled by publication year and research type, in Table 2.

**Table 2**  
*Profile of Studies by Year of Publication and Type of Research*

Variable	Absolute value	Percentage (%)
<b>Decade</b>		
2000-2009	8	12,12
2010-2019	38	57,58
2020-2023	20	30,30
<b>Study Type</b>		
Case Study	47	71,21
Literature Review	16	24,24
Mixed	1	1,52
Other	2	3,03
<b>Decade</b>		
2000-2009	8	12,12

The majority of the selected studies happened between 2010 and 2019 (57.58%), indicating a significant increase in research output over the past 15 years. Case studies predominated, accounting for 73.44% of the total, focusing on the institutional realities, and 21.88% were literature reviews addressing themes related to university planning and knowledge management with geographical scope, as shown in the distribution of countries in Figure 2.



**Figure 2**  
*Distribution of Research by Country*



The studies reviewed show a diverse geographic distribution, with most located in Asia and Europe (23.44% or 15 each), South America (14.06%), North America (9.38% or 3), and Africa (4.69% or 3), as illustrated on the map in Table 1 and the diversity of contexts identified in Table 3.

**Table 3**  
*Research Contexts and Key References*

Research Contexts and Key References		
Variable	Absolute value	Percentage (%)
<b>Context Category</b>		
Changes and Reforms	25	21,55
Globalization and Competition	23	19,83
Technology and Society of the Know.	21	18,10
Management and Strategy	17	14,66
Development	12	10,34
Quality and Evaluation	10	8,62
Financing and Efficiency	8	6,90

### Authors cited – Theoretical basis

Kaplan, R.S. & Norton, D.P.	37	34,26
Nonaka, I. and Takeuchi, H.	26	24,07
Mintzberg, H.	9	8,33
Davenport, T.H.	9	8,33
Senge, P.	6	5,56
Porter, M.E.	6	5,56
Kotter, J.P.	5	4,63
Drucker, P.	4	3,70
Chang, O.H and Chow, C.W	3	2,78
Rowley, J.	3	2,78

The researches reflect contexts marked by educational reforms and systemic changes in their respective countries (21.55%), driven by globalization and competitiveness (19.83%), followed by themes such as technology and the knowledge society (18.10%), management and strategy (14.66%), with a focus on local development (10.34%), quality and assessment (8.62%), and financing and efficiency (6.90%). The topics addressed in the researches highlight the most frequently cited authors, such as Kaplan, R.S. and Norton, D.P. (34.26%), Nonaka, I. and Takeuchi, H. (24.07%), followed by Mintzberg, H. and Davenport, T.H. (8.33% each), which approach strategic management theories, in the mobilization of knowledge, and in the indicators of evaluation and monitoring of development plans shown in Table 4.

**Table 4**  
*Conceptual Aspects in University Planning*

Variable	Absolute value	Percentage (%)
<b>Related Topics</b>		
Strategic Management and Planning	47	30,13
Knowledge Management	21	13,46
Technology	17	10,90
Innovation	11	7,05
Performance Evaluation	10	6,41
Organizational Learning	9	5,77

Leadership	8	5,13
Quality Management	7	4,49
Change Management	7	4,49
Collaboration	6	3,85
People Management	4	2,56
Project/Process Management	4	2,56
Other	5	3,21

The themes addressed in university planning research are multiple, as seen in Table 4. However, strategic management related to planning and knowledge management stand out, representing 30.13% (47 studies) and 13.46% (21 studies), respectively, and constitute a significant portion of the research focusing on integration approaches. Additional prominent topics include technology (17 studies, 10.90%), innovation (11 studies, 7.05%), performance evaluation (10 studies, 6.41%), and organizational learning, while other areas have less representation. However, their presence in the scope highlights the multidisciplinary nature of university planning, represented through organizations and initiatives within universities, as shown in Table 5.

**Table 5**  
*Representative Bodies of Initiatives in University Institutions*

Variable	Absolute value	Percentage (%)
<b>Strategic Area</b>		
People Management/HR	32	21,9
Technology/IT Management	23	15,8
Performance Evaluation	21	14,4
Process Management	17	11,6
Strategic Planning and Management	13	8,9
Leadership	10	6,8
Knowledge Management	7	4,8
Project Management	4	2,7
Academic Management	4	2,7

Partnerships	4	2,7
Organizational Structure	3	2,1
Other	8	5,5
<b>Tool</b>		
Digital/Online Platforms	27	34,62
Repositories	11	14,10
Virtual Learning Environments (VLE)	6	7,69
Information/Management Systems	11	14,10
Indicators and Metrics	6	7,69
Balanced Scorecard (BSC)	3	3,85
Institutional Development Plan (PDI)	4	5,13
Collaboration Tools	4	5,13
Other	5	6,41
Artificial intelligence	1	1,28

In Table 6, recurring challenges in university planning are highlighted, particularly those related to strategic areas within institutions, including Implementation of knowledge management (15.93%), Strategic planning and management (14.16%), Human resources (10.62%), Technology and tools for monitoring and evaluation implementation (9.73%), as well as resistance to change and organizational culture (7.08%), which directly affect processes of integration (6.19%), communication and leadership (3.54%), impacting competitiveness and funding in public universities.

**Table 6**  
*Challenges in University Planning*

Variable	Absolute value	Percentage (%)
<b>Challenge</b>		
Knowledge Management (KM) Implementation	18	15,93
Strategic Planning and Management	16	14,16
Human resources	12	10,62

Technology	11	9,73
Evaluation and Metrics	11	9,73
Other	9	7,96
Resistance to Change	8	7,08
Organizational Culture	8	7,08
Integration	7	6,19
Communication	4	3,54
Leadership	4	3,54
Globalization and Competition	3	2,65
Financing	2	1,77

### Discussion

The literature reviewed highlights the multifaceted use of the SECI model in various educational and organizational contexts. Each study contributes to understanding the process of knowledge creation, diffusion, and transformation, which requires highly advanced digital environments. The integration of these insights with the SECI model, supported by technologies, proves adaptable and relevant amid evolving paradigms (Cheng, 2020; Mazorodze & Mkhize, 2022; Reisch et al., 2023; Roys et al., 2023).

Broad definitions of knowledge emphasize its diverse forms—tacit, explicit, implicit, and systemic—at the individual, group, and organizational levels (Nonaka & Takeuchi, 1995, 1997, 2008). Knowledge Management (KM) is defined as a process focused on identifying, collecting, storing, sharing, and utilizing an organization's knowledge and experience to improve its effectiveness and efficiency in achieving its goals (Khatun et al., 2021; Roys et al., 2023). It is also seen as a method for the purposeful integration of human resources, processes, and technology dedicated to developing, capturing, and executing an organization's creative infrastructure (Galgotia & Lakshmi, 2022), and as a multidisciplinary approach used to achieve institutional objectives by enhancing the use of knowledge possessed by individuals (Mazorodze & Mkhize, 2022).

This aspect is reflected in the role of KM in strategy formulation and development within the planning cycle. The results highlight how KM practices can enhance quality and performance excellence (Khatun et al., 2021).

These elements contribute to an analysis of the implications and challenges of strategic planning and knowledge management, demystifying strategy theories in the university context. The study results are related to the positive or negative effects of implementing strategic planning in university institutions, including whether strategic objectives are achieved and whether other strategy formulation methods are adopted or maintained. As a

theoretical contribution, the insights generated may support further investigations into the dynamics of implementing and maintaining strategic planning, through externalization of tacit knowledge via documentation and knowledge sharing, combination of knowledge from different sources and perspectives to create new knowledge, and internalization of explicit knowledge through learning and training.

As highlighted by Santos et al. (2020), the main challenges of the planning process include lack of participation from strategically relevant individuals in the team, demands that hinder planning execution, and conflicts of interest. As a recommendation, the study emphasizes the need to address personal and professional attitudes, fostering greater commitment and co-responsibility among professionals, with an emphasis on interpersonal relationships and team communication.

In the analyzed studies, we synthesized the main practices that public universities apply in knowledge management strategies to achieve the objectives of institutional development plans. Here are the most frequent strategies: 1. Development of information systems: Investment in information systems to manage and share knowledge, such as library management systems, digital repositories, and collaboration platforms. 2. Creation of knowledge networks: Development of networks to connect faculty, researchers, students, and administrative staff from different areas and institutions, fostering collaboration and knowledge sharing. 3. Development of training programs: Offering training programs for faculty and administrative staff, aimed at developing skills in knowledge management, information and communication technologies, and other related areas. 4. Creation of innovation and entrepreneurship centers: Establishment of centers to promote the creation of innovative companies and products based on knowledge generated within institutions. 5. Development of partnerships with other institutions: Establishment of partnerships with other higher education institutions, companies, and government organizations to share knowledge, resources, and experience (Campbell et al., 2017; Pascucci & Meyer, 2013; Pérez & Pino, 2017).

Furthermore, the dynamics of knowledge creation are based on the critical premise that human knowledge is generated and expanded through social interaction between **tacit** and explicit knowledge. This theory, developed by Nonaka and Takeuchi (1995), is founded on the description of how the knowledge spiral emerges, which the authors call the conversion of knowledge, created when tacit and explicit knowledge interact. Through the four modes—socialization, externalization, combination, and internalization—the entire process of knowledge creation is driven. These modes reflect individual experiences. The mechanisms by which individual knowledge is articulated and “amplified” to and through the organization are the same.

Knowledge management is essential for the strategic planning of higher education institutions, as it strengthens their ability to adapt to change and identify new knowledge needs. By integrating knowledge management into planning, universities can align their institutional goals with effective organizational practices, promoting innovation and improving efficiency in all aspects of institutional planning. Thus, strategic planning, enriched by knowledge management, becomes a driving force for transforming institutional practices and responding to the demands for innovation in university performance.

Strategic planning is a process in which an organization defines its strategy and makes decisions about the allocation of resources to execute it. It involves understanding the

institution's vision, mission, values, and strategies and continuous monitoring throughout the cycle, with the participation of those involved at all stages (Inga, 2021; Mendonça et al., 2017; Williams, 2021).

Among the main difficulties of the planning process, Santos et al. (2020) identified the lack of participation of strategically relevant individuals in the team, demands that hinder the implementation of planning, and conflicts of interest. The study suggests the need to address issues related to personal and professional attitudes, especially promoting greater commitment and co-responsibility among professionals, with an emphasis on interpersonal relationships and communication within teams.

Kaplan and Norton (1996, 2006) state that organizations use the *Balanced Scorecard* (BSC) to: Clarify and update the vision and strategic direction; communicate strategic objectives and metrics throughout the organization; align departmental and individual goals with the vision and organizational strategy; link strategic objectives to long-term goals and annual budgets; identify and align strategic initiatives; conduct periodic performance evaluations to learn and improve the strategy; and obtain feedback to learn and refine the strategy.

Umashankar and Dutta (2007) reinforce that the BSC is a comprehensive framework that transforms an organization's strategic objectives into performance measures, fundamentally altering assumptions and helping to focus the strategic vision. The business theory underpins the strategy, and a well-designed BSC is a combination of results and performance drivers.

The observation of the temporal, geographic, and disciplinary distribution of the studies showed that the scope of university planning is extensive and challenging, crossing disciplinary fields with their methods, theories, and concepts, so that the objectives span transversal contexts, whose interrelations and multidisciplinaryity are also marked by each country's regulations, regional economic and technological development.

However, beyond the phenomenon of Information and Communication Technologies (ICTs) having a central role in transforming access to information, in the dynamics of knowledge creation, and in innovation processes, the conclusions of the studies point to the need to strengthen ties between the various social segments involved in university planning. This would promote the circulation of information and the development of strategies at various hierarchical levels, issues that directly involve digital knowledge not only in the technological field but also in collaboration, participation, and organizational learning.

The consolidation of this vision in university management will bring a broader understanding of KM, recognizing the importance of tacit and explicit knowledge and its application within the organization. Over this period, institutions have begun to integrate KM into their strategies, recognizing that knowledge is not merely a resource to be managed, but an asset that can generate competitive advantage and sustainability for development in university institutions.

This review has some limitations. Although the selected platforms are significant references for research and the CAPES periodicals portal is an accessible platform, not all journals are included in the Brazilian Ministry of Education's subscription. Therefore, some articles were excluded due to the lack of access to full texts. The substantial number of unavailable articles for analysis at the inclusion stage could, to some extent, alter the results presented here. The scope of the studies covered diverse areas within the evaluation framework, due to the fact

that specific studies on KM and strategic planning in public universities are scattered and not quantitatively representative in each context.

### **Conclusion**

It is concluded that the integration of technologies, planning, and knowledge management strategies is essential for transforming institutional practices, aligning them with the demands for innovation in university performance.

Knowledge management contributed to the generation of new knowledge in university planning, based on strategies for human capital development, information management, and the integration of models adopted within institutions—linking university management with academic management. The relationship between performance outcomes and knowledge management is evident in various contexts and effective practices, such as information transfer and staff training, which contribute to enhanced performance. This is crucial for organizational innovation, emphasizing the importance of systematic information sharing and continuous learning.

By doing so, institutions can not only monitor their performance but also adjust their knowledge management strategies to better meet planning needs, identifying knowledge gaps in functional and strategic areas for institutional development.

### **Acknowledgments**

We would like to thank Universidade do Estado da Bahia (UNEB) for financial support through the Institutional Program for Supporting the Training of Faculty and Administrative Staff (PAC-DT), the Graduate Support Program (PROAP/CAPES) of the Brazilian government, and the Graduate Program in Knowledge Diffusion for their support and significant knowledge sharing during this PhD program.



## References

- Baldé, M., Ferreira, A. I., & Maynard, T. (2018). SECI driven creativity: the role of team trust and intrinsic motivation. *Journal of Knowledge Management*, 22(8), 1688–1711. <https://doi.org/10.1108/jkm-06-2017-0241>
- Campbell, C., Pollock, K., Briscoe, P., Carr-Harris, S., & Tuters, S. (2017). Developing a knowledge network for applied education research to mobilise evidence in and for educational practice. *Educational Research*, 59(2), 209–227. <https://doi.org/10.1080/00131881.2017.1310364>
- Cheng, E. C. K. (2020). Knowledge management for improving school strategic planning. *Educational Management Administration & Leadership*, 49(5), 824–840. <https://doi.org/10.1177/1741143220918255>
- Dias, W., Nunes, C., Martinez, P., & Maruyama, Ú. (2018). New perspective on building strategy in public education institution. In *Lecture Notes in Management and Industrial Engineering* (pp. 3–10). Cham: Springer. [https://doi.org/10.1007/978-3-319-96005-0\\_1](https://doi.org/10.1007/978-3-319-96005-0_1)
- Galgotia, D., & Lakshmi, N. (2022). Implementation of knowledge management in higher education: A comparative study of private and government universities in India and abroad. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.944153>
- Galvão, A. L. M., Oliveira, E., Germani, A. C. C. G., & Luiz, O. D. C. (2021). Determinantes estruturais da saúde, raça, gênero e classe social: uma revisão de escopo [Structural determinants of health, race, gender, and social class: a scope review]. *Saúde e Sociedade*, 30(2), e200743. <https://doi.org/10.1590/S0104-12902021200743>
- Inga, E., Inga, J., Cárdenas, J., & Cárdenas, J. (2021). Planning and Strategic Management of Higher Education considering the vision of Latin America. *Education Sciences*, 11(4), 188. <https://doi.org/10.3390/educsci11040188>
- Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard: Translating strategy into action*. Harvard Business Press.
- Kaplan, R. S., & Norton, D. P. (2006). *Alignment: Using the balanced scorecard to create corporate synergies*. Harvard Business Press.
- Ketokivi, M., & Castañer, X. (2004). Strategic planning as an integrative device. *Administrative Science Quarterly*, 49(3), 337–365. <https://doi.org/10.2307/4131439>
- Khatun, A., George, B., & Dar, S. N. (2021). Knowledge Management Practices in the Higher Education Sector with Special Reference to Business Schools. *Education & Self Development*, 16(2), 47–59. <https://doi.org/10.26907/esd.16.2.04>
- Mazorodze, A. H., & Mkhize, P. (2022). Major drivers to innovation in higher education institutions of developing countries. *European Conference on Knowledge Management*, 23(2), 1356–1358. <https://doi.org/10.34190/eckm.23.2.461>

- Mendonça, L. C., Anjos, F. H. D., De Souza Bermejo, P. H., Sant'Ana, T. D., & Borges, G. H. A. (2017). Strategic planning in the public sector: How can Brazilian public universities transform their management, computerise processes and improve monitoring? In *International Conference on Electronic Government and the Information Systems Perspective* (pp. 294–306). Cham: Springer. [https://doi.org/10.1007/978-3-319-64248-2\\_21](https://doi.org/10.1007/978-3-319-64248-2_21)
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company*. Oxford University Press.
- Nonaka, I., & Takeuchi, H. (1997). *Knowledge creation in the firm: how Japanese companies generate the dynamics of innovation*. (A. B. Rodrigues & P. M. Celeste, Trans.). (6th ed.). Campus.
- Nonaka, I., & Takeuchi, H. (2008). Theory of organizational knowledge creation. In: Takeuchi, H.; Nonaka, I. (Eds.), *Knowledge management*. (A. Thorell, Trans.). Bookman.
- Pascucci, L., & Meyer, V., Jr. (2013). Estratégia em contextos complexos e pluralísticos [Strategy in Complex and Pluralistic Contexts]. *Revista De Administração Contemporânea*, 17(5), 536–555. <https://doi.org/10.1590/s1415-65552013000500003>
- Pérez, O. G. B., & Pino, J. W. F. (2017). Rol de la gestión educativa estratégica en la gestión del conocimiento, la ciencia, la tecnología y la innovación en la educación superior [The role of strategic educational management in knowledge management, science, technology, and innovation in higher education]. *Educación Médica*, 19(1), 51–55. <https://doi.org/10.1016/j.edumed.2016.12.001>
- Reisch, O. C., Lima, J., Soares, T. C., Tutida, A. Y., Mazon, G., De Lima, M. A., De Lima, C. R. M., Dutra, A. R. A., & De Andrade Guerra, J. B. S. O. (2023). Implementing and performing sustainability strategies at campus operations: The case of Instituto Federal de Santa Catarina. *International Journal of Sustainability in Higher Education*, 26(5), 987–1007. <https://doi.org/10.1108/IJSHE-08-2021-0332>
- Roys, G. a. G., Arredondo, L. E. M., & Miranda, L. J. V. (2023). Gerencia de la investigación y el conocimiento en la educación universitaria [Research and knowledge management in university education]. *Revista Venezolana De Gerencia*, 28(103), 1312–1326. <https://doi.org/10.52080/rvgluz.28.103.24>
- Santos, A. C., Iglesias-Rodríguez, A., & Pinto-Llorente, A. M. (2020). Identification of characteristics and functionalities for the design of an academic analytics model for higher education. In *Proceedings of the Eighth International Conference on Technological Ecosystems for Enhancing Multiculturality* (pp. 997–1003). ACM. <https://doi.org/10.1145/3434780.3436578>
- Shoham, S., & Perry, M. (2008). Knowledge management as a mechanism for technological and organizational change management in Israeli universities. *Higher Education*, 57(2), 227–246. <https://doi.org/10.1007/s10734-008-9148-y>

- Silva, B. R. G. D., Corrêa, A. P. D. V., & Uehara, S. C. D. S. A. (2022). Organização da atenção primária à saúde na pandemia de covid-19: revisão de escopo [Primary health care organization in the Covid-19 pandemic: scoping review]. *Revista de Saúde Pública*, 56, Article 94. <https://doi.org/10.11606/s1518-8787.2022056004374>
- Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D., Horsley, T., Weeks, L., Hempel, S., Akl, E. A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M. G., Garritty, C., ... & Straus, S. E. (2018). PRISMA Extension for Scoping Reviews (PRISMA-SCR): Checklist and explanation. *Annals of Internal Medicine*, 169(7), 467–473. <https://doi.org/10.7326/m18-0850>
- Umashankar, V., & Dutta, K. (2007). Balanced scorecards in managing higher education institutions: An Indian perspective. *International Journal of Educational Management*, 21(1), 54–67. <https://doi.org/10.1108/09513540710716821>
- Universidade do Estado da Bahia. (2023). Resolution No. 1,568/2023. *Official State Gazette [Bahia]*, p. 27.
- Williams, D. A. (2021). Strategic planning in higher education: A simplified B-VAR model. *International Journal of Educational Management*, 35(6), 1205–1220. <https://doi.org/10.1108/ijem-08-2020-0382>

**Contact emails:** ebezerra@uneb.br  
amfmezezes@uneb.br



## **Evaluation of the Impact of the Youth Brigades of Water Culture on the Students of ENMSL: A Retrospective Towards 2025**

Juana Beatriz Ortiz-Cienega, University of Guanajuato, Mexico  
Monica Mondelo-Villasenor, University of Guanajuato, Mexico  
Bertha Mondelo-Villasenor, University of Guanajuato, Mexico

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Water culture has become a prevailing need for humanity. Fortunately, there are several valuable youth-led projects and initiatives worldwide on this topic, such as the Youth Brigade of Water Culture (YBWC) at the Escuela de Nivel Medio Superior de Leon (ENMSL), the largest high school in Leon city, Mexico (Portal guanajuato.mx, 2024). The primary endeavor of the YBWC is to educate children from public elementary schools about water issues in the city and globally. To reach this goal, the brigade works as a team throughout the semester to prepare their activities and necessary materials. This study will show the very first follow up on the more than one hundred students from different cohorts who have been members of the YBWC since its creation in 2016 to date (University of Guanajuato, 2017). The study is conducted to establish the possible impact that the Youth Brigade of Water Culture has had on the students regarding the issue of water and its current problems. Firstly, it is crucial to know whether the members of the brigade have acquired the same environmental awareness that is intended to be generated in children. Additionally, it is essential to determine whether the management done within the brigade over the past nine years should be reevaluated to adjust its approaches based on previous and future generations or if it can be maintained as it has been.

*Keywords:* water culture, environmental awareness, Mexico

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

At the University of Guanajuato (UG), in Mexico, all high school students are required to accomplish social service activities (University of Guanajuato, 2018). The purpose of social service is to promote empathy, solidarity, and the capacity for entrepreneurship to meet and transform the social needs of the environment (University of Guanajuato, 2018). The social service activities will seek, from an altruistic and co-responsible attitude, to give back to society for the benefits of the education received in a public institution (University of Guanajuato, 2018). This is the case in the Escuela de Nivel Medio Superior de Leon (ENMSL), a high school belonging to the UG.

Regarding social needs, since all over the world there is a complicated situation about water, major crises in various regions due to problems such as: scarcity, lack of access, pollution, waste, hoarding, economy, diseases, lack of drinking water, among many others, spreading the word and having a surrounding community educated about water problems and the urgent need for its care is the goal of the high social impact project Youth Brigades of Water Culture from the ENMSL (Ortiz, 2019).

The Youth Brigades of Water Culture (YBWC) is a team made up of a teacher and her students, which has the distinction of involve the society outside the school walls by visiting public elementary schools to interact with children aged from four to twelve (Ortiz, 2019).

The first YBWC in the Escuela de Nivel Medio Superior de Leon (ENMSL) was created in 2016 (University of Guanajuato, 2017) with a group of ten first-semester students, who, aware of the current problem of vital liquid, began activities by training and visiting elementary schools with the aim of raising awareness about the care of water to little ones through various recreational activities (Ortiz, 2019). In 2017, the YBWC became a social service project (University of Guanajuato, 2017). Since then, around 110 members have visited more than ten schools (almost one thousand children).

This study will analyze the impact that the YBWC has had on its participants from the ENMSL since 2016 to the present. In doing so, it will provide valuable background and supporting evidence to assess whether the brigade members have also developed their awareness regarding the protection of water resources. Additionally, the teacher coordinating the brigade will have access to supporting data for the future planning of this social service, to determine whether previous activities have been effective and, if so, whether they would remain relevant for students of current and future generations at ENMSL.

## Literature Review

### Environmental Consciousness

Jimenez and Lafuente (2010) describe the environmental consciousness as multi-dimensional and behavior-oriented, in which are considered diverse types of pro-environmental behaviors and combine psychological constructs that can be associated with four dimensions: affective, cognitive, dispositional, and active (Torres et al., 2022).

According to Torres et al. (2022) the cognitive dimension refers to the degree of knowledge and information that one person has about environmental problems, as well as the organizations responsible for promoting pro-environmental behavior. The affective

dimension (Torres et al., 2022) refers to the set of emotions that demonstrate feelings and beliefs about environmental issues. The dispositional dimension is composed of environmental attitudes that form judgments, feelings, and patterns of behavior for or against the environment and that condition behavior aimed at the preservation or degradation of the biosphere (Torres et al., 2022). Finally, the active dimension is made up of the individual and collective facet, the first alludes to the set of environmental behaviors of a personal nature such as saving electricity, environmentally friendly consumption (recycling, reducing and reusing), the second is represented through behaviors of a public or symbolic nature through the different expressions of support for the protection of the environment (Torres et al., 2022).

### **Methodology**

As a first instrument, a survey was designed in Microsoft Form with the intention of evaluating the four dimensions of environmental consciousness based on the Characterization of positive values in the two measures of environmental consciousness (Jimenez & Lafuente, 2010). The survey was completed anonymously. More than fifty former and current YBWC members were contacted; however, only thirty-six responses were received. The survey items included multiple-choice questions, Likert scale questions, closed-ended questions, and one open-ended item aimed at gathering recommendations for enhancing the activities of the brigades.

The survey remained open for a period of forty days. Participants ranged in age from 15 to 25 years. Among them, fourteen had not yet completed high school education, seventeen had graduated from high school, and five had completed an undergraduate degree. Of the total, twenty-three participants were enrolled in full-time studies. Twenty-six individuals identified as women and ten as men.

To distribute the survey, social media platforms such as Facebook and WhatsApp were used, as well as email. The results were analyzed based on the data provided by Microsoft Forms in its response section.

### **Results**

Following the review of the survey results provided by Microsoft Forms, valuable data were obtained that offer an initial insight into the impact of the YBWC on its members while performing their social service.

As shown in Figure 1, the issue that concerns survey participants the most is water availability. These responses reflect both cognitive and affective dimensions, as the students compared several options and selected the one they perceived to be the most serious problem.

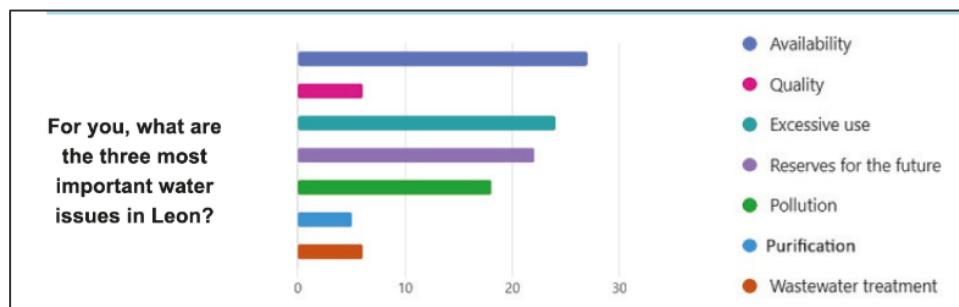
**Figure 1***Answers in Question 8*

Image by author.

Regarding question 7, most responses indicate a high level of concern about environmental conservation. This finding can be linked to the affective dimension of environmental consciousness.

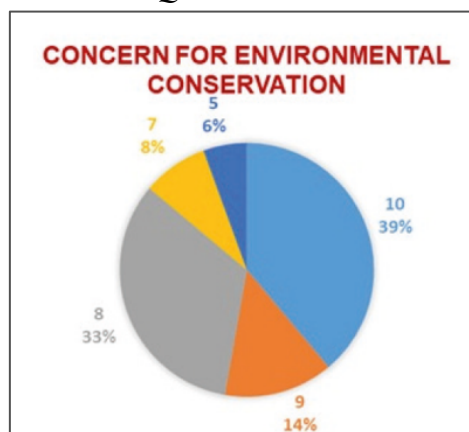
**Figure 2***Answers in Question 7*

Image by author.

In relation to question 19, over 50% of the participants believe that the future of water availability in Leon city will be worse than the current situation, although seven individuals anticipate an improvement. This perception involves affective, cognitive, and even dispositional components.

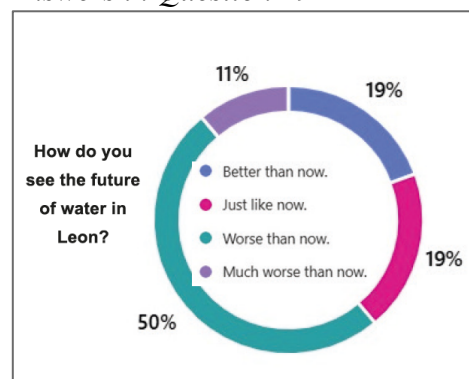
**Figure 3***Answers in Question 19*

Image by author.



Responses to question 16 reveal that most participants have improved their attitudes toward environmental protection and water conservation. Nevertheless, it is evident that efforts to promote water conservation must be strengthened among both children and adults.

**Figure 4**

*Answers in Question 16*

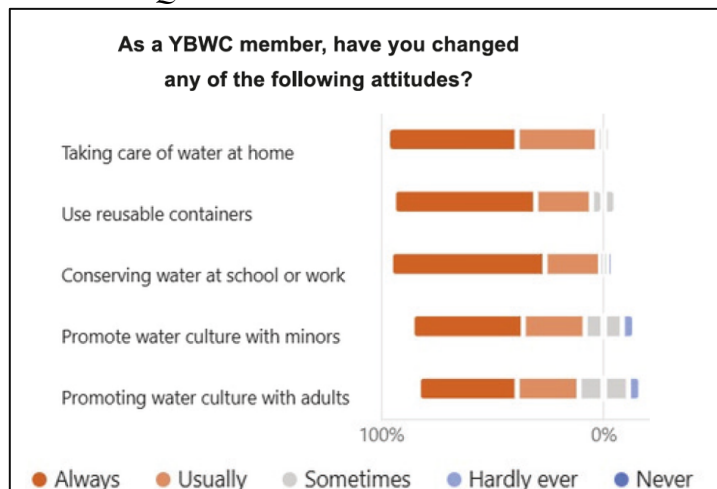


Image by author.

For question 17, all responses align: the project contributes to environmental awareness, according to those who completed the survey.

**Figure 5**

*Answers in Question 17*

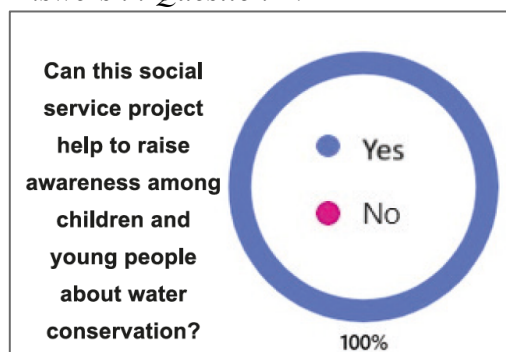
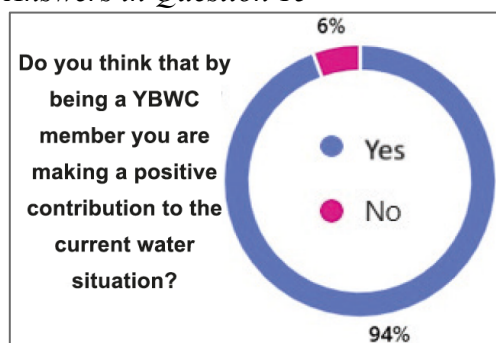


Image by author.

Finally, in question 15, 94% of participants affirmed that the YBWC project contributes positively to the current water situation in the city of Leon. This response reflects both the dispositional and active dimensions, as everyone decides whether to incorporate the knowledge gained into their daily life.

**Figure 6***Answers in Question 15*

### Conclusion

The Youth Brigades of Water Culture is one of the oldest social service projects at ENMSL. However, not enough care was taken to keep a complete record of the YBWC members and their activities, as well as their contact information. The follow-up upon their graduation from the ENMSL is useful and necessary to know if the project also influenced their environmental consciousness. During one semester, there was not enough time to locate former YBWC participants. Although the survey requires proper validation, the fact that at least 36 out of 110 students responded offers a meaningful outcome for its initial implementation. Most importantly, the YBWC has the potential to promote awareness among children and young people about the importance of preserving our precious and finite resource: water

### Acknowledgements

To the principal of the ENMSL, Mr. Benjamin Chavez, for the facilities to develop this project and for allowing the corresponding author to attend the 4th IAFOR conference in Paris. To our beloved relatives for all their support.

## References

- Jimenez, M., & Lafuente, R. (2010). Definition and measurement of environmental awareness. *International Journal of Sociology*, 68(3), 731–755.  
<https://doi.org/10.3989/ris.2008.11.03>
- Ortiz, J. B. (2019). *Online training course for members of youth brigade members water culture*. pp. 3–5. AUSJAL Repository.
- Portal guanajuato.mx. (2024). *The NMS UG community completes their studies*.  
<https://portalguanajuato.mx/2024/07/culminan-sus-estudios-comunidad-del-nms-ug/>
- Torres, N. S., Martinez, B., Rascon, F. A., Medina, J. A., & Reyna, L.A. (2022). Design and validation of the Environmental Awareness Scale (ECA) in elementary school children. *Arete. Digital Journal of the Doctorate in Education of the Central University of Venezuela*, 8(16), 139–157.  
<https://doi.org/10.55560/ARETE.2022.16.8.7>
- University of Guanajuato. (2017a). *Agreements of the Academic Council of the Upper Middle Level adopted at Ordinary Session CANMS2017-O2*. p. 2.
- University of Guanajuato. (2017b) *The Youth Brigades of Water Culture of the Upper Middle Level endorse their commitment*. <https://www.ugto.mx/noticias/quehacer-institucional/11447-refrendan-compromiso-las-brigadas-juveniles-de-cultura-del-agua-del-nivel-medio-superior>
- University of Guanajuato. (2018). *Academic regulations of the University of Guanajuato*. (pp. 16, 34, 39, 40).

**Contact email:** [jb.ortiz@ugto.mx](mailto:jb.ortiz@ugto.mx)



## **An AI-Inspired Approach to Student Performance Assessment**

Vladimir Shapiro, Northeastern University, United States

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This study leverages Artificial Intelligence (AI) methodologies to enhance Human Learning (HL) outcomes. Such AI concepts as weak and strong learners, learnability, and boosting are examined. Weak learners are rudimentary Machine Learning (ML) models that predict only slightly better than random chance, whereas strong learners achieve high performance after undergoing iterative training. Similarly, students with limited prior knowledge (weak learners) can be transformed into strong learners through ongoing structured feedback delivered throughout an educational program. The significance of feedback in both AI and human learning is emphasized. Additionally, motivation is recognized as another crucial factor in achieving learning success. The study advocates AI-inspired performance assessment methods that reward rapid progress, helping initially weaker students catch up with their initially more knowledgeable peers. The findings suggest that AI-inspired strategies can foster more effective, fair, and rewarding learning environments.

*Keywords:* AI-inspired learning, performance assessment, feedback in education, learnability, motivation

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

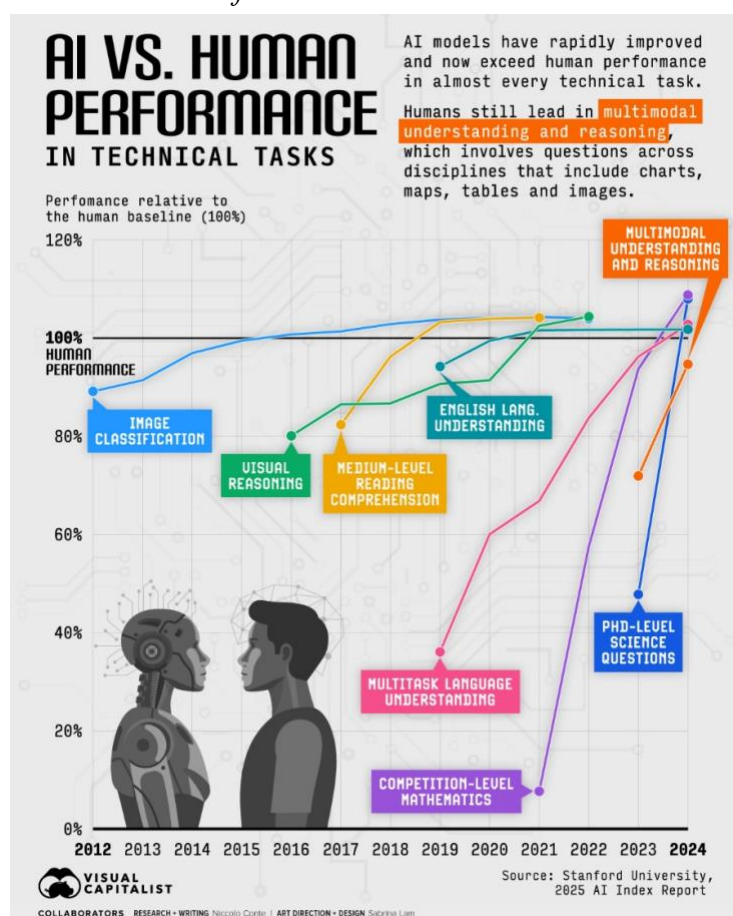
## Introduction

Educational researchers agree that prior knowledge, motivation, cognitive skills, and teaching strategies contribute to learning outcomes. According to Ausubel (1968), the National Research Council (2000), and other sources, prior domain knowledge is considered the most critical determinant of learning success. More recent sources, e.g., Brod (2021), Simonsmeier et al. (2022) admit that prior knowledge may have “positive, negative, or negligible effects on learning.” Yet, they came short of ranking the contributing factors by their importance. The motivational factor plays a crucial role, as noted by Pintrich (2003) and Usher and Kober (2012), meaning that prior knowledge alone cannot guarantee success without strong motivation.

Artificial Intelligence/Machine Learning (AI/ML) has grown to rival the human brain in many aspects of intelligence, as seen in **Figure 1**, and has even surpassed human intelligence in many complex tasks. This study explores the potential benefits for human learning derived from advances in AI/ML. If basic computer hardware with clever training algorithms can perform well starting virtually from scratch, the same should be true for humans with motivation and cognitive skills. The goals are to identify conditions for more consistent and positive learning outcomes across learners with different backgrounds and to develop practical strategies for motivation assessment and performance evaluation using targeted feedback.

**Figure 1**

*AI vs. Human Performance in Technical Tasks*



Note: AI is surpassing human performance in various technical tasks (clipart is from Zhu, 2025).

## Approach and Methods

AI/ML learning paradigms have drawn inspiration from human cognitive processes since the early days of AI/ML, when the first artificial neuron circuit was modeled after a simplified biological one (McCulloch & Pitts, 1943). Nikolaidis (2018) outlined similarities between humans and machine learners. Neftci and Averbeck (2019) stated that there is considerable room for the exchange of ideas between biological and artificial learning. Goyal and Bengio (2020) suggested that studying human inductive biases could inspire AI research.

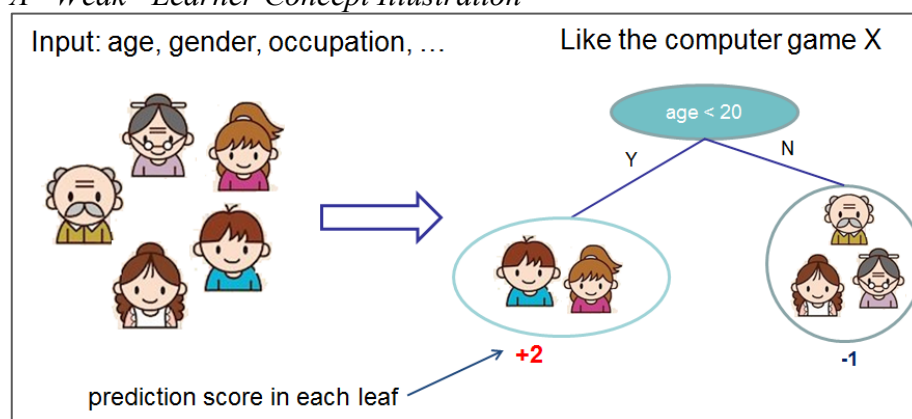
In reversal of the traditional AI/ML learning paradigm, this study draws inspiration from advanced AI/ML to refine the boundaries of what it takes to achieve human learning outcomes.

### “Weak” Versus “Strong” Learners

Schapire (1990) described weak learners as AI/ML models that perform slightly better than random guessing, while strong learners can attain high accuracy. An example of a simple decision tree “stump,” representing a weak learner, is shown in **Figure 2**. Boosting techniques convert weak learners into strong ones through iterative training (Freund & Schapire, 1997; Friedman, 2001). Other AI/ML methods, such as Artificial Neural Networks (ANN), e.g., Rumelhart et al. (1986), or Reinforcement Learning, e.g., Neftci and Averbeck (2019), can be applied for the same purposes. This idea is especially relevant to human learners, as structured feedback during training can turn those with weaker prior knowledge into stronger ones.

**Figure 2**

*A “Weak” Learner Concept Illustration*



*Note:* An example of a decision tree that predicts whether a person likes computer games based on a single condition (their age < 20), among many other features. Such a model would likely perform only slightly better than random guessing. However, it would not be accurate for, say, older game fans (clipart is from Mu, 2024).

**Table 1***Weak vs. Strong Learner Concepts*

AI/ML Context	Human Learning (HL) Context
A “weak” learner is a simple model that consistently predicts only slightly better than random guessing on a given task.	A “weak” learner is a human with limited prior knowledge about a given subject.
A “strong” learner is a model that achieves arbitrarily good performance.	A “strong” learner is a human who attains a robust and comprehensive understanding of a given subject.
Boosting, reinforcement learning, and error propagation techniques transform weak learners into strong ones by using gradients as corrections.	An active feedback role will be discussed later.

**AI/ML: Boosting Methods**

Boosting methods are used to train weak learners until they become strong learners. The Gradient Boosting (GB) method focuses on reducing prediction errors (Friedman, 2001), iteratively improving models to increase accuracy. Another boosting method, AdaBoost, increases the weight of incorrectly classified instances, making them more influential in the subsequent steps of modeling (Freund & Schapire, 1997). These methods can inspire human learning strategies.

Instead of building a single, ultimate, and powerful predictive model all at once, boosting methods iteratively improve models based on errors from earlier iterations. Often, an intermediate model  $f_m(x)$  created at  $m$ -th iteration is considered one of the models contributing to the final model. In our view, the final boosting model can be seen as an ensemble (composite) of all earlier iterations.

$$F_m(x) = F_{m-1}(x) + f_m(x) \quad (1)$$

The boosting approach’s premise is that these composite models gradually improve by incorporating one weak model after another, eventually becoming a single strong composite model.

**Gradient Boosting**

GB is a boosting algorithm’s flavor focusing on prediction errors (residuals). A current “weak” model  $f_m(x)$  is used to tweak the previous model  $F_{m-1}(x)$  by  $\Delta_m(x)$  to nudge the model predictions towards the actual target, see **Figure 3**. After several iterations, the overall cumulative model becomes an increasingly stronger predictor. In the notation above, the tweak  $\Delta_m(x)$  represents a gradient, i.e., a signed rate of change of the loss function  $L$ . The latter quantifies a discrepancy between the predicted and the true values of  $y$ . Among loss functions, the most common is the Mean Squared Error (MSE) calculated across all  $N$  instances of the feature vector  $X$ , see (2):



$$L(y, F_M(X)) = \frac{1}{N} \sum_{i=1}^N (y_i - F_M(\mathbf{x}_i))^2 \quad (2)$$

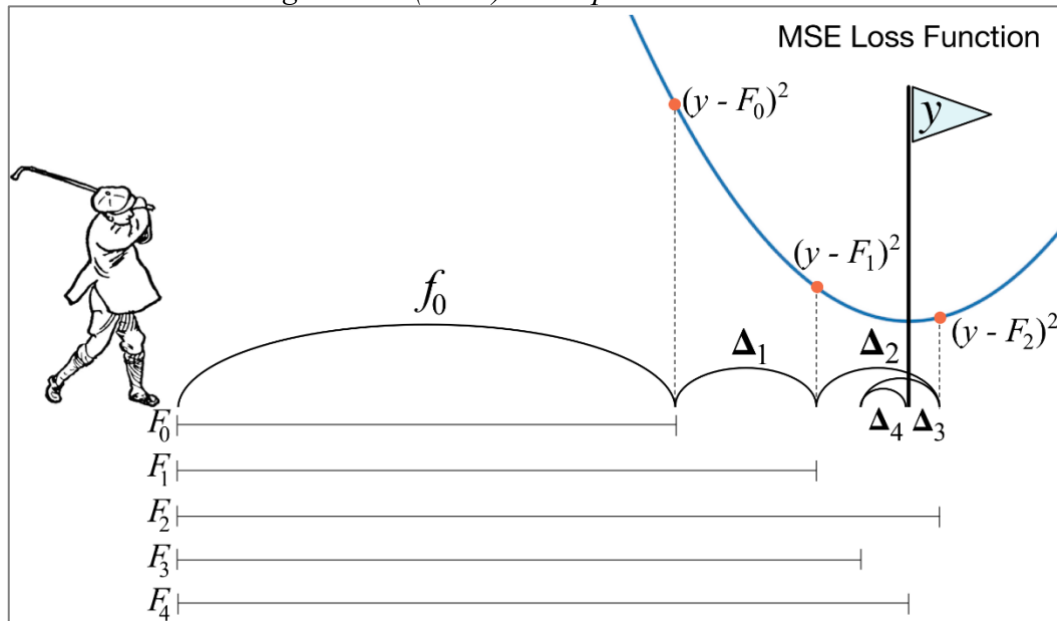
To calculate the optimal amount of tweak, a gradient descent optimization method is typically used to minimize the  $L$ . At each iteration, we update the position by adding a negative gradient scaled by the learning rate,  $\eta$  (eta), to better control the process of  $L$  minimization. Equation (3) shows the composite gradient boosting model  $F_M$  expressed recursively:

$$F_m(x) = F_{m-1}(x) + \eta \Delta_m(x) \quad (3)$$

Every time we add a new weak model to the composite model  $F_M$ , we hope to nudge our prediction  $F_M$ , towards the target  $y$ . Predictions will gradually decrease in step size until they finally converge on  $y$ , see (Parr & Howard, n.d.). The analogy with the learner is that with each step, the goal gets closer. GB-inspired learning strategies are discussed in Chapter **HL Strategies Inspired by AI/ML**.

**Figure 3**

*The Gradient Boosting Method (GBM) Concept Illustration*

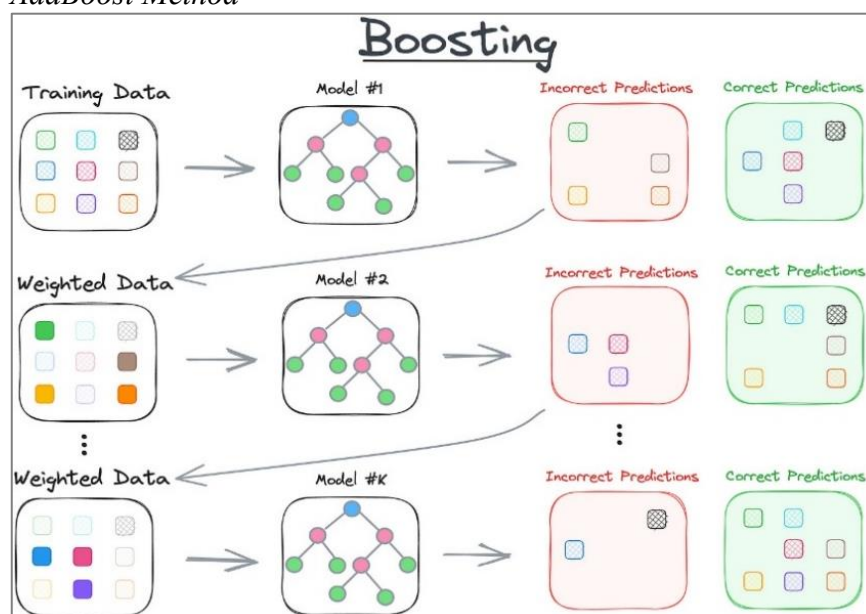


*Note:* The gradient boosting method converges on its goal through a gradient descent process, similar to a golfer aiming for the hole  $y$ . At each step (golfer's shot), the move is in the opposite (negative) direction of the slope of the MSE (Mean Square Error) loss function's gradient (clipart is from Parr & Howard, n.d.)

### ***"Adaptive Boosting" – AdaBoost (Freund & Schapire, 1997)***

AdaBoost uses the same idea of combining weak learners to iteratively reduce prediction errors, eventually creating a strong predictor (learner), similar to the Gradient Boosting Method (GBM). However, it employs a slightly different approach to managing prediction errors throughout the iterations. Specifically, it increases the weight of misclassified instances, boosting their importance for the next model in the sequence (the next learning phase), as discussed in Glorot and Bengio (2010). AdaBoost-inspired strategies are covered in Chapter **AdaBoost-inspired**.

**Figure 4**  
*AdaBoost Method*



Source: STEM Learning (2023).

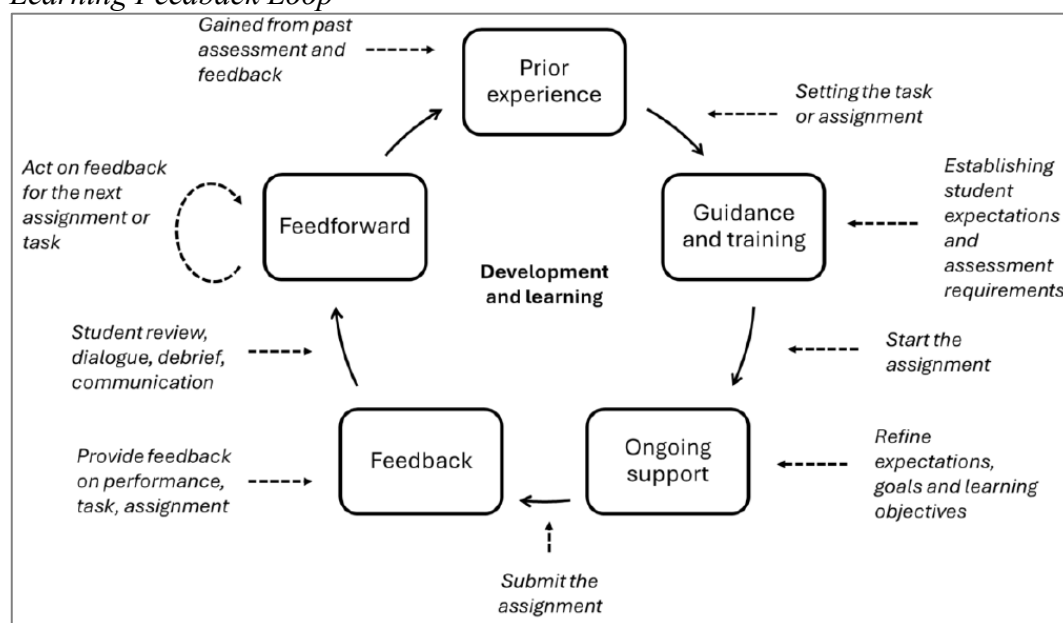
## AI/ML: Artificial Neural Networks (ANN) and the Gradient Flow

Gradient descent optimization is essential for training ANNs with the backpropagation algorithm to minimize the loss function. A smooth flow of gradients (feedback) between layers has been a key requirement for successful ANN training, e.g., (Jha et al., 2021; Rumelhart et al., 1986). However, an ANN's gradient flow can be obstructed due to design or implementation issues, leading to vanishing or exploding gradient problems that cause slow weight updates and poor model performance (Glorot & Bengio, 2010).

### The Feedback Role in AI/ML and HL

Feedback is central to both AI/ML and HL (Human Learning), e.g., Kearns and Vazirani (1994), Hattie and Timperley (2007), Lipnevich and Panadero (2021), Williams (2024). The concept draws on broader theoretical frameworks from cybernetics and systems theory, emphasizing the importance of feedback in regulating and improving systems beyond the education sector. Large feedback increments ("exploding" gradients) can cause learning failures, while small increments ("vanishing" gradients) may slow down learning. The ideal feedback (gradients) is coarse-to-fine, with large adjustments at first when the goal is far away, and smaller corrections as the target gets nearer.

**Figure 5**  
*Learning Feedback Loop*



Source: Improving student learnability with a feedback loop (clipart from Williams, 2024).

### ***Qualitative vs. Quantitative Feedback***

AI/ML methods such as the boosting introduced above and the ANNs utilize quantitative feedback in the form of loss function gradients to enable learning models to solve various prediction problems.

HL accepts both quantitative and qualitative feedback, as both are essential in education and complement each other in enhancing student performance: a) Quantitative feedback indicates what students have achieved in terms of measurable outcomes; b) Qualitative feedback helps students understand how to improve their learning strategies and processes.

Just as AI/ML, HL requires a free flow of feedback and is sensitive to feedback flow obstructions.

### **Machine Learning vs. Human**

Assuming that the free flow of feedback is maintained, we can analyze what factors would contribute to the success of Machine and Human Learning, respectively.

### ***Machine Learning – Success Factors***

We would suggest that the success of an AI/ML is a “function” of the following factors:

$$\begin{aligned}
 & \text{Learning}_{\text{Success}} \\
 & = f(\text{Problem Learnability} + \text{Cognitive Skills} + \text{Motivation} \\
 & \quad + \text{Other Factors})
 \end{aligned} \tag{4}$$

Let us consider the factors one by one:

- *Problem learnability* in AI/ML is based on computational learning theory, which states that a problem is learnable if an algorithm can effectively approximate the target concept from training data (Jha, 2024; Kearns & Vazirani, 1994; Shalev-Shwartz & Ben-David, 2014; Williams, 2024). Once learnability is established, AI/ML methods like gradient boosting or ANN can transform weak learners into strong ones.
- *Motivation* is "the process whereby goal-directed activity is instigated and sustained" (Schunk et al., 2008), as it refers to the internal drive that initiates and keeps someone actively working toward a specific goal. Unlike humans, machines possess intrinsic motivation; they strictly follow their programming instructions, whereas humans may vary in their willingness to engage with the learning process.
- *Cognitive skills* in AI/ML are determined by the computational capabilities, which can easily be provided to meet the demands of popular AI/ML methods.
- *Other factors* can include the data quality and quantity, model hyperparameters, and other auxiliary implementation aspects.

Therefore, the success of machine learning is fundamentally assured once **learnability is established**, regardless of the starting point. Other factors can be managed but still need to be considered.

$$AI/ML_{Success} = f(\text{Problem Learnability} + \text{Other Factors}) \quad (5)$$

Note that prior knowledge is not one of the major factors here.

### ***Human Learning – Success Factors***

Achieving learning outcomes in human learning (HL) requires adequate cognitive skills and motivation. Assuming the program is learnable and instruction is appropriate, success depends on the learner's cognitive-motivational profile, which combines cognitive skills and motivational factors that influence learning and performance (Bandura, 1986; Cordeiro, 2016).

Let us take another look at the function (4), and consider the factors for HL case one by one:

- *Problem learnability* - in higher education, programs are designed to be learnable, as demonstrated by previous successful completions. Therefore, "weak" human learners can achieve learning outcomes if they have enough motivation and cognitive skills. The variation in human motivation and cognitive abilities means that while machines can reliably reach learning goals, humans need a supportive environment that fosters motivation and develops cognitive skills.
- *Motivation* - low motivation hinders the free flow of feedback, negatively impacting the "feedback receptivity" (Lipnevich & Panadero, 2021). Motivation is dynamic and changes over time, in response to situations and course content. It is the inner drive that starts and maintains goal-oriented activity. Without strong motivation, the learning process is unlikely to succeed, regardless of cognitive skills. Regular motivation checks, ideally at the start of each course, are crucial to keep learners engaged. This helps prevent instructors from wasting resources on less motivated learners.
- *Cognitive skills* - often assessed during program admission. They tend to be relatively stable and are unlikely to change significantly within a single course or program.

Therefore, once cognitive skills are confirmed, they usually do not require frequent reassessment.

- *Other factors* - such as instructional methods and presentation of the material, e.g., Anderson (2015)—are external to the learner’s profile and fall clearly within the instructor’s responsibility.

**Table 2**

*Aspects of HL and the ML Differences*

Human learning (HL)	Machine learning (ML)
<i>Motivation</i> (desire/willingness) to learn is not inherent and is a major factor.	<i>Motivation</i> is not a factor.
<i>Cognitive skills</i> needed to acquire essential knowledge vary from person to person and are a major factor.	The machine’s <i>cognitive skills</i> are not a factor given adequate computational capabilities.
HL (education) tasks are <i>learnable</i> ; the learnability is not a factor.	ML tasks’ <i>learnability</i> varies; it is generally a factor.

$$HL_{Success} = f(Motivation + Cognitive Skills + Other Factors) \quad (6)$$

In summary, the guaranteed success of AI/ML for learnable problems and the fact that educational programs are learnable suggest that a motivated, initially “weak” human learner with cognitive skills, given proper guidance, will succeed in achieving learning outcomes in educational programs.

### ***Learner Motivation Assessment***

As we observe, motivation and cognitive skills are among the main success factors of HL (6). It would be helpful to evaluate them to predict students’ success. Unlike cognitive skill assessment, which can be done once per degree program, motivation is dynamic, see e.g., Eccles and Wigfield (2002), and needs to be tested more often, perhaps once per semester. A single test or interview cannot reliably measure motivation, as a “snapshot” may not accurately reflect a learner's true motivation.

A more dependable sign of motivation is how the learner responds to feedback or other communication from the instructor (see Hattie & Timperley, 2007). Active participation in feedback demonstrates a learner's dedication to the learning process. Therefore, practical methods for assessing motivation should concentrate on the learner's reaction to the instructor's communication or task.

Simple tests can gauge motivation by assessing the learner's reaction to a specific task (“goal-directed activity”), see **Table 3**. These tests focus not on knowledge but on the openness of the communication channel and the learner's response. The sequence of steps is important: a) the instructor's action (task), b) the learner's reaction, and c) the instructor's assessment of whether the reaction is adequate.

**Table 3***Examples of Motivation Assessment Tests*

Sequence of Actions	Diligence Test	Attention/Collaboration Test
1. Instructor's Action:	Suggest a material to read/review, software to install, etc.	Guide to formatting electronic submissions.
2. Learner's Reaction:	The learner takes the requested action.	The learner implements the guidance.
3. Instructor's Assessment:	Assess the thoroughness of the execution.	Assess the completeness and accuracy of the execution.

Applying these tests early in the program helps assess the learner's motivation. Although imperfect, these tests offer insights into the learner's engagement and willingness to learn.

**HL Strategies Inspired by AI/ML***AdaBoost-Inspired*

As described in Chapter **AI/ML: Boosting Methods**, AdaBoost gradually improves the performance of weak learners, eventually turning them into strong learners (predictors). It does this by increasing the weight of misclassified instances, making them more influential for the next model in the sequence, and so on. HL can implement the following AdaBoost-inspired techniques, progressively filling in gaps in learners' knowledge, resulting in coherent and positive learning outcomes, as shown in **Table 4**.

**Table 4***HL Techniques Inspired by AdaBoost*

Instructor actions	Learner actions	Benefits
Assign higher weights to significant errors, essential gaps, etc.	<ul style="list-style-type: none"> <li>• Allowed to retake exams</li> <li>• Allowed to redo assignments</li> <li>• Allowed multiple attempts on quizzes</li> </ul>	<ul style="list-style-type: none"> <li>• Learners are assisted in recognizing their weaknesses and focusing on them in future attempts.</li> <li>• Learners should see errors as opportunities to improve rather than fear them.</li> </ul>

*GB-Inspired vs. Conventional Quantitative Feedback*

The GB-inspired approach is based on an incremental grading system. The goal is to enhance students' knowledge (learning outcomes) by the end of the program; therefore, consistently applying incremental progress is a way to reach this goal. This is exactly how AI/ML accomplishes its objectives.

*Conventional quantitative feedback* is given to a student as a grade (score). Conventional, or “fair,” grading evaluates students' work solely based on correctness, without considering their speed of progress. It ensures the same grade for equal levels of work quality. As a result, students with advanced prior knowledge are more likely to receive higher grades, while students with weaker prior knowledge, or “weak” learners, are more likely to get lower grades, regardless of their progress.

The iterative progress of initially stronger learners (**S**) and weaker ones (**W**), with variation margins due to individual learner and instructor characteristics, curriculum, and other factors, is shown in **Figure 6**. The initial gaps in the knowledge in **Figure 6a**) and the grade in **Figure 6b**) will shrink somewhat, indicating initial faster progress when learning from a lower base; see, e.g., Fitts and Posner (1967), Anderson (1982). However, the gap will not be entirely bridged, see  $W_{\text{fair}}$  and  $S_{\text{end}}$  in **Figure 6b**).

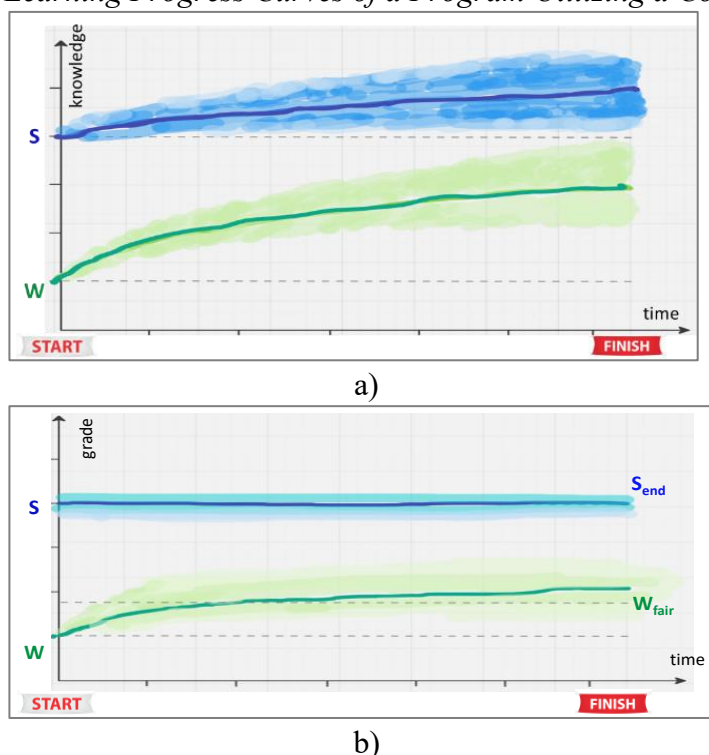
The *GB-inspired quantitative feedback* method is based on gradient boosting principles, adjusting grades according to progress since the last milestone. This approach promotes ongoing improvement and increases motivation, especially for learners who start off weaker.

In conventional grading, students' work is evaluated based solely on solution correctness, often leading to higher grades for those with advanced prior knowledge and lower grades for initially weaker learners. The GB-inspired method adjusts grades according to progress, rewarding each iteration based on the amount of improvement made. This means that a student's grade reflects both the accuracy of their current work and their iterative progress from the last assessment, acting as a bonus. For instance, a motivated student showing significant improvement in subsequent assessments would have their grade boosted to reflect this progress, further reducing the gap (see **Figure 7a** vs. **Figure 6a**).

This approach might seem counterintuitive, as the initially weak learners could reach or even surpass those with more prior knowledge. Possible reasons for the quick progress may be related to the “clean slate” and “beginner’s mind” ideas, as discussed by Locke (1689), Kalyuga et al. (2003), and Kabat-Zinn (2003).

**Figure 6**

*Learning Progress Curves of a Program Utilizing a Conventional Performance Assessment*

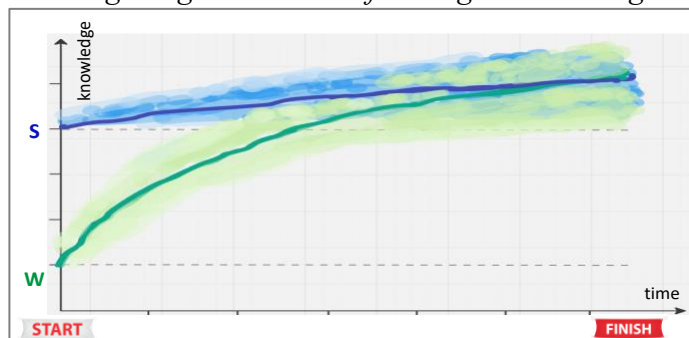


*Note:* a) Learning progress curves with variation margins for an initially stronger learner, **S**, and a weaker one, **W**, of a program utilizing a conventional performance assessment; b) Grade evolution under the “fair” grading scheme. We assume that both learners are equally capable and motivated.

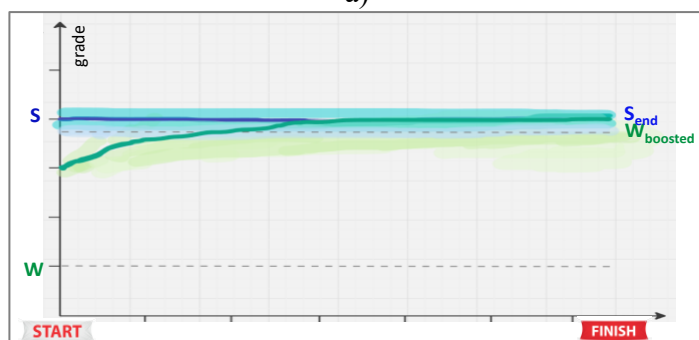
Inspired by gradient boosting, the boosted grading approach adjusts grades based on the speed of progress, which can challenge the assumption that equal-quality work warrants equal grades, also known as “fair grading.” However, extra credits are common in higher education, such as Skinner (1953). The class will likely see grade bonuses as justified if the grading criteria are transparent and the rapid progress bonuses are accessible to all students.

**Figure 7**

*Learning Progress Curves of a Program Utilizing a Boosted Grading*



a)



b)

*Note:* a) With the “boosted” grading adopted, a motivated **W** will likely reduce the gap faster than under the conventional grading scheme in Figure 6; b) **W**’s grades will start higher, and the end grade will be close to the **S**’s.

## Discussion

The study emphasizes the greater importance of motivation and cognitive skills over prior knowledge in achieving successful learning outcomes in education. AI/ML inspiration indicates that motivated learners can perform well regardless of their prior knowledge. This challenges the traditional focus on the latter and demonstrates the potential for AI-inspired assessment methods to influence education.

The analogy between weak and strong learners in AI/ML and HL (Human Learning) offers valuable insights. Boosting techniques can transform weak AI models into strong ones. Likewise, structured, iterative feedback can help initially weaker students catch up with their more knowledgeable peers, promoting ongoing improvement and fairness.

Feedback mechanisms are essential in both AI/ML and HL. Balanced feedback promotes optimal learning conditions, encouraging students to steadily advance. Inspired by AI, quantitative feedback offers students clear and actionable insights.



Boosting techniques, such as Gradient Boosting and AdaBoost, provide practical strategies for performance evaluation. By encouraging quick progress and focusing on fixing errors, these methods help students who are initially weaker improve their performance.

Motivation is essential for effective learning. Regular motivation assessments help students stay engaged and dedicated to their learning goals, fostering a supportive learning environment.

### Conclusions

This study takes inspiration from established AI techniques to enhance human learning and performance assessment. By drawing parallels between AI methods and HL processes, we propose a new approach that uses AI-inspired strategies to improve educational outcomes. Key findings from this research include:

- **From “Weak” to “Strong” Learners:** Structured feedback and iterative training can turn students with limited prior knowledge into high-achieving learners.
- **Feedback Mechanisms:** Feedback inspired by AI/ML methods, such as Gradient Boosting and AdaBoost, encourages quick progress, helping initially weaker students catch up with their peers.
- **Motivation** is crucial for effective learning, and this study emphasizes the importance of regular motivation assessments. Since motivation can vary over time, it should be reassessed periodically.
- **Practical Implications:** By adopting incremental grading and error-focused learning techniques, instructors can improve learning outcomes, helping a broader range of students, including those with limited prior knowledge, to succeed.

Integrating AI-inspired methods into education practices offers promise for improving student performance assessment and developing more effective, fair, and motivating learning environments.

### Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The Grammarly AI writing assistant was used to enhance the writing style and grammar.

## References

- Anderson, J. R. (1982). Acquisition of cognitive skill. *Psychological Review*, 89(4), 369–406. <https://doi.org/10.1037/0033-295X.89.4.369>
- Anderson, J. R. (2015). *Cognitive psychology and its implications* (8th ed.). Worth Publishers.
- Ausubel, D. P. (1968). *Educational psychology: A cognitive view*. Holt, Rinehart and Winston.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- Brod, G. (2021). Toward an understanding of when prior knowledge helps or hinders learning. *npj Science of Learning*, 6, Article 24. <https://doi.org/10.1038/s41539-021-00103-w>
- Chawla, A. (2023, November 22). A visual and overly simplified guide to the AdaBoost algorithm. *Daily Dose of Data Science*. <https://blog.dailydoseofds.com/p/a-visual-and-overly-simplified-guide-676>
- Cordeiro, P. (2016). *Cognitive-motivational determinants of career decision-making processes: Validation of a conceptual model* [Doctoral dissertation, University of Coimbra]. Estudo Geral. <https://estudogeral.uc.pt/bitstream/10316/47431/1/Tese%20Pedro%20Cordeiro.pdf>
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, 53, 109–132. <https://doi.org/10.1146/annurev.psych.53.100901.135153>
- Fitts, P. M., & Posner, M. I. (1967). *Human performance*. Brooks/Cole.
- Freund, Y., & Schapire, R. E. (1997). A decision-theoretic generalization of on-line learning and an application to boosting. *Journal of Computer and System Sciences*, 55(1), 119–139. <https://doi.org/10.1006/jcss.1997.1504>
- Friedman, J. H. (2001). Greedy function approximation: A gradient boosting machine. *The Annals of Statistics*, 29(5), 1189–1232. <https://doi.org/10.1214/aos/1013203451>
- Glorot, X., & Bengio, Y. (2010). Understanding the difficulty of training deep feedforward neural networks. In Y. W. Teh & M. Titterton (Eds.), *Proceedings of the Thirteenth International Conference on Artificial Intelligence and Statistics* (pp. 249–256). PMLR.
- Goyal, A., & Bengio, Y. (2020). Inductive biases for deep learning of higher-level cognition. *Proceedings of the Royal Society A*, 478(2266), Article 20200060. <https://doi.org/10.1098/rspa.2020.0060>

- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81–112. <https://doi.org/10.3102/003465430298487>
- Jha, D., Ward, L., Paul, A., Liao, W., Choudhary, A., Wolverton, C., & Agrawal, A. (2021). Enabling deeper learning on big data for materials informatics applications. *Scientific Reports*, 11, Article 4244. <https://doi.org/10.1038/s41598-021-83193-1>
- Jha, S. K. (2024). *Assessing learnability and applicability of machine learning to a given problem*. LinkedIn. <https://www.linkedin.com/pulse/assessing-learnability-applicability-machine-learning-jha-qghdf/>
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, 10(2), 144–156. <https://doi.org/10.1093/clipsy.bpg016>
- Kalyuga, S., Ayres, P., Chandler, P., & Sweller, J. (2003). The expertise reversal effect. *Educational Psychologist*, 38(1), 23–31. [https://doi.org/10.1207/S15326985EP3801\\_4](https://doi.org/10.1207/S15326985EP3801_4)
- Kearns, M. J., & Vazirani, U. V. (1994). *An introduction to computational learning theory*. MIT Press.
- Lipnevich, A. A., & Panadero, E. (2021). A review of feedback models and theories: Descriptions, definitions, and conclusions. *Frontiers in Education*, 6, Article 720195. <https://doi.org/10.3389/educ.2021.720195>
- Locke, J. (1689). *An essay concerning human understanding*. Thomas Bassett.
- McCulloch, W. S., & Pitts, W. (1943). A logical calculus of the ideas immanent in nervous activity. *Bulletin of Mathematical Biology*, 5(4), 115–133. <https://doi.org/10.1007/BF02478259>
- Mu, H. (2024, January 22). *Time-series Forecasting with ML: Part 4 Time-series models and why choose them — XGBoost 1*. <https://medium.com/@AmberMo/time-series-forecasting-with-ml-part-4-time-series-models-and-why-choose-them-xgboost-1-9bf04f8333f0>
- National Research Council. (2000). *How people learn: Brain, mind, experience, and school* (Expanded ed.). National Academy Press.
- Neftci, E. O., & Averbach, B. B. (2019). Reinforcement learning in artificial and biological systems. *Nature Machine Intelligence*, 1, 133–143. <https://doi.org/10.1038/s42256-019-0025-4>
- Nikolaïdis, A. (2018). Training humans and machines. *arXiv*. <https://doi.org/10.48550/arXiv.1807.08655>
- Parr, T., & Howard, J. (n.d.). *Gradient boosting performs gradient descent*. Explained.ai. <https://explained.ai/gradient-boosting>

- Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, 95(4), 667–686. <https://doi.org/10.1037/0022-0663.95.4.667>
- Rumelhart, D. E., Hinton, G. E., & Williams, R. J. (1986). Learning representations by back-propagating errors. *Nature*, 323(6088), 533–536. <https://doi.org/10.1038/323533a0>
- Schapire, R. E. (1990). The strength of weak learnability. *Machine Learning*, 5, 197–227. <https://doi.org/10.1007/BF00116037>
- Schunk, D. H., Pintrich, P. R., & Meece, J. L. (2008). *Motivation in education: Theory, research and applications* (3rd ed.). Pearson.
- Shalev-Shwartz, S., & Ben-David, S. (2014). *Understanding machine learning: From theory to algorithms*. Cambridge University Press.
- Simonsmeier, B. A., Flaig, M., Deiglmayr, A., Schalk, L., & Schneider, M. (2022). Domain-specific prior knowledge and learning: A meta-analysis. *Educational Psychologist*, 57(1), 31–54. <https://doi.org/10.1080/00461520.2021.1939700>
- Skinner, B. F. (1953). *Science and human behavior*. Macmillan.
- Usher, A., & Kober, N. (2012). *Student motivation: An overlooked piece of school reform* (Summary). Center on Education Policy.
- Williams, A. (2024). Delivering effective student feedback in higher education: An evaluation of the challenges and best practice. *International Journal of Research in Education and Science*, 10(2), 473–501. <https://doi.org/10.46328/ijres.3404>
- Zhu, K. (2025, April 25). *Visualizing AI vs. Human Performance in Technical Tasks*. <https://www.visualcapitalist.com/visualizing-ai-vs-human-performance-in-technical-tasks/>

**Contact email:** v.shapiro@northeastern.edu

## **Breaking Barriers: Experiences of Women Leaders in Guyana's Education Sector**

Soula Kyriakou, International Executive School, France

Frank Naboulsi, International Executive School, France

Zina Kyriakou, International Executive School, France

Jimmy Naipaul, International Executive School, France

The Paris Conference on Education 2025

Official Conference Proceedings

### **Abstract**

In Guyana, a developing nation in South America, traditional gender norms significantly influence societal roles and expectations for both women and men. These norms often position men as primary decision-makers and breadwinners, while women are frequently relegated to supportive roles. Despite legal frameworks promoting gender equality, the impact of these norms on women's experiences in the workplace in Guyana, especially in leadership positions, remains underexplored. This study explores the lived experiences of women in leadership roles within Guyana's education sector. Employing a phenomenological approach, in-depth semi-structured interviews were conducted with seven women leaders. The analysis revealed three key themes: First, participants faced significant barriers to leadership due to cultural beliefs associating leadership with masculinity. Many noted that societal perceptions portraying women as overly emotional or ill-suited for leadership reinforce expectations that they prioritize family over career, ultimately hindering professional advancement. Second, participants described ongoing conflict and marginalization from male colleagues, who frequently dismissed their contributions and reinforced the perception of leadership as a male domain. Third, resilience emerged as a central theme, with participants emphasizing the importance of familial support in resisting gendered expectations and navigating their leadership trajectories. These findings highlight the need for systemic change to address persistent gender disparities in educational leadership in Guyana and to foster an environment where women's contributions are fully recognized and supported.

*Keywords:* leadership, gender, educational leadership, Caribbean, Guyana

**iafor**

The International Academic Forum

[www.iafor.org](http://www.iafor.org)

## Introduction

Leadership in education plays a pivotal role in shaping institutional practices, promoting student success, and fostering equitable development outcomes (Barzilay & Vazquez, 2025; Brescoll, 2011; Leithwood, 2020; Robinson, 2008). Within this critical domain, the gender composition of leadership has emerged as a key determinant of organizational effectiveness, innovation, and representational justice (Acker, 1990; Gillard & Okonjo-Iweala, 2022; Herring, 2009; Hunt, 2015). Yet despite substantial progress in gender equity, women remain markedly underrepresented in senior educational leadership positions globally (Blackmore, 2013; Carli & Eagly, 2016; Cimene, 2024; Cozza & Parnther, 2022; Northouse, 2019; Oyewumi, 2005), even where women constitute the majority of the teaching workforce, revealing systemic barriers that disproportionately hinder their advancement.

Extensive research has illuminated the structural, cultural, and interpersonal dynamics sustaining these gender disparities in leadership. Persistent stereotypical associations between leadership and masculinity continue to shape perceptions of competence, authority, and legitimacy (Catalyst, 2020; Heilman, 2012; Heilman & Caleo, 2018; Koenig, 2011). These implicit biases are compounded by women's exclusion from informal professional networks and differential standards in evaluating behavior and performance (Carli & Eagly, 2016; Ibarra, 2010, 2013; Schnackenberg & Simard, 2021). Consequently, women leaders face greater penalties for assertive behavior or emotional expression (Moorosi, 2010; Rudman & Glick, 2001; Rudman & Phelan, 2008; Williams, 2000). These dynamics create a “double bind,” forcing women to navigate contradictory expectations in ways their male counterparts typically do not (Hannum et al., 2017; Hozien, 2024; Meza-Mejia, 2023; Ridgeway, 2011).

Crucially, these barriers operate within cultural norms and institutional traditions that vary significantly across contexts (Ayman & Korabik, 2010; Chin, 2007; Eagly & Chin, 2010). Leadership, like gender itself, is a socially constructed phenomenon embedded in specific cultural and historical frameworks (Bailyn, 2006; Hofstede, 2001; Lauricella, 2025; Mareque, 2022; Sinclair, 2005). Therefore, constraints and opportunities women face in leadership roles must be understood through contextually grounded investigation. Generalized models often fail to account for the locally specific ways in which gender norms are enacted and contested (Fauzi et al., 2024; Lumby & Azaola, 2014; Oplatka, 2006).

This imperative for contextualized understanding becomes particularly compelling when examining Guyana, a country whose distinctive sociocultural and institutional profile fundamentally challenges conventional narratives about women's educational leadership (Thomas, 2018). Although geographically located in South America, Guyana is culturally and politically aligned with the English-speaking Caribbean and shaped by complex colonial history and multiethnic social structure (Barriteau, 2001; Ministry of Education, Guyana, 2019; Mohammed, 2002). Remarkably, women in Guyana not only constitute the majority of the education workforce but have also achieved substantial representation in educational leadership positions, distinguishing Guyana from many global contexts where women's leadership underrepresentation is more pronounced (Danns, 2002; Ministry of Education, Guyana, 2019).

This context presents a compelling paradox that demands deeper investigation. Despite women's numerical dominance in the profession and their notable presence in leadership roles, their experiences continue to unfold within a sociocultural context shaped by persistent gendered expectations about authority, caregiving, and professional legitimacy that may not

be codified in formal policy but are embedded in organizational culture and community attitudes. This paradox raises fundamental questions about how gender dynamics operate in contexts where traditional narratives of exclusion may not fully capture women's lived realities.

However, despite the theoretical significance of this context, there exists a notable absence of empirical research centering the lived experiences of women leaders within Guyana's education system. While broader sociological accounts have examined gender dynamics in the Caribbean region (Barriteau, 2001; Mohammed, 2002), existing studies often treat gender as a background variable rather than a dynamic dimension of experience, thereby overlooking the subjective and psychological dimensions of leadership, such as identity negotiation, emotional labor, and the strategies women employ to navigate complex professional terrains. This gap limits both theoretical development and policy formulation that can respond authentically to the realities of women's professional lives.

The absence of phenomenological research on women's leadership experiences constrains understanding in several critical ways. Theoretically, it prevents the development of nuanced models of gendered leadership that account for contexts where women hold significant positional power yet continue to navigate cultural and institutional complexities. Practically, it hampers the formulation of policies and professional development programs that can respond to actual needs rather than assumptions about their experiences.

This study addresses these gaps through an interpretative phenomenological analysis (IPA) of the lived experiences of women educational leaders in Guyana's secondary and tertiary sectors. IPA is well-suited to this inquiry because it prioritizes participants' own meaning-making processes and recognizes that leadership experiences are fundamentally shaped by individual interpretation within specific cultural contexts. The aim is to explore how women make sense of their leadership experiences within a sociocultural context where traditional gender norms, institutional practices, and professional expectations intersect in ways that create both opportunities and constraints.

By centering women's own interpretations of their leadership experiences, this research will contribute to a more nuanced understanding of how gender operates in educational leadership contexts where women have achieved substantial representation. The findings will inform leadership theory by revealing how traditional models may need to be reconceptualized for contexts of gender parity, and will contribute to educational policy in the Caribbean region by providing insights grounded in women's actual lived experiences.

#### Research Question:

- How do women educational leaders in Guyana make sense of their experiences in navigating leadership roles?

## Method

### Participants

Seven women educational leaders, aged 30-55, participated in this study (see Table 1 for sample characteristics). The sample comprised three university administrators and four leaders at secondary education institutions, providing perspectives across tertiary and secondary education sectors, with four participants from the Corentyne region and three from

Georgetown ensuring diverse regional representation within Guyana's education landscape. Participants were recruited through snowball sampling, initiated by an initial informant who facilitated connections with additional participants, enabling access to a network of professionals with diverse career trajectories, institutional experiences, and cultural backgrounds within Guyana's education sector.

**Table 1**

*Sample Characteristics*

Sample Characteristics	<i>N</i>	<i>%</i>	<i>M</i>	<i>SD</i>
Ethnicity				
Indo-Caribbean	4	57.1		
Afro-Caribbean	2	28.6		
Native Caribbean	1	14.3		
Education Level				
Bachelors	1	14.3		
Masters	5	71.4		
Doctoral	1	14.3		
Age			42	6

*Note.* Participant demographic information was collected using a demographics questionnaire, which included items on age, ethno-racial identity, and education level.

## Data Collection

Data were collected between November 2024 and February 2025 through semi-structured, in-depth interviews lasting approximately 45 minutes each. All interviews were conducted individually and in person at locations selected by participants to ensure comfort and privacy. With participants' informed consent, interviews were audio-recorded and transcribed verbatim. To maintain confidentiality, all identifying information was removed during transcription, and pseudonyms were assigned to participants as well as any institutions or individuals mentioned.

The interviews followed a participant-led, conversational format designed to facilitate reflective and detailed accounts of experience. A flexible interview protocol, informed by relevant literature on women's leadership, gender equity in education, and the sociocultural context of the Caribbean, guided the discussions. This protocol incorporated strategic prompts to support the emergence of nuanced themes and enable participants to elaborate on complex issues. Key areas of inquiry included leadership trajectories, challenges encountered and adaptive strategies employed, access to and utilization of support networks, and participants' reflections on identity, authority, mentorship, institutional dynamics, and work-life integration.

Key interview questions included

- “Tell me about your journey to leadership in education”
- “Tell me about your experiences with support throughout your career”
- “Tell me about your experiences in the leadership roles you've had”

Follow-up prompts such as “Can you give me a specific example of that?” “How did that make you feel?” and “Tell me more about that experience” were used to elicit deeper reflection and concrete illustrations of participants' experiences.



Interviews were supplemented by brief demographic questionnaires to capture relevant background information without compromising anonymity. Field notes were recorded immediately following each interview to capture contextual observations and initial researcher reflections. Data collection continued until thematic saturation was achieved. All audio recordings were stored securely and will be destroyed following completion of the research project in accordance with institutional data retention policies.

### **Data Analysis**

Data were analyzed using Interpretative Phenomenological Analysis (IPA), in accordance with the approach outlined by Willig (2013). The analysis aimed to explore how participants made sense of their lived experiences, with close attention to the contextual and subjective nuances of each narrative. Transcripts were examined through multiple readings, during which detailed notes were made on descriptive content, language use, and emergent conceptual insights. Themes were developed inductively, progressing from in-depth engagement with individual transcripts to the identification of shared patterns across the dataset. To enhance analytic rigour, each author conducted an independent analysis before collaboratively reviewing and refining interpretations. Consensus on key themes was achieved through iterative discussion, ensuring that the findings were both conceptually robust and grounded in participants' accounts.

### **Ethical Considerations**

This research was conducted in accordance with the British Psychological Society's Code of Human Research Ethics (2021) and received ethical approval from the Institutional Review Board of the International Executive School in Strasbourg, France. All participants provided written informed consent after being fully briefed about the study's purpose, procedures, and their unconditional right to withdraw at any time without consequences. Strict confidentiality protocols were maintained throughout, with all data immediately anonymized using pseudonyms and any personally identifiable information systematically removed from transcripts and reports. Data security was ensured through encrypted, password-protected storage systems with restricted access limited to authorized research team members only, and all data handling procedures complied with relevant regulations.

### **Results**

The interpretative phenomenological analysis of the interview data revealed four overarching themes that encapsulate the leadership experiences of women educational leaders in Guyana. These themes emerged through a rigorous, iterative process, reflecting both shared patterns and individual nuances in participants' narratives. Together, they illuminate the complex realities and contextual factors shaping women's pathways and practices in leadership across secondary and tertiary education sectors. An overview of these themes and their defining characteristics is presented in Table 2.

**Table 2***Summary of Themes From Women Leaders' Experiences*

<b>Theme</b>	<b>Description</b>	<b>Example Excerpt</b>
Challenging Cultural Norms*	Navigating traditional gender expectations that position women as unsuitable for leadership roles.	“In our culture, people still believe that women should be in the home, taking care of children, and that leadership is for men.”
Gendered Power Dynamics in the Workplace*	Experiencing various forms of gender bias and resistance to female authority in professional settings.	“I would present an idea, and it would be dismissed or ignored. Then a male colleague would say the same thing ten minutes later, and suddenly everyone thought it was brilliant.”
Resilience and the Power of Support Networks**	Drawing strength from family support and mentorship relationships to persist through challenges.	“My husband and my mother-in-law actually encouraged me to take this position. They said, 'If you don't try, you'll never know what you can achieve.'”

*Note.* \* Endorsed by all (n = 7) participants; \*\* endorsed by fewer than 7, but no fewer than 5 participants.

### **Theme 1: Challenging Cultural Norms**

Participants reported facing deeply rooted cultural norms in Guyana that challenge the perceived legitimacy of women occupying leadership positions in education. They explained that these norms reflect broader societal expectations within Guyanese communities, where women are primarily seen as responsible for domestic duties, while leadership and public authority are traditionally reserved for men.

Camille, a headteacher at a secondary school, articulated this prevailing mindset: “In our culture, people still believe that women should be in the home, taking care of children, and that leadership is for men.”

Nadira’s experience as a newly appointed headteacher in a Guyanese secondary school exemplifies the direct community skepticism women leaders face:

When people found out I was appointed headteacher, some of them asked if there wasn't a man more suited for the job. They said it out loud, like it was a logical question. It made me realise they didn't see women as leaders.

Her experience highlights how, within this cultural context, women’s leadership is often treated not as a norm but as an anomaly. It is something to be questioned or justified, rather than accepted.

Beyond public skepticism, participants emphasized the emotional and psychological toll of navigating persistent gendered expectations. Many spoke of facing a “double bind” in which their behavior as leaders was constantly scrutinized and often judged through conflicting standards. Alina, a University Dean, explained: “If I’m firm, they say I’m too aggressive. If I

show empathy, they say I'm too soft. Unlike my male colleagues, I'm constantly navigating what version of myself will be tolerated, and it's exhausting."

This tension illustrates how broader cultural expectations, intertwined with gender norms, create an environment where women are required to perform ongoing emotional labor. They must constantly balance authority with approachability in ways their male counterparts rarely face.

The internal impact of these external pressures was evident in participants' self-monitoring and diminished confidence. Simone, a department chair at a university, reflected: "It feels like I have to prove myself twice as hard to be taken seriously. Sometimes I catch myself holding back because I worry how others will judge my decisions or my demeanor as a woman."

Her words reveal the deep psychological burden of leading in a context where legitimacy is never taken for granted but must be continuously earned. For the participants, the challenge went beyond simply obtaining leadership positions; it involved maintaining their authority while navigating cultural expectations that consistently questioned their right to lead.

## **Theme 2: Gendered Power Dynamics in the Workplace**

Participants described persistent gender-based resistance within their professional environments, even after securing formal leadership roles. Despite their qualifications and positions, many found their authority questioned, their input minimized, and their leadership constrained by deeply embedded gender norms. These challenges were particularly evident within the workplace cultures of Guyana's education system, where informal power dynamics often undermined formal structures of leadership.

A common experience shared by participants involved the consistent dismissal or undervaluing of their ideas. Shanice, a department manager at a secondary school, recalled:

I would contribute suggestions during team planning, but there was always silence after I spoke. A few minutes later, a male colleague would repeat the same idea, and suddenly everyone would support it. It wasn't accidental. It was a pattern.

Her account reveals how gendered power operates in subtle yet systematic ways. Even when women occupy senior positions, their voices can be rendered invisible in environments where male contributions are more readily affirmed.

Other participants reported more overt forms of resistance, often from male colleagues who challenged their legitimacy. Camille shared: "The men would bypass me entirely and go straight to the ministry's male representative. It was their way of saying, 'We don't accept your authority.' I had to assert myself, formally and informally, to stop that."

Such behavior illustrates how institutional practices can reinforce gender hierarchies. The act of bypassing a female leader is not merely a personal slight, but a broader expression of gender-based power that seeks to delegitimize her role.

In addition to formal exclusion, participants highlighted how informal male-dominated networks influenced key decisions and limited their access to leadership influence. Simone reflected: "Often, key decisions were made during informal meetings or casual conversations

among male leaders. I was left out of these spaces, which made it harder to influence outcomes or feel fully part of the leadership team.”

These dynamics reflect a hidden layer of organizational life, where informal relationships and gendered social norms determine who holds real power. By being excluded from these networks, women leaders in Guyana often found themselves operating at a disadvantage, even when they held positions of authority on paper.

These accounts reveal that leadership for women in Guyana’s education sector is not solely defined by title or position, but by their ability to navigate and challenge the persistent gendered structures that shape daily professional life. The exclusion from informal networks, the questioning of their authority, and the minimization of their contributions all point to a deeper issue: power in the workplace remains gendered, and for many women, leading means constantly pushing against invisible barriers that others do not have to face.

### **Theme 3: Resilience and the Power of Support Networks**

In navigating the cultural and institutional barriers in Guyana, participants emphasized the essential role that support networks play in sustaining their leadership journeys. Rather than viewing resilience as an innate personal quality, they described it as something actively cultivated and strengthened through relationships with family, mentors, and peers.

Supportive domestic arrangements emerged as particularly crucial. Camille explained: “My husband shares everything at home, like school runs, meals, laundry. Without that partnership, I couldn’t manage the demands of this job. Leadership is not just what happens at work; it’s everything around it too.”

Her experience highlights how equitable support at home enables women’s full participation in professional life, challenging the traditional assumption that domestic responsibilities fall solely on women.

Mentorship from other women leaders also played a transformative role in building confidence and shaping authentic leadership identities. Roshni, a department manager at a secondary school, shared: “She told me, ‘You don’t have to lead like a man. You lead like yourself, and that’s enough.’ That gave me permission to stop imitating others and to trust my own style.”

This kind of mentorship helped participants resist pressures to conform to male leadership norms and allowed them to lead in ways that align with their values and personalities.

Participants further emphasized the importance of peer support, even when informal or infrequent. Nadira reflected: “We don’t have many women in leadership roles here, but when we do meet, even informally, it feels like a safe space where we can be honest about the struggles and share advice without judgment.”

These gatherings provided much-needed affirmation and solidarity within an otherwise isolating professional environment.

Together, these support systems were framed as essential not only to surviving but also to thriving as women leaders in Guyana's male-dominated educational landscape. Camille expressed this powerfully:

There were times I wanted to give up, but having people I could talk to, people who understood what I was facing, made all the difference. It reminded me that I wasn't alone, and that gave me strength to keep going.

### **Discussion**

This study represents one of the first investigations to examine the leadership experiences of women within Guyana's education sector. The findings reveal a complex leadership terrain in which women navigate layered cultural expectations, gendered institutional barriers, and persistent power asymmetries, while drawing upon individual agency and relational resources to sustain their professional roles. By foregrounding participants' interpretive processes, the study contributes to a more nuanced understanding of educational leadership in underexplored sociocultural contexts and offers significant theoretical and practical implications for addressing gender inequities in leadership systems (Cimene et al., 2024; Cozza & Parnter, 2022; Smith et al., 2009; Uhl-Bien, 2006).

A central finding of the study is the tension participants experience between establishing professional legitimacy and contending with institutional and cultural discourses that implicitly position female leadership as atypical. Participants engaged in what is conceptualized as "adaptive cultural reasoning" - that is, a strategic process in which systemic challenges were interpreted not as reflections of personal inadequacy but as embedded within wider sociocultural and organizational structures (Ely, 2010; Markus & Kitayama, 2010; Mnzile & Ceylan, 2025). This strategy enabled participants to maintain self-efficacy while navigating professional environments where implicit gender biases and male-normed expectations remained pervasive. These findings extend identity development theories by illustrating how marginalized professionals mobilize meaning-making processes as protective mechanisms in response to social devaluation (Fletcher, 2004; Phinney, 1990; Sue & Sue, 2015).

Relationality also emerged as a critical dimension of participants' leadership practice. Consistent with Caribbean cultural norms that emphasize collectivism and interconnectedness (Barriteau, 2001), participants described support from peers, mentors, and equitable domestic partners as central to their resilience and leadership continuity. These relationships functioned not merely as sources of emotional support but as foundational elements in the formation of leadership identity. This insight aligns with relational-cultural theory (Ely, 2010, 2011; Miller & Stiver, 1997; Yahya, 2024), which emphasizes that growth-fostering relationships are essential to psychological development and professional thriving. The centrality of these relational structures challenges dominant Western leadership models that privilege individualism and hierarchical control (Nkosi & Maphalala, 2025; Northouse, 2019), and instead highlights the importance of community-based and collaborative leadership approaches. Leadership development initiatives should therefore prioritize cultivating supportive professional networks and institutionalizing mentorship structures, particularly for women at mid-career levels, where attrition often intensifies due to compounded work-life pressures (Carli & Eagly, 2016; Fletcher, 2004; Grogan & Shakeshaft, 2011; Mareque, 2022).

While participants demonstrated acute awareness of structural inequities within their professional environments, their interpretive frameworks emphasized the immediate institutional and cultural dynamics shaping leadership practice in Guyana, rather than attributing challenges solely to historical legacies. This form of situated gender consciousness reflects a critical understanding of how current organizational norms and entrenched gender expectations intersect to influence access, authority, and recognition. Their ability to resist internalizing these constraints and instead frame their experiences through culturally informed and relationally grounded strategies aligns with models of culturally responsive leadership (Grogan & Shakeshaft, 2011; Hozien, 2024; Santamaria & Santamaria, 2012; Santamaria, 2014).

In the Guyanese context, where education systems often reproduce informal hierarchies and gendered assumptions, these findings highlight the urgent need for systemic reform. Policy efforts should move beyond individual capacity-building to address institutional cultures and practices. This includes reviewing promotion practices to eliminate informal gatekeeping, implementing transparent and equitable evaluation criteria, and embedding cultural reflexivity, mentorship, and relational skills into leadership preparation programs. Such reforms would more effectively support women's advancement by aligning leadership development with the cultural and institutional realities faced by educational leaders in Guyana.

### **Theoretical and Practical Implications**

These findings carry important theoretical implications by challenging universalist leadership models and advancing culturally responsive and relational frameworks that better capture the lived realities of women educational leaders in Guyana (Ely, 2010; Schnackenberg & Simard, 2021; Smith, 2009; Uhl-Bien, 2006). By emphasizing adaptive cultural reasoning, situated gender consciousness, and communal leadership practices, this study enriches leadership scholarship with nuanced, context-sensitive perspectives that account for the complex interplay of culture, identity, and institutional structures.

From a practical standpoint, the study underscores the urgency of institutional reforms aimed at dismantling systemic gender biases within leadership pipelines. Research suggests that effective strategies to promote gender equity in leadership include revising promotion practices to eradicate informal gatekeeping (Chung, 2003; Yahya, 2024), implementing transparent, equity-driven evaluation criteria (Patton, 2015), and embedding cultural reflexivity and relational mentorship into leadership development programs (Smith, 2009; Yousefi et al., 2025). Additionally, formalizing peer support networks and fostering inclusive organizational cultures that recognize diverse leadership styles have been identified as critical for advancing gender equity in educational leadership. These theoretical and practical insights offer a foundation for designing interventions that are responsive to the cultural and institutional specificities of Guyana's education sector.

### **Broader Contributions to Leadership Theory**

Extending beyond the immediate context, the findings contribute to broader theoretical debates on the cultural grounding of leadership identity. By demonstrating how leadership is negotiated through interactions with cultural expectations, institutional norms, and interpersonal dynamics, this study challenges dominant universalist models that conceptualize leadership as a fixed set of traits or competencies divorced from sociocultural

context. The experiences of women educational leaders in Guyana reveal leadership as a contextually embedded and relationally sustained practice shaped by local values, gendered norms, and systemic constraints (Cubillo & Brown, 2003; Eggins, 2017). This perspective reinforces calls for more localized, culturally responsive leadership models that better reflect the realities of non-Western and underrepresented contexts (Santamaria & Santamaria, 2012).

By centering the interpretive frameworks of women navigating complex cultural and institutional environments, this study contributes to a growing body of scholarship that advocates for a more pluralistic, situated approach to leadership theory and development (Fauzi et al., 2024; Nkosi & Maphalala, 2025; Schnackenberg & Simard, 2021; Uhl-Bien, 2006). The findings call for a fundamental reconceptualization of leadership as a culturally mediated and relationally sustained practice, highlighting the necessity of policies and organizational practices that reflect this understanding.

From a policy and institutional reform perspective, the study underscores the need for multifaceted interventions that recognize the sociocultural specificity of leadership experience. Educational leaders and policymakers should implement contextually relevant strategies that both dismantle systemic barriers and enhance relational support structures. These include formalizing peer mentorship programs, integrating equity-focused leadership criteria into promotion frameworks, and fostering inclusive leadership cultures that affirm diverse leadership styles and pathways. Such interventions are particularly vital in settings like Guyana, where leadership development has historically lacked attention to gendered dynamics and cultural specificity (Chung, 2003; Cubillo & Brown, 2003; Mnzile & Ceylan, 2025).

This study demonstrates that women's leadership in Guyana's education sector is sustained through a complex interplay of individual meaning-making, relational support, and cultural navigation. Future research should continue to build on context-sensitive methodologies, particularly in Global South settings, to ensure that leadership theory and practice more fully reflect the diverse realities of those working within them.

## **Limitations and Future Research**

Several limitations should be acknowledged in interpreting these findings. First, the study's sample size of seven participants, while appropriate for phenomenological research, limits the generalizability of findings to the broader population of women educational leaders in Guyana (Smith, 2009). The use of snowball sampling may have introduced selection bias, potentially overrepresenting women leaders who are well-connected within professional networks and may have more positive experiences than those who are more isolated (Patton, 2015). Additionally, the study focused exclusively on women's perspectives, which provides valuable insights into their lived experiences but does not capture the full complexity of gendered dynamics that would emerge from including male leaders' perspectives (Bryman, 2016; Schnackenberg & Simard, 2021).

The geographic concentration of participants in Georgetown and the Corentyne region may not fully represent the experiences of women leaders in other areas of Guyana, particularly more remote regions where cultural norms and institutional contexts may differ significantly (Creswell, 2013; Creswell & Clark, 2018). The study's focus on current leaders also means that the experiences of women who may have left leadership positions or been unable to

access them are not represented in the findings, potentially creating a survival bias in the data (Gillard & Okonjo-Iweala, 2022; Maxwell, 2013).

The cross-sectional nature of the study provides a snapshot of participants' experiences at a particular point in time but does not capture how these experiences may evolve over career trajectories or in response to changing social and institutional contexts (Saldaña, 2003). Furthermore, the study's reliance on self-reported experiences, while valuable for understanding subjective meaning-making, may not capture unconscious biases or structural barriers that participants may not be fully aware of (Fauzi et al., 2024; Merriam & Tisdell, 2016).

Future research should expand the geographical and demographic scope of inquiry to include women leaders from additional regions and ethnic communities within Guyana, as well as those working in different educational contexts such as primary schools and vocational institutions (Stake, 2005). Comparative studies examining women's leadership experiences across different Caribbean nations would help identify both shared patterns and unique cultural influences, contributing to broader theoretical understanding of gender and leadership in postcolonial contexts (Yin, 2018). Additionally, longitudinal research tracking women's leadership trajectories over time would provide valuable insights into how experiences and strategies evolve across career stages and in response to changing social contexts (Fauzi et al., 2024; Saldaña, 2003; Yousefi et al., 2025).

Research incorporating male educational leaders' perspectives would offer a more complete understanding of gendered power dynamics and could inform interventions that engage men as allies in promoting gender equity (Eagly & Karau, 2002; Fauzi et al., 2024; Flood, 2019). Mixed-methods approaches that combine phenomenological insights with quantitative measures of organizational climate, leadership effectiveness, and career outcomes would provide a more comprehensive understanding of the factors that influence women's leadership success (Creswell & Clark, 2018). Finally, intervention studies testing the effectiveness of different approaches to supporting women's educational leadership, such as mentorship programs, institutional policy changes, or community engagement initiatives, would provide crucial evidence for developing effective practices and policies (Patton, 2015; Yousefi et al., 2025).

## Conclusion

This study represents one of the first empirical investigations of women educational leaders in Guyana, revealing how participants successfully navigate masculine leadership norms and workplace challenges through adaptive cultural reasoning and strategic relational networks. The findings show that women leaders demonstrate resilience by recognizing barriers as embedded within organizational and cultural structures, while actively leveraging family support, mentorship, and peer networks to sustain and advance their leadership roles. These results challenge universalist leadership theories by demonstrating that effective leadership in Guyana emerges through culturally situated resilience mechanisms and collaborative practices that reflect Caribbean values of collectivism and interconnectedness. The study contributes to broader debates about culturally grounded leadership identity and advocates for pluralistic, situated approaches to leadership theory that honor diverse leadership styles. These findings underscore the urgent need for institutional interventions that dismantle systemic barriers and enhance relational support structures, including formalizing mentorship programs, integrating equity-focused evaluation criteria, and fostering inclusive



organizational cultures that affirm diverse leadership pathways in postcolonial educational contexts.

## References

- Acker, J. (1990). Hierarchies, jobs, bodies: A theory of gendered organizations. *Gender & Society*, 4(2), 139–158.
- Ayman, R., & Korabik, K. (2010). Leadership: Why gender and culture matter. *American Psychologist*, 65(3), 157–170. <https://doi.org/10.1037/a0018806>
- Bailyn, L. (2006). *Breaking the mold: Women, men, and time in the new corporate world*. Cornell University Press.
- Barriteau, V. E. (2001). *The Political Economy of Gender in the Twentieth-Century Caribbean*. Palgrave Macmillan.
- Barzilay, J., & Vazquez, F. K. (2025). Global perspectives of women leaders in international education. In M. Yousefi, A. S. Azar, C. Anderson, & S. K. Gray (Eds.), *Cultivating inclusive educational leadership ecosystems: Women trailblazers and the path forward* (pp. 1–32). IGI Global.
- Blackmore, J. (2013). A feminist critical perspective on educational leadership. *International Journal of Leadership in Education*, 16(2), 139–154.
- Brescoll, V. L. (2011). Who takes the floor and why: Gender, power, and volubility in organizations. *Administrative Science Quarterly*, 56(4), 622–641.
- British Psychological Society. (2021). *Code of human research ethics*. British Psychological Society.
- Bryman, A. (2016). *Social research methods*. Oxford University Press.
- Carli, L. L., & Eagly, A. H. (2016). Women face a labyrinth: An examination of metaphors for women leaders. *Gender in Management*, 31(8), 514–527.
- Catalyst. (2020). *Women in leadership: Why it matters*. Catalyst Press.
- Chin, J. L. (2007). *Women and leadership: Transforming visions and diverse voices*. Blackwell.
- Chung, R. (2003). Examining suicidal behavior of Asian American female college students. *Journal of Counseling Psychology*, 50(1), 1–10. <https://doi.org/10.1037/0022-0167.50.1.1>
- Cimene, F. (2024). Editorial: Women in educational leadership. *Frontiers in Education*, 9, Article 1441183. <https://doi.org/10.3389/feduc.2024.1441183>
- Cozza, B., & Parnther, C. (2022). *Voices from women leaders on success in higher education: Pipelines, pathways, and promotion*. Routledge.
- Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches*. Sage.

- Creswell, J. W., & Clark, V. L. (2018). *Designing and conducting mixed methods research*. Sage.
- Cubillo, L., & Brown, M. (2003). Women into educational leadership and management: International differences? *Journal of Educational Administration*, 41(3), 278–291.
- Danns, G. K. (2002). *Domination and power in Guyana: A study of the police in a third world context*. Transaction Publishers.
- Eagly, A. H., & Chin, J. L. (2010). Diversity and leadership in a changing world. *American Psychologist*, 65(3), 216–224.
- Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review*, 109(3), 573–598.
- Eggins, H. (Ed.). (2017). *The changing role of women in higher education: Academic and leadership issues*. Springer.
- Ely, R. (2010). Women and leadership: Defining the challenges. In N. Nohria & R. Khurana (Eds.), *Handbook of leadership theory and practice* (pp. 377–410). Harvard Business Press.
- Ely, R. (2011). Taking gender into account: Theory and design for women's leadership development programs. *Academy of Management Learning & Education*, 10(3), 474–493.
- Fauzi, M. A., Tan, C. N.-L., Muhamad Tamyez, P. F., Abd Aziz, N. A., & Wider, W. (2024). Women leadership in higher education: Past, present and future trends. *Asian Education and Development Studies*, 13(2), 117–133. <https://doi.org/10.1108/AEDS-11-2023-0168>
- Fletcher, J. K. (2004). The paradox of postheroic leadership: An essay on gender, power, and transformational change. *Leadership Quarterly*, 15(5), 647–661.
- Flood, M. (2019). *Engaging men and boys in violence prevention*. Springer.
- Gillard, J., & Okonjo-Iweala, N. (2022). *Women and leadership: Real lives, real lessons*. Penguin.
- Grogan, M., & Shakeshaft, C. (2011). *Women and educational leadership*. Jossey-Bass.
- Hannum, K. M., Muhly, S. M., Shockley-Zalabak, P. S., & White, J. S. (2017). Women leaders within higher education in the United States: Supports, barriers, and experiences of being a senior leader. *Advancing Women in Leadership Journal*, 35, 65–75. <https://doi.org/10.21423/awlj-v35.a129>
- Heilman, M. E. (2012). Gender stereotypes and workplace bias. *Research in Organizational Behavior*, 32, 113–135.

- Heilman, M. E., & Caleo, S. (2018). Combatting gender discrimination: A lack of fit framework. *Group Processes & Intergroup Relations*, 21(5), 725–744.
- Herring, C. (2009). Does diversity pay?: Race, gender, and the business case for diversity. *American Sociological Review*, 74(2), 208–224.  
<https://doi.org/10.1177/000312240907400203>
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations*. Sage.
- Hozien, W. (2024). *Strategies and insights for women leaders in higher education: A guide to driving positive transformation*. Taylor & Francis.
- Hunt, V. (2015). *Why diversity matters*. McKinsey & Company.
- Ibarra, H. (2010). Why men still get more promotions than women. *Harvard Business Review*, 88(9), 80–85.
- Ibarra, H. (2013). Women rising: The unseen barriers. *Harvard Business Review*, 91(9), 60–66.
- Koenig, A. (2011). Are leader stereotypes masculine? A meta-analysis of three research paradigms. *Psychological Bulletin*, 137(4), 616–642.  
<https://doi.org/10.1037/a0023557>
- Lauricella, S. (2025). *Women Transforming the Future of Higher Education*. IGI Global.
- Leithwood, K. (2020). Seven strong claims about successful school leadership revisited. *School Leadership & Management*, 40(1), 5–22.  
<https://doi.org/10.1080/13632434.2019.1596077>
- Lumby, J., & Azaola, M. C. (2014). Women principals in South Africa: Gender, mothering and leadership. *British Educational Research Journal*, 40(1), 30–44.  
<https://doi.org/10.1002/berj.3028>
- Mareque, M. (2022). Aspiring and inspiring: The role of women in educational leadership. *Gender in Management: Gender in Management*, 37(8), 1009–1025.  
<https://doi.org/10.1108/GM-07-2021-0221>
- Markus, H. R., & Kitayama, S. (2010). Cultures and selves: A cycle of mutual constitution. *Perspectives on Psychological Science*, 5(4), 420–430.  
<https://doi.org/10.1177/1745691610375557>
- Maxwell, J. A. (2013). *Qualitative research design: An interactive approach*. Sage.
- Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation*. Jossey-Bass.
- Meza-Mejia, M. (2023). Women and leadership in higher education: A systematic review. *Social Sciences*, 12(10), 555. <https://doi.org/10.3390/socsci12100555>

- Miller, J. B., & Stiver, I. P. (1997). *The healing connection: How women form relationships in therapy and in life*. Beacon Press.
- Ministry of Education, Guyana. (2019). *Annual education statistics report*. Ministry of Education.
- Mnzile, J. Y., & Ceylan, M. (2025). Women's role in educational leadership in the 21st century. In *Cultural awareness and diversity management in contemporary education* (pp. 1–36). IGI Global.
- Mohammed, P. (2002). *Gendered realities: Essays in Caribbean feminist thought*. University of the West Indies Press.
- Moorosi, P. (2010). South African female principals' career paths: Understanding the gender gap in secondary school management. *Educational Management Administration & Leadership*, 38(5), 547–562.
- Nkosi, N., & Maphalala, M. C. (2025). *Women's leadership in African education*. Springer Nature.
- Northouse, P. G. (2019). *Leadership: Theory and practice*. Sage.
- Oplatka, I. (2006). Women in educational administration within developing countries: Towards a new international research agenda. *Journal of Educational Administration*, 44(6), 604–624.
- Oyewumi, O. (2005). *African gender studies*. Palgrave Macmillan.
- Patton, M. Q. (2015). *Qualitative research and evaluation methods*. Sage.
- Phinney, J. S. (1990). Ethnic identity in adolescents and adults: A review of research. *Psychological Bulletin*, 108(3), 499–514. <https://doi.org/10.1037/0033-2909.108.3.499>
- Ridgeway, C. L. (2011). *Framed by gender: How gender inequality persists in the modern world*. Oxford University Press.
- Robinson, V. (2008). The impact of leadership on student outcomes: An analysis of the differential effects of leadership types. *Educational Administration Quarterly*, 44(5), 635–674. <https://doi.org/10.1177/0013161X08321509>
- Rudman, L. A., & Glick, P. (2001). Prescriptive gender stereotypes and backlash toward agentic women. *Journal of Social Issues*, 57(4), 743–762.
- Rudman, L. A., & Phelan, J. E. (2008). Backlash effects for disconfirming gender stereotypes in organizations. *Research in Organizational Behavior*, 28, 61–79.
- Saldaña, J. (2003). *Longitudinal qualitative research: Analyzing change through time*. AltaMira Press.

- Santamaria, L. J. (2014). Critical change for the greater good: Multicultural perceptions in educational leadership toward social justice and equity. *Educational Administration Quarterly*, 50(3), 347–391.
- Santamaria, L. J., & Santamaria, A. P. (2012). *Applied critical leadership in education: Choosing change*. Routledge.
- Schnackenberg, H. L., & Simard, D. A. (2021). *Women and leadership in higher education during global crises*. IGI Global.
- Sinclair, A. (2005). Body and management pedagogy. *Gender, Work & Organization*, 12(1), 89–104. <https://doi.org/10.1111/j.1468-0432.2005.00264.x>
- Smith, J. (2009). *Interpretative phenomenological analysis: Theory, method and research*. Sage.
- Stake, R. E. (2005). Qualitative case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 443–466). Sage.
- Sue, D. W., & Sue, D. (2015). *Counseling the culturally diverse: Theory and practice*. John Wiley & Sons.
- Thomas, C. Y. (2018). *Guyana: From plantocracy to nationhood*. Hansib Publications.
- Uhl-Bien, M. (2006). Relational leadership theory: Exploring the social processes of leadership and organizing. *Leadership Quarterly*, 17(6), 654–676.
- Williams, J. C. (2000). *Unbending gender: Why family and work conflict and what to do about it*. Oxford University Press.
- Willig, C. (2013). *Introducing qualitative research in psychology*. Open University Press.
- Yahya, U. (2024). Women leaders in higher education: A systematic review offering insights for nations with wider gender gaps. *Issues in Educational Research*, 34(1), 378–399. <http://www.iier.org.au/iier34/yahya.pdf>
- Yin, R. K. (2018). *Case study research and applications: Design and methods*. Sage.
- Yousefi, M., Azar, A. S., Anderson, C., & Gray, S. (2025). *Cultivating inclusive educational leadership ecosystems: Women trailblazers and the path forward*. IGI Global.

## **Investigating the Impact of Rosetta Stone (A Computer-Assisted Language Learning Software) on Students' Proficiency in English Language: A Quasi-experimental Study**

Mohamed Benaissa, University Sidi Mohamed Ben Abdellah, Morocco  
Youness Attou, University Sidi Mohamed Ben Abdellah, Morocco

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

With computer-assisted language learning (CALL) software becoming a potent instrument to improve language proficiency, technology is drastically trying to change conventional language learning techniques in recent years. Among these resources, Rosetta Stone has become well-known due to its engaging and participatory method of language learning. Nevertheless, little is known about the efficacy of CALL tools like Rosetta Stone in the context of Moroccan higher education, despite the growing use of technology in the classroom. Addressing this gap, this study aims to investigate the impact of Rosetta Stone, a Computer-Assisted Language Learning software, on the English language proficiency of Master's students at the Faculty of Poly-disciplinary of Taza, Morocco. To achieve this, the study employs a quasi-experimental design, dividing participants into a control group receiving traditional instruction and an experimental group supplementing their learning with Rosetta Stone. Data was collected using pre-tests and post-tests to measure changes in students' language proficiency, alongside qualitative feedback to gauge user experiences. The findings revealed a significant improvement in the experimental group's proficiency, particularly in listening and reading skills, compared to the control group. Additionally, students reported increased engagement and confidence in using English. The study underscores the potential of CALL tools to enhance language learning. It also highlights the need for integrating such technologies into language curricula to complement traditional pedagogies. These insights contribute to the broader discourse on digital language learning and provide practical implications for educators and policymakers in Morocco and similar contexts.

**Keywords:** CALL, Rosette Stone, language acquisition, Morocco

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

### Background of the Study

The integration of technology in language education has witnessed unprecedented growth, reshaping the way languages are taught and learned. Among the many technological advancements, Computer-Assisted Language Learning (CALL) has emerged as a transformative approach that offers interactive, flexible, and learner-centered instruction. CALL software leverages multimedia features to create immersive environments, thereby promoting deeper engagement and more effective acquisition of language skills (Beatty, 2013; Chapelle, 2001). One notable example of CALL is Rosetta Stone, a widely recognized language learning software that adopts a contextualized, image-based method. Designed to simulate natural language acquisition, Rosetta Stone emphasizes listening and reading comprehension through repetition, visual prompts, and real-life scenarios. While its global popularity continues to grow, its application and measurable impact within Moroccan higher education settings remain underexplored. In Morocco, English language education has become increasingly important, especially at the tertiary level, where students are expected to acquire academic and communicative competence. Despite national efforts to promote English, many students continue to face challenges in mastering the language, particularly in listening and reading skills. With the Ministry of Higher Education encouraging digital transformation in pedagogy, there is an urgent need to evaluate the effectiveness of CALL tools like Rosetta Stone in the local academic context.

### Statement of the Problem

Although the literature confirms the potential of CALL tools to enhance language proficiency, empirical evidence from Moroccan universities is still limited. Existing studies often focus on general CALL integration without examining specific platforms like Rosetta Stone or assessing their impact using experimental methods. Consequently, language teachers and policymakers lack localized data to make informed decisions about adopting such tools. The core issue this study addresses is the lack of empirical evaluation of Rosetta Stone's effectiveness in improving English language proficiency among Moroccan postgraduate students.

### Research Questions

To address this gap, the study seeks to answer the following research questions:

1. What is the impact of using Rosetta Stone on the overall English language proficiency of Master's students at the Faculty of Polydisciplinary of Taza?
2. In what specific language skills (e.g., listening, reading) does Rosetta Stone have the most significant effect?
3. How do students perceive their learning experiences with Rosetta Stone compared to traditional instruction?

### Hypotheses

Based on existing research and the study design, the following hypotheses are formulated:

- **H1:** Students who use Rosetta Stone as a supplementary tool will show significantly greater improvement in their English language proficiency than those who receive traditional instruction only.



- **H2:** Rosetta Stone will have the most significant impact on students' listening and reading skills.
- **H3:** Students using Rosetta Stone will report higher levels of engagement and confidence in using English than those in the control group.

### **Aim of the Study**

The primary aim of this study is to investigate the effectiveness of Rosetta Stone as a supplementary CALL tool in enhancing English language proficiency among Master's students at the Faculty of Polydisciplinary of Taza, Morocco. Specifically, the study seeks to measure improvements in language performance and examine student perceptions of the tool's educational value.

### **Significance of the Study**

This study is significant in several respects. First, it provides empirical evidence on the use of Rosetta Stone in a Moroccan higher education context, contributing to the relatively sparse body of research in this area. Second, by employing a quasi-experimental design, the study offers robust data on the comparative effectiveness of CALL-based versus traditional instruction methods. Third, the findings offer practical implications for curriculum developers, language instructors, and educational policymakers seeking to integrate technology into language education. Finally, the study adds to the broader discourse on digital language learning and supports the call for more localized and evidence-based educational innovation in the Global South.

## **Review of Literature**

### **Computer-Assisted Language Learning (CALL)**

Computer-Assisted Language Learning (CALL) refers to the use of computer technologies to facilitate language acquisition. It has evolved significantly from early drill-based software to more interactive and adaptive systems. CALL is now viewed not just as a supplementary tool, but as an integral part of communicative and constructivist approaches to language teaching (Beatty, 2013). Studies suggest that CALL enhances learner autonomy, engagement, and exposure to authentic language use (Chapelle, 2001; Reinders & White, 2010). CALL tools are particularly effective in providing learners with individualized instruction, immediate feedback, and multi-modal learning opportunities, which are crucial for language development (Hubbard & Levy, 2016). As language learners in the digital age increasingly demand flexibility, CALL offers a scalable solution to bridge the gap between formal instruction and self-directed learning (Egbert & Petrie, 2005).

### **Rosetta Stone as a CALL Platform**

Rosetta Stone is one of the most prominent commercial CALL programs, known for its image-based, immersion-style learning approach. It emphasizes implicit learning through pattern recognition and contextual understanding, without relying on direct translation (Southard, 2018). The platform covers listening, reading, speaking, and writing, although its strongest components are often reported to be listening and reading comprehension due to the visual and repetitive structure of its lessons (Godwin-Jones, 2011). Empirical studies on Rosetta Stone are limited but promising. For example, Hsu (2015) found that learners using

Rosetta Stone significantly improved their vocabulary retention and listening comprehension compared to those receiving traditional instruction. However, critics argue that its lack of explicit grammar instruction and limited interaction with human speakers may hinder deeper communicative competence (Stockwell, 2012).

### **The Impact of CALL on Language Proficiency**

A growing body of research supports the effectiveness of CALL in improving language proficiency, particularly in listening and reading skills. For example, Levy and Stockwell (2006) note that CALL tools can provide targeted practice and exposure that is difficult to replicate in conventional classrooms. A meta-analysis by Plonsky and Ziegler (2016) confirmed that digital language learning tools positively impact second language acquisition, especially when integrated systematically into the curriculum. Studies also suggest that CALL enhances learner motivation. The interactive and gamified nature of many tools, including Rosetta Stone, increases student engagement and encourages frequent practice (Ushida, 2005). These benefits are particularly significant in contexts where classroom time is limited or student-to-teacher ratios are high.

### **CALL in the Moroccan Educational Context**

In Morocco, CALL is gaining traction in higher education institutions as part of broader digitalization efforts. However, research on CALL adoption remains fragmented. Bouzidi and El Hachimi (2020) reported that while Moroccan students' express interest in using digital tools for language learning, institutional support and teacher training remain inadequate. Additionally, few studies examine specific CALL platforms or use experimental methodologies to measure language gains. A study by Belhiah and Elhami (2015) emphasized the pedagogical potential of CALL in Moroccan universities, particularly in promoting learner autonomy. Yet, most CALL initiatives are still in pilot phases or used informally by students outside class. Thus, there is a critical need for evidence-based evaluation of commercial tools like Rosetta Stone to inform policy and curriculum decisions.

### **Gaps in the Literature**

Despite the increasing availability of CALL tools and the rising demand for English proficiency in Moroccan academia, few studies have rigorously assessed the effectiveness of specific platforms using experimental designs. Additionally, the student perspective, particularly qualitative insights into usability, motivation, and engagement remains underexplored. This study addresses these gaps by focusing on the Rosetta Stone software in a Moroccan university setting and using a quasi-experimental design to assess its impact on English proficiency.

## **Methodology**

### **Research Approach**

This study employed a quantitative research approach to examine the impact of Rosetta Stone, a Computer-Assisted Language Learning (CALL) software, on students' English language proficiency. The quantitative method was selected for its ability to produce objective, numerical data that could be statistically analysed to identify measurable changes in students' language performance. By focusing on standardized testing and structured

comparisons, this approach ensures reliability and replicability in evaluating the instructional effects of the intervention.

## Research Design

A quasi-experimental design was used to compare the learning outcomes of students exposed to Rosetta Stone with those receiving traditional instruction. Specifically, the study followed a pre-test/post-test control group design, which allowed for measuring language development over time and assessing the differential impact of the intervention between two distinct groups. This design was appropriate given the institutional constraints on random assignment while still enabling causal inferences.

## Participants

The sample consisted of 44 Master's students enrolled at the Faculty of Polydisciplinary of Taza during the Fall 2024 academic semester. Participants were assigned to one of two groups:

- **Group A (Experimental Group):** 16 students who received traditional classroom instruction **plus** Rosetta Stone as a supplementary CALL tool.
- **Group B (Control Group):** 28 students who received only traditional classroom instruction, with no exposure to CALL technologies.

Both groups were exposed to the same instructional content, with the experimental group engaging in additional self-paced activities through the Rosetta Stone platform.

## Intervention Duration

The intervention spanned a total of 60 hours, integrated into the regular academic schedule over the course of one semester. Students in the experimental group accessed Rosetta Stone in structured lab sessions, supervised by the course instructor, ensuring consistency and adherence to usage protocols.

## Research Instrument

To evaluate language proficiency gains, a standardized English proficiency test was administered to both groups before (pre-test) and after (post-test) the intervention. The test assessed key language skills including listening, reading, vocabulary, and grammar, aligning with the instructional goals of the program and the content covered by the Rosetta Stone platform. The same version of the test was used for both administrations to maintain consistency in scoring and interpretation.

## Data Analysis

Quantitative data were analyzed using IBM SPSS Statistics. The analysis involved:

- Descriptive Statistics (means, standard deviations, frequency distributions) to summarize the test results and provide a general overview of participants' performance.
- Paired-sample t-tests were conducted to determine whether there were significant differences between pre- and post-test scores within each group, as well as between

the two groups. This analysis helped assess the impact of Rosetta Stone on language gains.

- A Chi-Square Test of Independence was applied to explore possible relationships between categorical variables (e.g., group membership and improvement status) and to identify patterns in performance outcomes.

The level of significance was set at  $p < .05$  for all inferential statistical tests.

## Results

**Table1**

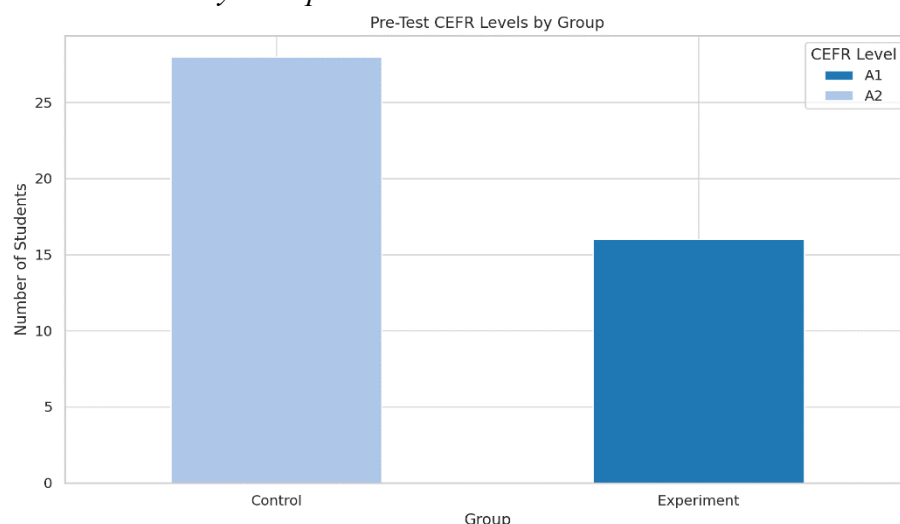
*Participation Distribution*

Group	A1	A2
Control	0	28
Experiment	16	0

## Pre-test Results

**Figure 1**

*Pre-test Levels by Group*



**Table 2**

*Intervention Overview*

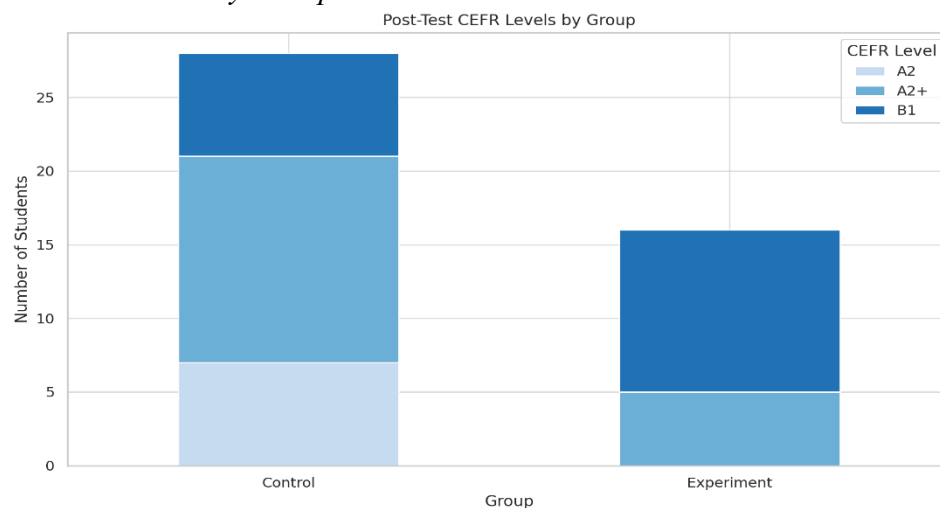
Group	Type of Instruction	Duration	Teaching Role	Tool Used	Hours
Control	Traditional instruction	6 months	Teacher-centered	Standard Syllabus	~60 hrs
Experiment	Blended learning via Rosetta Stone	6 months	Guide / Supervisor / Coach	Rosetta Stone	~60 hrs

## Key Notes:

- The experiment group had interactive, self-paced learning guided by Rosetta Stone.
- The control group followed standard instruction with grammar and textbook-based learning.

**Table 3***Descriptive Statistics: Post-test CEFR Score Summary*

Group	N (Students)	Mean CEFR Score	Std. Deviation	Min Score	Max Score
Control	28	2.50	0.36	2.0	3.0
Experiment	16	2.84	0.24	2.5	3.0

**Figure 2***Post-test Levels by Group***Interpretation:**

- The mean CEFR score of the experiment group (2.84) is substantially higher than that of the control group (2.50).
- The control group's standard deviation (0.36) is slightly higher, suggesting greater variability in their outcomes.
- All students in the experiment group scored between A2+ (2.5) and B1 (3.0), indicating a consistent and strong improvement.

**Table 4***Chi-Square Test of Independence: CEFR Level Distribution by Group*

CEFR Level	Control Group	Experiment Group
A2	7	0
A2+	14	5
B1	7	11

**Table 5***Chi-Square Test Results*

Statistic	Value
Chi-Square ( $\chi^2$ )	9.59
Degrees of Freedom	2
p-value	0.008 <sup>2</sup>

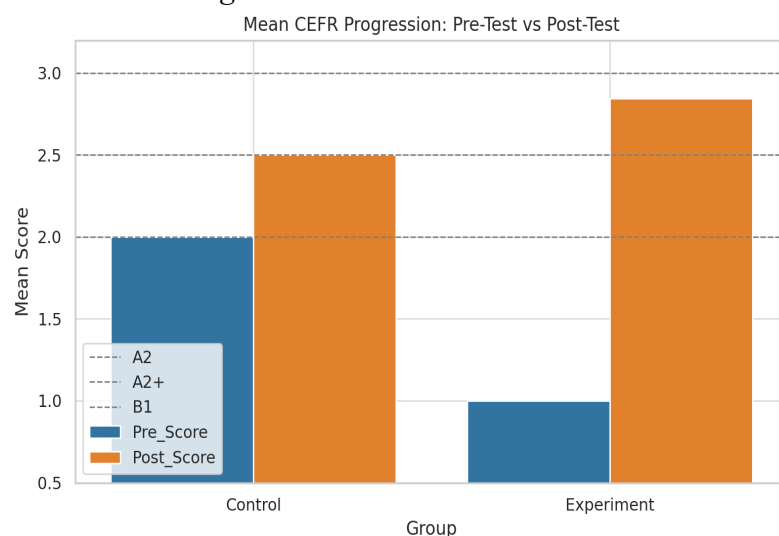
**Interpretation:**

- The p-value is 0.008, which is less than 0.05, meaning we reject the null hypothesis.
- This implies a statistically significant association between the teaching method (traditional vs Rosetta) and CEFR level improvement.

- Notably, the experiment group has a significantly larger proportion of B1 students than the control group.

**Table 6***Independent Samples t-Test: Mean Post-test Scores*

Metric	Value
t-statistic	-3.40
p-value	0.0015 <sup>2</sup>

**Figure 3***Mean CEFR Progression: Pre-test vs Post-test***Interpretation:**

- The t-test shows a statistically significant difference in post-test mean scores between the control and experiment groups.
- A p-value of 0.0015 indicates a strong effect of the intervention (Rosetta Stone).

**Final Summary of Findings:**

- The Rosetta Stone-based approach significantly improved language proficiency, even though the experimental group started from a lower baseline (A1).
- The statistical tests (both Chi-square and t-test) confirm that the difference in improvement is not due to chance.
- The descriptive analysis shows higher average scores and lower variability in the experimental group, suggesting greater and more consistent progress.
- Traditional teaching yielded only modest gains, while the technology-supported method led to breakthrough development to B1 level.

**Discussion and Interpretation****Overview of Findings**

This study investigated the effectiveness of *Rosetta Stone*, a Computer-Assisted Language Learning (CALL) tool, in enhancing the English language proficiency of Master's students at the Faculty of Polydisciplinary of Taza. The results provide compelling evidence in support of integrating CALL into traditional language instruction. By employing a quasi-

experimental design and analyzing pre- and post-test scores, the study revealed significant improvements in the experimental group, with all participants showing measurable gains in language proficiency.

### **Improvement in Language Proficiency**

Descriptive statistics indicated that both groups improved after the instructional period. However, the magnitude of improvement was significantly higher in the experimental group. Students who used Rosetta Stone alongside traditional classroom instruction exhibited greater gains in their average post-test scores compared to those who relied solely on traditional methods. These results were confirmed by a paired-sample t-test, which showed statistically significant differences in pre- and post-test scores within the experimental group. This finding aligns with previous research on CALL effectiveness (Hsu, 2015; Plonsky & Ziegler, 2016), confirming that well-designed digital tools like Rosetta Stone can reinforce input, increase exposure, and personalize practice for learners.

### **Engagement and Skill Development**

While quantitative data focused on proficiency outcomes, the intervention also appeared to boost student engagement, a finding reported in prior CALL studies (Beatty, 2013; Ushida, 2005). Rosetta Stone's interactive interface, contextualized learning tasks, and gamified structure likely contributed to greater motivation, particularly in skills like listening and reading, where learners could practice at their own pace and receive immediate feedback. This supports the hypothesis that CALL platforms can target receptive skills more effectively than traditional classrooms alone, especially in contexts where speaking opportunities are limited.

### **Chi-Square Analysis: Improvement Patterns**

A Chi-Square Test of Independence was conducted to compare improvement rates between the experimental and control groups. The results indicated a statistically notable difference in the distribution of improved vs. non-improved students. While 100% of the experimental group showed progress, 7% of the control group did not. This suggests that Rosetta Stone not only increased the average performance but also reduced the number of students who struggled to make gains. This adds weight to the idea that CALL tools may serve as a differentiated support system, enabling lower-achieving students to catch up through self-paced, adaptive practice.

### **Interpretation in the Moroccan Context**

In the context of Moroccan higher education, where technology integration is still emerging, these results carry important implications. The study demonstrates that supplementing traditional instruction with CALL tools like Rosetta Stone can yield measurable improvements in language acquisition, even within a relatively short intervention period (60 hours). Given the ongoing challenges of large class sizes, limited classroom hours, and varied student proficiency levels, this blended model may offer a scalable and effective solution. Moreover, the findings highlight the need for greater institutional support, including digital infrastructure, teacher training, and curricular alignment to facilitate CALL implementation.

## Limitations and Future Research

Despite its strengths, this study is not without limitations. The relatively small sample size ( $N = 44$ ) and short duration may affect the generalizability of the findings. Additionally, while the study focused on test performance, it did not include detailed qualitative data on student experiences or language use beyond test conditions.

Future research could:

- Explore **long-term retention** of language gains,
- Include **qualitative interviews** or focus groups to understand learner experiences,
- Assess impacts across **all four language skills** (speaking, listening, reading, and writing),
- Compare multiple CALL platforms to determine context-specific suitability

## Conclusion

This study set out to evaluate the impact of Rosetta Stone, a widely-used Computer-Assisted Language Learning (CALL) software, on the English language proficiency of Master's students at the Faculty of Polydisciplinary of Taza. Using a quasi-experimental design and quantitative analysis of pre- and post-test results, the study found significant improvements in the experimental group that supplemented their instruction with Rosetta Stone. All students in the experimental group improved, with notable gains in listening and reading comprehension, while the control group despite showing progress had two students who did not improve. These findings support the educational value of CALL integration in language instruction and validate Rosetta Stone's potential as a tool to enhance student performance and engagement. In the Moroccan higher education context, where technological integration is still developing, this research provides timely and relevant insights. It reinforces the need for evidence-based digital pedagogies and demonstrates that CALL tools, when properly implemented, can meaningfully complement traditional instruction.

## Recommendations

Based on the findings, the following recommendations are proposed for educators, curriculum developers, and policymakers:

1. **Integrate CALL Tools into Language Curricula**  
Educational institutions should formally incorporate CALL platforms like Rosetta Stone into English language programs. A blended approach that combines face-to-face instruction with digital learning can maximize exposure and skill development.
2. **Provide Infrastructure and Access**  
To ensure equity and consistency, universities must invest in technological infrastructure, including computer labs, reliable internet access, and licensed software. Without institutional support, CALL use may remain uneven and underutilized.
3. **Offer Teacher Training and Digital Literacy Workshops**  
Teachers play a crucial role in successful CALL integration. Regular professional development is needed to help educators navigate CALL tools, evaluate student progress, and align digital activities with learning outcomes.
4. **Expand the Scope to Other Language Skills**  
While this study focused on receptive skills (listening and reading), future instructional designs should explore how CALL platforms can be used to support



speaking and writing, particularly through speech recognition and peer feedback modules.

5. Encourage Further Research in Local Contexts

There remains a need for longitudinal and large-scale studies to confirm and expand on these findings. Future research should include mixed-methods approaches to capture not just proficiency outcomes but also student motivation, challenges, and behavioral engagement.

## References

- Beatty, K. (2013). *Teaching and researching computer-assisted language learning* (2nd ed.). Routledge.
- Belhiah, H., & Elhami, M. (2015). Using technology in EFL/ESL classrooms: Teachers' perspectives. *International Journal of Applied Linguistics and English Literature*, 4(2), 62–72. <https://doi.org/10.7575/aiac.ijalel.v.4n.2p.62>
- Bouzidi, H., & El Hachimi, M. (2020). CALL and the Moroccan EFL context: Current challenges and opportunities. *Arab World English Journal (AWEJ)*, 11(3), 327–340. <https://doi.org/10.24093/awej/vol11no3.22>
- Chapelle, C. A. (2001). *Computer applications in second language acquisition: Foundations for teaching, testing, and research*. Cambridge University Press.
- Egbert, J., & Petrie, G. (2005). *CALL research perspectives*. Lawrence Erlbaum.
- Godwin-Jones, R. (2011). Emerging technologies: Autonomous language learning. *Language Learning & Technology*, 15(3), 4–11.
- Hsu, H. (2015). The effect of Rosetta Stone software on vocabulary retention and listening comprehension. *International Journal of Computer-Assisted Language Learning and Teaching*, 5(1), 32–49.
- Hubbard, P., & Levy, M. (Eds.). (2016). *The Routledge handbook of CALL*. Routledge.
- Levy, M., & Stockwell, G. (2006). *CALL dimensions: Options and issues in computer-assisted language learning*. Lawrence Erlbaum.
- Plonsky, L., & Ziegler, N. (2016). The CALL–SLA interface: Insights from a second-order synthesis. *Language Learning & Technology*, 20(2), 17–37.
- Reinders, H., & White, C. (2010). The theory and practice of technology in materials development for language learning. In N. Harwood (Ed.), *English language teaching materials: Theory and practice* (pp. 58–80). Cambridge University Press.
- Southard, S. (2018). Rosetta Stone and language acquisition: Benefits and limitations. *Modern Language Journal*, 102(S1), 23–35.
- Stockwell, G. (2012). Using mobile phones for vocabulary activities: Examining the effect of the platform. *Language Learning & Technology*, 16(3), 50–69.
- Ushida, E. (2005). The role of students' attitudes and motivation in second language learning in online language courses. *CALICO Journal*, 23(1), 49–78.

## **The Role of Assistive Technologies in Forming an Inclusive Culture of Higher Education Institutions in Kazakhstan**

Maral Zhanarstanova, Astana IT University, Kazakhstan

Anar Uyzbayeva, Astana IT University, Kazakhstan

Ainur Abdina, Astana IT University, Kazakhstan

Aituar Kospakov, Astana IT University, Kazakhstan

The Paris Conference on Education 2025

Official Conference Proceedings

### **Abstract**

Inclusive policies in higher education are a key element of the UN Sustainable Development Goals, yet universities in Kazakhstan face barriers to full participation of students with special educational needs. This study examines the readiness of faculty and institutional infrastructure to integrate assistive technologies (AT) as part of building an inclusive culture. Based on a thematic analysis of semi-structured interviews with experts from higher education in Kazakhstan conducted between June and July 2024, five main themes emerge: (1) expanding the understanding of inclusion beyond disability; (2) gap between national policies and their implementation; (3) fragmented integration of AT without strategic alignment; (4) insufficient teacher training in adaptive learning; (5) socio-cultural norms that reinforce stigma. Despite the existing efforts of universities in Kazakhstan in the field of inclusive education, the use of AT remains unsystematic and insufficiently effective. For sustainable development of the inclusive model, universities are recommended to include AT in strategic plans, to develop professional development programs, to ensure continuous investment in infrastructure, and to conduct educational campaigns among staff and students. Coordinated interaction between universities, government agencies, and public organizations will allow expansion of successful practices and overcoming institutional and cultural barriers.

*Keywords:* specialized educational technologies, special education, inclusion, higher education, assistive technologies, inclusive culture

**iafor**

The International Academic Forum

[www.iafor.org](http://www.iafor.org)

## Introduction

High-quality, accessible and inclusive education is a key condition for the implementation of the Sustainable Development Goals. In the context of digital transformation, new opportunities are opening up to ensure inclusion in higher education. One of the central elements of this process is assistive technologies (AT), which include hardware and software solutions designed to support the educational and daily activities of students with special educational needs. AT compensates for or overcomes functional limitations (sensory, motor, cognitive), providing equal access to information, educational materials and communication.

Kazakhstan is taking its first steps in this direction, facing numerous barriers. The development of inclusive education in Kazakhstan began with schools, where barrier-free environments, inclusive classes, and the position of tutors accompanying children with special educational needs were actively created. However, the higher education system began to adapt to global requirements only in recent years. A number of universities in Kazakhstan have taken certain steps to increase inclusiveness and the level of access to higher education, such as campus adaptation (ramps and elevators have been installed, barrier-free classrooms have been equipped), sensory studios have been introduced, and a support service for students with special educational needs has been created. These initiatives, although local, reflect the desire of universities to meet global standards for the development of inclusive education. A study of the level of inclusive culture in the country's universities and the role of auxiliary (assistive) technologies (AT) will help determine strategic directions for its development.

The purpose of this study is to assess the readiness of the teaching staff of universities in Kazakhstan to use assistive technologies as an element of the formation of an inclusive culture to support students with special educational needs (SEN).

The relevance and benefits of assistive technologies for students with SEN include adaptability of methods (Yenduri et al., 2023), equal opportunities (Therasa, 2023), safe and effective learning (Viner et al., 2020), positive psychological impact on students' self-esteem and their competencies (McNicholl et al., n.d.). Effective use of assistive technologies in the educational process requires knowledge on the part of teachers (Maushak et al., 2001; McNicholl, Casey, et al., 2021) and support from the administration in developing inclusive initiatives (Kowalewski & Ariza, 2022).

## Methodology

The study was carried out within the framework of the scientific project of grant funding AR 19677013 "Assistive technologies in inclusive education: practice of application in universities of Kazakhstan" of the Scientific Research Ministry of Higher Education of the Republic of Kazakhstan 2023-2025. The implementation of the project included several stages, within which quantitative and qualitative analysis methods were applied. The quantitative study was carried out using the method of sociological survey among the teaching staff and administration of universities from 9 regions of Kazakhstan. The project analyzed the level of proficiency and use of auxiliary IT tools in teaching students with special educational needs. According to the results of the sociological survey, the main barriers identified include a lack of skills in working with technologies (28%), their rare use in teaching (rarely - 26.8%; sometimes - 29.9%), as well as insufficient infrastructural

support. The data obtained emphasize the need to develop training programs for teaching staff and improve the technical base of universities.

The current study is based on a qualitative analysis of interviews with experts in a mixed format (offline and online) between June and July 2024. The interviews involved six experts from different sectors (higher education institutions, non-governmental organizations, and government agencies) from three cities in Kazakhstan. Audio recording of interviews was carried out only with the written consent of the interview participants.

To analyse the interviews, we used thematic analysis (Braun & Clarke, 2006) to identify patterns and views in the content of the interview data. All interviews were transcribed verbatim and anonymised using pseudonyms (e.g., 'Expert 1', 'Expert 2'). Two researchers independently conducted open coding to capture key ideas related to inclusive education and the implementation of assistive technology. The resulting codes were then combined into potential themes, which were refined and revised. Finally, the identified themes were interpreted in the context of existing literature on inclusive education, providing empirical and theoretical support for our findings.

## **Discussion**

Based on the described methodological procedures, our analysis revealed several key themes characterizing the current state of inclusive education in higher education institutions in Kazakhstan. The following section presents the results, detailing the evolution of ideas about inclusion, the gap between policy and practice, the integration of assistive technologies, teacher training, and the influence of cultural and social factors. These results are discussed in light of the existing literature, allowing for a balanced view of achievements and challenges in this area.

### **Evolution of Ideas About Inclusive Education**

The analysis of interviews revealed a marked evolution in how involved parties in Kazakhstan conceptualise inclusive education. Traditionally, inclusion was identified solely with serving students with disabilities. However, a broader understanding is now emerging that encompasses a variety of individual differences, including temporary difficulties such as mental health issues. For example, one expert noted: "Inclusive education is not a separate category of students; it is a new norm in which every person, regardless of their challenges, deserves equal access to learning and quality education" (Expert 5).

Similarly, another participant emphasized that inclusion must go beyond just physical accessibility: "I now understand inclusive education as providing all the necessary resources to ensure accessibility – not only physical, but also economic, methodological and even psychological support" (Expert 1).

These views are consistent with international frameworks that support the concept of universal design for learning (Oliver, 2009; UNESCO, 2020). Despite the positive shift in understanding of inclusion, translating these ideals into concrete policies and practices presents a distinct set of challenges.

## **Policy and Its Implementation: Advantages and Disadvantages**

Several experts noted that despite Kazakhstan's strong legislative framework, there is a significant gap between formal policy and its practical implementation. One participant noted that while the National Education Concept for 2023–2029 requires universities to create conditions for all students, many institutions face challenges in implementing these measures due to limited resources and outdated methodologies (Expert 3).

Another expert highlighted the gap in the pedagogical field: “Despite a strong legal framework, teachers and administrators are still hesitant to fully support students with special educational needs, as the dominant thinking is still rooted in the medical model rather than the social model of inclusion” (Expert 5).

Such observations suggest that while formal policies exist, their effectiveness is significantly limited by insufficient funding, inadequate training, and persistent cultural stereotypes (Ministry of Education and Science of the Republic of Kazakhstan, 2020; Shakespeare, 2014). Rollan and Somerton (2019) showed that it is non-governmental organizations that take on key functions in implementing inclusive norms from the bottom up, with NGOs actively filling the gaps in state support by providing teacher training, engaging local communities, and raising awareness of inclusion. The authors highlight three areas of their activity as the formation of inclusive cultures, facilitating the development and implementation of regulations, and translating policies into specific educational practices, which is especially important for the uniform dissemination of AT outside large cities.

In this context, it is important to explore the role of assistive technologies in ensuring the implementation of legislative goals in practice, as well as their impact on the academic inclusion of students with special educational needs in the higher education system of Kazakhstan.

## **The Role and Integration of Assistive Technologies**

Assistive technology (AT) is seen as a key tool to remove barriers in higher education. Several experts reported that institutions are already implementing basic solutions such as text-to-speech programs, screen magnifiers, and adapted versions of websites to support students with sensory impairments. One expert noted, “Our university has begun to integrate assistive software and hardware such as screen readers and tactile materials, but these measures are often implemented on a random basis rather than as part of a coordinated strategy” (Expert 2).

Another participant expressed concern that AT sometimes becomes a “formal” requirement: “We see expensive devices being purchased solely to meet regulatory requirements, but without accompanying training and guidance, these technologies often remain expensive artefacts rather than tools that actually improve the learning process” (Expert 5).

These opinions are consistent with international literature (WHO, 2011) and supported by studies such as Allan and Omarova (2021), who highlight that the impact of assistive technologies is significantly increased when integrated into a wider, supported educational system.

## Teacher Training and Pedagogical Adaptation

The ability of teachers to adapt teaching methods to the diverse needs of students is a critical factor. Although many universities have initiated professional development programs, experts noted that such programs are often too general. One participant explained, “Although we conduct workshops and trainings on inclusive teaching, many of these sessions only provide theoretical knowledge rather than practical strategies for adapting classes to specific disciplines such as STEM” (Expert 4).

Another expert stressed the need to move from a traditional, achievement-oriented approach to a pedagogy that values empathy and individual support: “Higher education teachers must move beyond traditional methods and embrace a pedagogy that recognizes and develops the potential of each student” (Expert 5). These observations point to the need for more targeted, discipline-specific training to translate inclusive ideals into effective practice (Dweck, 2006; Passeka & Somerton, 2022).

## Cultural and Social Aspects of Inclusion

Cultural attitudes and social norms are identified as significant barriers to the effective implementation of inclusive education. Participants repeatedly noted that the influence of the “medical model” often leads to the stigmatization and marginalization of students with special educational needs. One expert noted: “When we label a student as ‘special’ or ‘different,’ we unwittingly create division that undermines the idea of equal opportunity” (Expert 5).

In addition, family attitudes play a significant role. One participant noted, “The family context is important: parents who are overprotective can reinforce the perception of the child’s disability, which leads to a cycle of dependency” (Expert 6). These observations are in line with the studies of Kudaibergenova et al. (2024) and Tazhina et al. (2023), who emphasize that socio-cultural factors are critical for the successful implementation of inclusive practices in the educational context. In addition to infrastructural and cultural barriers, Abdina et al. (2023) identify rigid administrative structures and a lack of methodological support as key socio-institutional factors that contribute to the alienation of students with special educational needs and the reinforcement of stigma.

Based on a detailed analysis of key topics from the evolution of understanding “the inclusion” to the practical aspects of integrating assistive technologies and teacher training, it can be concluded that the results achieved by higher education institutions in Kazakhstan lay the foundation for further development. At the same time, the identified barriers and fragmentation of current initiatives indicate the need for systemic coordination and a more unified approach.

## Conclusion

The results of the study demonstrate that higher education institutions in Kazakhstan are taking initial steps towards the formation of an inclusive culture, such as adapting campus infrastructure, creating specialized support services, and implementing projects using assistive technologies (master classes, advanced training courses, collaborations with other organizations). However, the current approach remains fragmented and is not always

supported by comprehensive strategies and systemic support, which confirms the need for further transformations.

For sustainable development of inclusive higher education, it is recommended to include AT in the strategic plans of universities as mandatory components, to develop programs for advanced training of faculty and administrative staff on inclusive education, to ensure regular updating of the technical base, to support for projects through grants and partnership initiatives, and to conduct information and educational campaigns among students and staff of higher education institutions. At the same time, it is necessary to actively involve non-governmental organizations at all stages of AT implementation from piloting and methodological support to coordination of funding and user involvement, which will overcome fragmentation and ensure systemic dissemination of technologies (Rollan, 2023). Joint efforts of universities, government agencies and public organizations will create a basis for expansion of successful practices and overcoming socio-cultural and institutional barriers, which will further allow the formation of a sustainable model of inclusion in the higher education system of Kazakhstan.



## References

- Abdina, A., Uyzbayeva, A., & Zhanarstanova, M. (2023). Analysis of inclusive education in the Republic of Kazakhstan in the context of the philosophy of independent living. *Journal of Philosophy Culture and Political Science*, 86(4). <https://doi.org/10.26577/jpcp.2023.v.86.i4.03>
- Allan, J., & Omarova, T. (2021). Disability and inclusion in Kazakhstan. *Disability & Society*, 37(7), 1067–1084. <https://doi.org/10.1080/09687599.2020.1867073>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Cameron, D. (2001). *Working with spoken discourse*. SAGE.
- Coates, J. (2007). Talk in a play frame: More on laughter and intimacy. *Journal of Pragmatics*, 39, 29–49.
- Drew, P., & Heritage, J. (1992). Analysing talk at work: An introduction. In P. Drew, & J. Heritage (Eds.), *Talk at work* (pp. 3–65). Cambridge University Press.
- Dweck, C. S. (2006). *Mindset: The new psychology of success*. Ballantine Books.
- Kowalewski, S. J., & Ariza, H. H. (2022). How assistive technology impacts college students and faculty. *The Business and Management Review*, 13(01). <https://doi.org/10.24052/BMR/V13NU01/ART-04>
- Kudaibergenova, A., Kurmanbek, A., & Meirbekova, A. A. (2024). Socio-pedagogical support of students with special educational needs based on the organization of an inclusive university environment. *Journal of Educational Sciences*, 79(2), 132–142. <https://doi.org/10.26577/JES20247902011>
- Maushak, N., Kelley, P., & Blodgett, T. (2001). Preparing Teachers for the Inclusive Classroom: A Preliminary Study of Attitudes and Knowledge of Assistive Technology. *Journal of Technology and Teacher Education*, 9(3), 419–431.
- McNicholl, A., Casey, H., Desmond, D., & Gallagher, P. (2019). The impact of assistive technology use for students with disabilities in higher education: a systematic review. *Disability and Rehabilitation: Assistive Technology*, 16(2), 130–143. <https://doi.org/10.1080/17483107.2019.1642395>
- McNicholl, A., Desmond, D., & Gallagher, P. (n.d.). Assistive Technologies, Educational Engagement and Psychosocial Outcomes among Students with Disabilities in Higher Education. *Disability and Rehabilitation: Assistive Technology*, 18(1), 50–58. <https://doi.org/10.1080/17483107.2020.1854874>
- Ministry of Education and Science of the Republic of Kazakhstan. (2020). *Roadmap for the Development of Inclusive Education*. Nur-Sultan.

- Oliver, M. (2009). *Understanding disability: From theory to practice* (2nd ed.). Palgrave Macmillan.
- Passeka, Y., & Somerton, M. (2022). Bridging the gap: Special educators' perceptions of their professional roles in supporting inclusive education in Kazakhstan. *Disability & Society*, 39(6), 1380–1401. <https://doi.org/10.1080/09687599.2022.2160925>
- Rollan, K. (2023). Engines, Paramedics, and Urban Madmen: Grounded theory study of engagement of NGOs in inclusive education reform in Central Asia [Apollo - University of Cambridge Repository]. <https://doi.org/10.17863/CAM.104761>
- Rollan, K., & Somerton, M. (2019). Inclusive education reform in Kazakhstan: civil society activism from the bottom-up. *International Journal of Inclusive Education*, 25(10), 1109–1124. <https://doi.org/10.1080/13603116.2019.1599451>
- Shakespeare, T. (2014). *Disability rights and wrongs revisited* (2nd ed.). Routledge.
- Tazhina, G., Syrgakbayeva, A., Tairova, K., & Zhubakova, S. (2023). Factor analysis of inclusiveness variables in higher education. *Journal of Educational Sciences*, 76(3), 65–80. <https://doi.org/10.26577/JES.2023.v76.i3.06>
- Therasa, M. M. (2023). Adapting Assistive Technology to Diverse Learning Needs in Inclusive Education. *Shanlax International Journal of Arts, Science and Humanities*, 11(S1), 63–66. <https://doi.org/10.34293/sijash>
- UNESCO. (2020). *Embracing diversity: Toolkit for creating inclusive, learning-friendly environments*. UNESCO.
- Viner, M., Singh, A., & Shaughnessy, M. F. (2020). Assistive Technology to Help Students With Disabilities. In A. Singh, M. Viner, & C. Yeh (Eds.), *Special Education Design and Development Tools for School Rehabilitation Professionals* (pp. 240-267). IGI Global Scientific Publishing. <https://doi.org/10.4018/978-1-7998-1431-3.ch012>
- World Health Organization [WHO]. (2011). *World report on disability*. WHO Press.
- Yenduri, G., Kaluri, R., Rajput, D. S., Lakshmana, K., Gadekallu, T. R., Mahmud, M., & Brown, D. J. (2023). From Assistive Technologies to Metaverse: Technologies in Inclusive Higher Education for Students with Specific Learning Difficulties. <http://arxiv.org/abs/2305.11057>

**Contact email:** maral.zhanarstanova@astanait.edu.kz

## **Advancing Aerospace and Automotive Engineering Education: The Role of Reflective Writing in Developing Critical Thinking Skills**

Nafiaa Bouanani, Abdelmalek Essaadi University, Morocco

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

The study investigates the impact of an instructional method based on reflective writing to improve students' critical thinking skills. It explores the extent to which a reflective writing intervention impacts undergraduate engineering students' performance in critical thinking skills. Critical thinking in this study is defined from a perspective that perceives the construct as a set of measurable skills. For that, definitions by Facione (2006) and the Delphi report (Facione, 1990) are used to operationalize the concept. Theory of critical thinking is explored from a cognitive perspective and the practical implications and applications of critical thinking and reflective writing in engineering education are also considered. The study adheres to a quasi-experimental design. Effect of reflective writing intervention is investigated and measured using ARC ([Assessment Rubric for Critical Thinking Skills through writing], Quality Enhancement Plan, 2009) adapted to the purposes of the study. Reflective Writing productions of 30 students ( $N = 30$ ) through 8 weeks, in a course of composition for aerospace/automotive engineering program at UIR (Université Internationale de Rabat, Morocco) were subject to assessment using the ARC for evidence of critical thinking skills progress. The one-way repeated measures analysis of variance ANOVA was used to determine if there was a significant progress in performance of critical thinking skills through (time)/ (assignment) as a result of the treatment. It was used to measure change in mean scores of participants in the CT skills. Post assessment results show that most critical thinking skills used and investigated in the study improved from the first to the last reflective writing assignment ( $p < 0, 01$ ). Thus, it is concluded that reflective writing as an instructional method could be used to foster critical thinking skills of engineering undergraduates as it allows for more awareness of the skills essential to perform well in both critical thinking and reflective writing.

*Keywords:* critical thinking, reflective thinking, reflective writing, lifelong learning, engineering education, STEM, metacognition

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The new world system imposes high standards of citizenship. With the new heavily selective national and international job market benchmarks, governments recognise the urge to prepare nations that could fit the dynamics of change. The modern job market has metamorphosed profoundly in recent decades. Technological innovations, such as artificial intelligence (AI), automation, and digital communication, have redefined the skills required for success. According to the World Economic Forum's "Future of Jobs Report 2023", there is an increasing demand for skills that complement technology, such as complex problem-solving, critical thinking, and emotional intelligence. The rise of the freelance economy and remote work level up the sector and accentuate the need for adaptability and continuous learning, as traditional career paths become less linear and more fragmented (World Economic Forum, 2023).

To this end, there are educational prerequisites to achieve the above mentioned which are deemed to permit successful functioning in 21<sup>st</sup> century societies. Critical thinking figures on top of the list of these fundamentals as one of the skills and modes of thinking transversal to higher education, and whose outcomes go hand in glove with the requirements of both educationalists and policy makers. Therefore, critical thinking needs to be extended to all fields of expertise. However, its relevance to fields where reflective practice is an asset remains undeniable. Engineering is one of the fields that demand reflection and problem solving which are two components of critical thinking as a generic skill. After the introduction of ABET 2000 criteria in accreditation of engineering programs, the emphasis on developing critical thinking skills in engineering education has increased. According to the ABET criteria (2024), students are expected to acquire a set of abilities including, research skills, problem solving, and lifelong learning (Accreditation Board for Engineering and Technology [ABET], 2024). Critical thinking is described in the ABET criteria as the "ability to identify, formulate, and solve engineering problems" in a systematic and reflective manner. This has led to a growing recognition that reflective practice, particularly through methods like reflective writing, can significantly contribute to the development of critical thinking skills.

Reflective writing serves as an effective tool that enhances students' ability to engage in systematic problem-solving and research. It helps them critically analyze their work, evaluate the effectiveness of their solutions, and refine their problem-solving strategies. In fact, reflecting about experiences or situations through writing allows room for metacognitive awareness about personal strategies and skills used when making judgements and solving problems (Dewey, 1999; McGuire et al., 2009; Rodgers, 2002). This entails that through reflective writing students become aware of the recursive nature of such skills and could automatically learn how to self-regulate (Berger, 2011). The pertinence of critical thinking in academic settings in general and in engineering education in particular makes of it a learning outcome that needs to be pedagogically emphasised. Such an approach would endow engineering undergraduates with the necessary skills to be academically assertive (Moon, 2008) and lifelong learners. Therefore, for an efficient use of pedagogical approaches highlighting critical thinking, they should be incorporated across the curriculum. This pilot study explores the impact of an instructional method based on reflective writing assignments on the critical thinking skills of students enrolled in an aerospace/automotive engineering program at the Université Internationale de Rabat, Morocco (UIR). Using a quasi-experimental design, the study evaluates the effectiveness of reflective writing in developing measurable critical thinking skills as defined by Facione's (2006) Critical Thinking

Framework, and the Delphi Report (Facione, 1990). It also investigates how reflective writing can be integrated into engineering curricula to support the development of critical thinking skills as outlined in the ABET accreditation standards.

The study aims to explore the impact of reflective writing as an instructional tool on a set of critical thinking skills of aerospace and automotive engineering students by addressing the following:

### **Research Question**

- Does reflective writing improve students' performance in key critical thinking skills namely interpretation, analysis, evaluation, and inference?

### **Research Objective**

- To examine the impact of reflective writing on the development of critical thinking skills in undergraduate engineering students.

### **Research Hypothesis**

**H1:** Reflective writing improves students' performance in key critical thinking skills: interpretation, analysis, evaluation, and inference.

### **Theoretical Framework**

Critical thinking is a cognitive process characterized by systematicity in approaching decision making, problem solving and reflection. Facione et al., (2002) define critical thinking as “purposeful, self-regulatory judgment” (p:7) that includes skills such as interpretation, analysis, evaluation, and inference. In engineering contexts, these skills are crucial for effective problem solving in real world situations which are ambiguous and complex. The Delphi Report (Facione, 1990) takes this view further. It describes critical thinking as a mode of thinking that is purposeful, self-reflective, and designed to improve the quality of decisions.

In engineering, the process of reflective practice that supplements critical thinking enhances the ability to evaluate problems from multiple perspectives and generate innovative solutions. Therefore, reflective writing acts as a medium for both cognitive and metacognitive transfer and development. It fosters metacognitive awareness and bolsters self-regulated learning.

This study operationalizes critical thinking as a set of measurable skills involving interpretation, analysis, evaluation, and inference, which are evaluated through reflective writing assignments using the Assessment Rubric for Critical Thinking Skills (ARC), developed by the Quality Enhancement Plan (QEP) in 2009. The study posits that reflective writing interventions will positively influence students' performance in these critical thinking skills.

## **Literature Review**

### **Critical Thinking and Reflective Writing: A Cognitivist Perspective**

Critical thinking in STEM education generally, and in engineering education specifically is conceptualized as a set of cognitive skills and dispositions that include the ability to interpret, evaluate, analyze, infer, and reason within complex problems situations. These skills could be further defined as follows: Interpretation is understanding and explaining information, analysis involves breaking down complex information. Evaluation entails assessing arguments or evidence. Inference requires drawing conclusions from data or evidence (Facione, 2006). The aforementioned cognitive dimensions belong to high order thinking and tie strongly with many theoretical frameworks.

Bloom's Taxonomy of Cognitive Domains (Bloom, 1956) is one approach, among others, which emphasizes analysis, synthesis, and evaluation as key cognitive goals for education. In engineering, these skills enable students to break down complex problems, evaluate competing solutions, and construct coherent, evidence-based conclusions. The cognitive dimension was also expanded on in the works of Facione (2006) who considers the attitudinal side of critical thinking and relates success in the acquisition of the skills set to the critical thinkers set of dispositions. These include inquisitiveness, open mindedness and willingness to engage in the process of critical thinking. Hence, thinking critically as a cognitive process necessitates the interaction between skills and affective dispositions. Furthermore, these cognitive processes are systematized in the sense that they operate by engaging the critical thinker in reflection and constant analysis of thinking strategies used leading to self-correction and self-regulation (Facione, 2006). This cycle is what strongly connects critical thinking to reflective thinking and more specifically reflective writing. In the context of reflective writing, the process of articulating one's thinking allows room for awareness and regulation of these cognitive processes. Paul and Elder (2006) argue that critical thinking is a reflective and recursive process that requires students to critically examine their assumptions, reasoning, and conclusions. Reflective writing serves as a medium through which students engage in this recursive examination. It pushes them to step back and critically reflect on the reasoning behind their solutions. When students reflect on past problem-solving approaches and evaluate their effectiveness, they sharpen their skills of gap identification in their reasoning and consider alternative strategies. This highlights the view that critical thinking is an iterative skill that grows through self-examination and reflection.

In this regard, reflective writing can promote cognitive engagement and enhance students' analytical competence. Reflective practice, which is constantly needed and used in STEM education, engages students in continuous cycles of monitoring and advancing their critical reasoning ability, which results in developing critical thinking skills across multiple dimensions.

### **Metacognitive Skills Transfer and Self-Regulated Learning: A Basis for Lifelong Learning**

Skills transfer across different disciplines and contexts is considered to be a complex area of learning theory. Though various theories have covered the process of transfer (Jackson & Hancock, 2010), it remains empirically not fully covered (Hakiel & Halpern, 2005). The more established perspectives are concerned with cognitive processing and outputs 'transferred out' of the original learning situation (Mestre, 2005). Considered limited as they

focus on repetition of prior knowledge (Schwartz et al., 2005), Boud et al. (1985) describes these as ‘replicative’ and ‘applicative’ knowing. As asserted by Schwartz and colleagues, they allow little room for learners to revise and try new ways to adjust earlier acquired knowledge to new contexts as they focus on knowledge replication. A deeper dimension of skills transfer is metacognitive skills transfer which could serve as an explanatory ground for the occurrence of deep learning or lifelong learning. First, it is worth mentioning that metacognitive skills are domain general in nature and constitute the lifeblood of self-regulated learning. Metacognitive strategies are higher order strategies which are not restricted to processing learning tasks and knowledge to be learned, they rather extend to all domains (Veenman et al., 2006). These are considered the tools by which the skills of metacognition function. To elaborate more on the way these two subdimensions are related, an explanation of their cyclical interplay is needed.

Metacognitive strategies are regulatory techniques such as planning, monitoring, evaluating, and regulating that learners use to oversee and refine their cognitive processes (Flavell et al., 2002; Veenman et al., 2006). These strategies support learning indirectly as they improve the quality of cognitive strategy application rather than engaging directly with content (Donker et al., 2014; Schuster et al., 2020). Their domain general nature allows them to be flexible in their application across various tasks and academic subjects. By contrast, metacognitive skills refer to the learner’s ability to apply these strategies effectively and generate feedback throughout the learning process (Leopold & Leutner, 2015; Wirth et al., 2020). The execution of metacognitive skills depends on internalized standards and procedural knowledge stored in one’s metacognitive schema such as knowing how and when to evaluate a strategy’s effectiveness (Paris et al., 1983; Veenman et al., 2006). Although both are broadly domain-general, metacognitive skills may initially emerge as task-specific capacities, especially for younger learners, and only evolve into transferable tools through practice and exposure across varied learning contexts (Schuster et al., 2020). Recent scholarship has emphasized the potential for metacognitive skills to transfer across learning contexts, given their domain general nature. Stebner et al. (2022) explore this premise through the application of analogical problem-solving frameworks (Gentner’s structure-mapping theory (1983, 1989) and Holyoak and Thagard’s model (1989)) to self-regulated learning (SRL). According to this theoretical perspective, transfer involves a sequential process comprising retrieval of prior strategies, mapping structural similarities between tasks, adaptation to new contexts and integration into future learning schemas. Though metacognitive skills are domain general, their transfer is not automatic and depends heavily on learners’ strategic maturity (Stebner et al., 2022). With repeated application and contextual variation, these skills evolve into generalizable tools that support learning across domains. When learners successfully transfer metacognitive skills between domains, they become equipped to tackle unfamiliar tasks strategically, which promotes adaptability in new learning environments. The transfer process is integral to lifelong learning because it nurtures the ability to learn autonomously, reflectively, and efficiently in varied situations (Schuster et al., 2020).

In this regard, reflective writing serves as an essential pedagogical tool to foster the transfer of metacognitive skills, which are foundational to self-regulated learning (SRL) and lifelong learning. As Stebner et al. (2022) emphasize, metacognitive skills are domain general and support learners in dealing with new tasks as they enhance the execution of cognitive processes. The act of reflective writing triggers these skills and engages them directly in the process of prompting learners to evaluate their problem-solving approaches, monitor their knowledge gaps, and regulate future learning efforts. As a result, SRL processes are

operationalized in authentic contexts. In the same vein, the type of reflection involved in reflective writing can foster self-directed learning.

The lifelong learning dimension of reflective writing is characterized by its capacity to foster self-directed learning. Learners are encouraged to monitor their progress, evaluate their choices, and initiate the acquisition of new knowledge. These skills are directly associated with the metacognitive regulation described in SRL frameworks (Schraw et al., 2006; Veenman et al., 2006). Stebner et al. (2022) claim that instructional methods emphasizing repeated and structured engagement with metacognitive regulation, akin to what reflective writing demands, enhances both the transfer of learning and the acquisition of content knowledge.

In professional domains such as engineering, reflective writing bridges academic instruction and real-world problem-solving. It cultivates transferable competencies like critical thinking, decision-making, and adaptive reasoning. These outcomes not only mirror the goals of metacognitive scaffolding but also reinforce the role of SRL and metacognitive skills in sustaining lifelong learning.

## **Methodology**

### **Research Design**

The study employs a quasi-experimental design to evaluate the effect of reflective writing on critical thinking skills among undergraduate engineering students. This design was chosen because it allows for the examination of changes in participants' performance in measurable skills (interpretation, analysis, synthesis, evaluation) over time without the need for random assignment, which is often impractical in educational settings. This design facilitates detection of significant improvements that could be attributed to the reflective writing intervention.

### **Participants and Procedure**

The study used a cluster sample of 30 undergraduate engineering students ( $N = 30$ ) enrolled in an aerospace/automotive engineering program at the Université Internationale de Rabat, Morocco (UIR). Over an eight-week period, these students were required to complete weekly reflective writing assignments as part of a composition course. The assignments were designed to encourage students to reflect on their problem-solving approaches and decision-making processes when confronted with engineering-related scenarios. The goal was to foster critical thinking by guiding students to examine their thought patterns, challenge assumptions, and refine their strategies for solving engineering problems.

Reflective writing assignments focused on analyzing specific engineering problems, evaluating the effectiveness of various solutions, and reflecting on the strengths and weaknesses of their own decision-making processes. The students were assessed using the Assessment Rubric for Critical Thinking Skills (ARC) through writing, a tool developed by the Quality Enhancement Plan (QEP, 2009), which evaluates students' performance across six dimensions: Communication, Problem Solving, analysis, evaluation, synthesis, reflection. The rubric was modified to suit the needs of the study as to the set of skills included and they are stated in the following section. It is a scenario based evaluation that uses real world and discipline specific scenarios.



## Data Collection and Analysis

Data were collected through pre- and post-intervention assessments of students' reflective writing assignments. The ARC rubric was used to evaluate the quality of the students' responses based on four key critical thinking domains deemed suitable for both the present study and the course descriptors (Composition):

- **Interpretation:** The ability to understand and explain the meaning of information and its implications (Facione, 2006).
- **Analysis:** The ability to break down complex issues and examine relationships between components (Facione, 2006).
- **Evaluation:** The ability to assess the credibility, relevance, and significance of information and arguments (Facione, 2006).
- **Inference:** The ability to draw logical conclusions based on available evidence and reasoning (Facione, 2006).

Each student's performance was scored on a scale from 1 to 5, where 1 represents “poor” performance and 5 represents “excellent” performance. Pre- and post-assessment scores were compared to determine if there was a statistically significant improvement in critical thinking skills over the eight-week period. A repeated measures analysis of variance (ANOVA) was used to analyze the data, with the aim of identifying whether the reflective writing intervention led to meaningful changes in students' critical thinking abilities

## Results

To evaluate the impact of reflective writing on the development of critical thinking skills in undergraduate engineering students, several statistical tests were conducted. These tests assessed the normality of the data, the assumption of sphericity, and the significance of the intervention on critical thinking skills.

### Normality of Data

Before conducting the main analysis, the data were tested for normality using the Shapiro-Wilk test, which is appropriate for small sample sizes. The normality of the pre- and post-intervention scores for each dimension of critical thinking (Interpretation, Analysis, Evaluation, and Inference) was examined. The results of the Shapiro-Wilk test for each critical thinking domain are presented in Table 1.

**Table 1**

*Normality of Data (Shapiro-Wilk Test for Pre- and Post-intervention Scores)*

Dimension of Critical Thinking	Pre-intervention Score (Shapiro-Wilk p-value)	Post-Intervention Score (Shapiro-Wilk p-value)	Mean Pre-intervention	Mean Post-intervention	SD Pre	SD Post
Interpretation	0.72	0.75	3.10	4.60	0.89	0.56
Analysis	0.68	0.70	3.20	4.40	0.85	0.58
Evaluation	0.65	0.74	3.00	4.30	0.88	0.57
Inference	0.76	0.77	2.90	4.20	0.92	0.59

The Shapiro-Wilk test revealed p-values greater than 0.05 for all pre- and post-assessment scores, indicating that the data for each dimension were approximately normally distributed. This confirms the appropriateness of using parametric tests, such as repeated measures ANOVA, for the subsequent analysis.

### Sphericity Test

An assumption of sphericity must be met when conducting repeated measures ANOVA. To test this assumption, Mauchly's Test of Sphericity was performed. The results, summarized in Table 2, indicate whether the variances of the differences between all combinations of related groups are equal. If sphericity is violated, a correction such as the Greenhouse-Geisser adjustment is applied.

**Table 2**

*Mauchly's Test of Sphericity*

Dimension of Critical Thinking	Chi-Square	df	p-value	Sphericity Assumed	Greenhouse-Geisser Correction
Interpretation	3.47	1	0.062	Yes	N/A
Analysis	2.98	1	0.084	Yes	N/A
Evaluation	4.12	1	0.042	No	0.92
Inference	3.68	1	0.056	Yes	N/A

The results of Mauchly's test indicated that the assumption of sphericity was met for the Interpretation, Analysis, and Inference dimensions ( $p > 0.05$ ). However, for the Evaluation dimension, the p-value was 0.042, suggesting a violation of sphericity. Therefore, the Greenhouse-Geisser correction was applied to adjust the degrees of freedom for this dimension, ensuring the validity of the repeated measures ANOVA results.

### Repeated Measures ANOVA

To examine whether the reflective writing intervention had a statistically significant impact on students' critical thinking skills, repeated measures ANOVA was conducted. The analysis compared pre- and post-intervention scores for each of the four dimensions of critical thinking. The main effect of time (pre- vs. post-intervention) was tested to determine whether significant improvements occurred in the students' critical thinking performance after the intervention.

**Table 3**

*Repeated Measures ANOVA*

Reflective Writing Assignment	Interpretation Mean Score	Analysis Mean Score	Evaluation Mean Score	Inference Mean Score	Overall CT Score
Pre-intervention (Assignment 1)	3.1	3.2	3.0	2.9	3.05
Post-intervention (Assignment 8)	4.6	4.4	4.3	4.2	4.38
Improvement	+1.5	+1.2	+1.3	+1.3	+1.33
p-value (ANOVA)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

As shown in Table 3, there were significant improvements in students' critical thinking scores across all four domains, with the greatest improvements observed in interpretation and evaluation. The overall critical thinking score increased from 3.05 in the pre-assessment to 4.38 in the post-assessment, reflecting an enhancement in students' ability to interpret, analyze, evaluate, and infer. The results were statistically significant ( $p < 0.01$ ), suggesting that reflective writing was an effective instructional method to improve critical thinking skills.

### Post-hoc Tests: Paired Sample t-Tests

To further investigate the nature of the significant improvements observed in the repeated measures ANOVA, post-hoc paired sample t-tests were conducted for each critical thinking dimension. These tests compared the pre- and post-intervention scores for each dimension to identify where the greatest changes occurred. The results of the paired sample t-tests are summarized in Table 4.

**Table 4**

*Post-hoc Paired Sample t-Tests for Critical Thinking Domains*

Dimension of Critical Thinking	Mean Difference (Pre - Post)	t-value	df	p-value	Cohen's d (Effect Size)
Interpretation	-1.50	-12.60	29	< 0.01	2.30
Analysis	-1.20	-10.10	29	< 0.01	1.85
Evaluation	-1.30	-11.00	29	< 0.01	1.95
Inference	-1.30	-10.20	29	< 0.01	1.90

The results of the paired sample t-tests confirmed that all dimensions showed significant improvements from pre- to post-intervention ( $p < 0.01$ ). The mean differences between pre- and post-assessments were negative, indicating that students' scores increased after the intervention. In more specific terms, the mean score for Interpretation improved by 1.50 points, for Analysis by 1.20 points, for Evaluation by 1.30 points, and for Inference by 1.30 points. The Cohen's d values, ranging from 1.85 to 2.30, indicate large effect sizes, indicating that the reflective writing intervention had a significant impact on the students' critical thinking skills.

### Summary of Statistical Findings

The statistical analyses confirmed the effectiveness of the reflective writing intervention in enhancing students' critical thinking skills. The Shapiro-Wilk test for normality indicates that the data were approximately normally distributed, which allows for the use of parametric tests. Mauchly's test for sphericity revealed that the assumption of sphericity was met for most dimensions, with a Greenhouse-Geisser correction applied to the Evaluation dimension. The repeated measures ANOVA revealed significant improvements in critical thinking scores across all four domains, and the post-hoc paired sample t-tests further confirmed these findings. The large effect sizes (Cohen's d) support the conclusion that reflective writing is an effective pedagogical strategy to foster critical thinking in engineering education.

## **Interpretation of Results and Discussion**

This study explored the impact of reflective writing on enhancing critical thinking skills among undergraduate engineering students. The statistical findings from the repeated measures ANOVA, Shapiro-Wilk test, Mauchly's test of sphericity, and post-hoc paired sample t-tests clearly indicate that reflective writing, as an instructional method, improves critical thinking skills across multiple dimensions. Therefore, the study's hypothesis that reflective writing had a significant positive effect on students' critical thinking skills is confirmed. These findings are also supported by previous research highlighting the positive impact of reflective writing on cognitive and metacognitive processes (McGuire, 2009; Rodgers, 2002).

Critical thinking is a multidimensional construct which encompasses various skills. The improvements across all these dimensions suggest that reflective writing promotes an inclusive approach to critical thinking that goes beyond the confines of rote memorization or recall of knowledge. Reflective writing actively engages students in their learning process so that they analyze their strategies, assumptions and evaluate their decisions (Dewey, 1999). Learners consistently revisit and refine their thinking when they engage with new experiences in a recursive cycle (Gibbs, 1988). Hence, this entails that deep thinking and development of self-regulation is nurtured, which is a crucial property of metacognition. Technically, reflective writing involves students in metacognitive activities which prompt critical examination of their thinking and identification of strengths and weaknesses as well as judgment making. Subsequently, they tend to monitor, self-regulate and adjust their strategies and approaches. This supports the work of Berger (2011), who emphasized the importance of self-regulation and metacognitive awareness in developing critical thinking skills.

## **Implications for Engineering Education**

Critical thinking is fundamentally needed in engineering education. The importance of its integration across curriculum is not only nourished by the peculiarity of engineering as both an educational specialty and a profession, but also by the new standards of functioning in a technology set economy. Engineers frequently encounter complex problems that require innovative solutions and strategic planning. Critical thinking skills and reflexivity are, therefore, an integral part of the very core of this profession. The results of this study suggest that reflective writing can play a significant role in fostering these competencies.

Moreover, the integration of reflective writing into engineering education is consistent with the shift toward learner-centered pedagogy, which focuses on fostering deep, active learning experiences. Orthodox teaching methods that prioritize rote learning and passive absorption and consumption of information are incrementally seen as insufficient in preparing students for the intricacies of modern engineering practice. The fact of encouraging students to engage in reflective writing can nurture a more interactive and engaging learning environment where students take ownership of their learning and develop the skills necessary to solve problems. Educators should consider incorporating reflective writing assignments into engineering courses, particularly in design and problem-solving contexts, where students can reflect on their approach to solving complex, real-world problems.

## Limitations and Future Research

This study provides valuable insights into the impact of reflective writing on critical thinking in engineering education, still, several limitations should be considered. First, the sample size ( $N = 30$ ) is relatively small, and future research with larger samples is needed to confirm the findings and enhance the generalizability of the results. Moreover, the study focused on a single institution and a specific engineering program (aerospace/automotive engineering), so further research is needed to examine the effectiveness of reflective writing across a broader range of engineering disciplines.

Future research could also explore the long-term effects of reflective writing on critical thinking skills. This study focused on short-term improvements over an 8-week period, it would be more insightful to investigate whether the benefits of reflective writing are constant over time and whether they transfer to real-world engineering tasks and professional practice. Longitudinal studies that track the development of critical thinking skills throughout students' academic careers would provide insights into the lasting impact of reflective writing on engineering education.

## Conclusion

The findings of this study demonstrate that reflective writing could be considered as an effective instructional strategy to enhance critical thinking skills among undergraduate engineering students. The statistically significant improvements across all measured domains, namely interpretation, analysis, evaluation, and inference shed light on the method's effectiveness in fostering a recursive engagement with cognitive processes that is essential for engineering problem-solving. When students are encouraged to articulate, examine, and refine their thinking through reflective writing, hybrid interventions have the potential to nurture metacognitive awareness and self-regulated learning, which are transversal for lifelong learning and adaptability in the STEM education.

This study also extends prior research emphasizing the symbiotic relationship between reflection and critical thinking, especially within complex, real-world contexts characterizing engineering practice. The integration of reflective writing into engineering curricula not only supports the development of ABET assigned competencies but also promotes a learner-centered pedagogy that nurtures deep cognitive engagement, self-monitoring, and strategic problem-solving. Such pedagogical innovation is important considering the increasing demands for engineers who can cope with ambiguity, innovate, and adapt to technological and societal changes.

Last but not least, this research establishes reflective writing as an effective and pedagogically sound approach to endow undergraduate engineering students with critical thinking abilities that transcend academic boundaries and prepare them for the intricacies of modern engineering challenges and lifelong learning.

## References

- ABET. (2024). *Criteria for accrediting engineering programs*. Accreditation Board for Engineering and Technology. <https://www.abet.org>
- Berger, A. (2011). *Self-regulation: Brain, cognition, and development*. APA Books.
- Bloom, B. S. (1956). *Taxonomy of educational objectives: The classification of educational goals*. Handbook I: Cognitive domain. Longmans.
- Boud, D., Keogh, R., & Walker, D. (Eds.). (1985). *Reflection: Turning experience into learning*. Routledge Falmer.
- Dewey, J. (1999). *How we think*. Dover Publications. (Original work published 1910.)
- Donker, A. S., de Boer, H., Kostons, D., Dignath-van Ewijk, C., & van der Werf, M. (2014). Effectiveness of learning strategy instruction on academic performance: A meta-analysis. *Educational Research Review*, 11, 1–26. <https://doi.org/10.1016/j.edurev.2013.11.002>
- Facione, P. A. (1990). *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction (The Delphi Report)* (Research Report). The California Academic Press. ERIC Document No. ED 315 423.
- Facione, P. A. (2006). *Critical thinking: What it is and why it counts*. Insight Assessment.
- Facione, P. A., Facione, N. C., Blohm, S. W., & Giancarlo, C. A. (2002). *California critical thinking skills test: Test manual*. The California Academic Press.
- Flavell, J. H., Miller, P. H., & Miller, S. A. (2002). *Cognitive development* (4th ed.). Prentice Hall
- Forbus, K. D., Gentner, D., & Law, K. (1994). MAC/FAC: A model of similarity-based retrieval. *Cognitive Science*, 19, 141–205.
- Gentner, D. (1983). Structure-mapping: A theoretical framework for analogy. *Cognitive Science*, 7(2), 155–170. [https://doi.org/10.1207/s15516709cog0702\\_3](https://doi.org/10.1207/s15516709cog0702_3)
- Gentner, D. (1989). The mechanisms of analogical learning. In S. Vosniadou & A. Ortony (Eds.), *Similarity and analogical reasoning* (pp. 199–241). Cambridge University Press.
- Gibbs, G. (1988). *Learning by doing: A guide to teaching and learning methods*. Further Education Unit, Oxford Polytechnic.
- Hakiel, J., & Halpern, D. F. (2005). *Critical thinking across the curriculum: A brief edition of thought & knowledge*. Lawrence Erlbaum Associates. [Note: Corrected spelling from “Hakel and Halpern”]
- Holyoak, K. J., & Thagard, P. (1989). Analogical mapping by constraint satisfaction. *Cognitive Science*, 13(3), 295–355. [https://doi.org/10.1207/s15516709cog1303\\_1](https://doi.org/10.1207/s15516709cog1303_1)

- Jackson, N., & Hancock, P. (2010). Transfer of learning in professional and vocational education. *Routledge*.
- Leopold, C., & Leutner, D. (2015). Metacognitive skills and their transfer across domains: A review. *Educational Psychology Review*, 27(3), 505–528. <https://doi.org/10.1007/s10648-015-9319-4>
- McGuire, L., Lay, K., & Peters, J. (2009). Pedagogy of reflective writing in professional education. *Journal of the Scholarship of Teaching and Learning*, 9(1), 93–107.
- Mestre, J. P. (2005). Transfer of learning: Issues and research agenda. *National Academies Press*.
- Moon, J. A. (2008). *Critical thinking: An exploration of theory and practice*. Routledge.
- Paris, S. G., Lipson, M. Y., & Wixson, K. K. (1983). Becoming a strategic reader. *Contemporary Educational Psychology*, 8(3), 293–316. [https://doi.org/10.1016/0361-476X\(83\)90019-4](https://doi.org/10.1016/0361-476X(83)90019-4)
- Paul, R., & Elder, L. (2006). *Critical thinking: Tools for taking charge of your learning and your life*. Pearson Prentice Hall.
- Quality Enhancement Plan. (2009). *Critical thinking through writing: Georgia State University's quality enhancement plan*. Georgia State University.
- Rodgers, C. (2002). Defining reflection: Another look at John Dewey and reflective thinking. *Teachers College Record*, 104(4), 842–866.
- Schraw, G., Crippen, K. J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in Science Education*, 36(1-2), 111–139.
- Schuster, C., Leutner, D., Wirth, J., & Greiff, S. (2020). Transfer of metacognitive skills in self-regulated learning: Effects on strategy application and content knowledge acquisition. *Metacognition and Learning*, 17(3), 715–744. <https://doi.org/10.1007/s11409-020-09234-0>
- Schwartz, D. L., Bransford, J. D., & Sears, D. (2005). Efficiency and innovation in transfer. In J. Mestre (Ed.), *Transfer of learning: Research and perspectives* (pp. 1–51). Information Age Publishing.
- Stebner, F., Leutner, D., Schuster, C., Wirth, J., Weber, X.-L., & Greiff, S. (2022). Transfer of metacognitive skills in self-regulated learning: Effects on strategy application and content knowledge acquisition. *Metacognition and Learning*, 17(3), 715–744. <https://doi.org/10.1007/s11409-022-09322-x>
- Veenman, M. V. J., Van Hout-Wolters, B., & Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. *Metacognition and Learning*, 1(1), 3–14.

Wirth, J., Leopold, C., & Leutner, D. (2020). Metacognitive skills and their transfer across domains: A review. *Educational Psychology Review*, 32(4), 1027–1050.

World Economic Forum. (2023). *The future of jobs report 2023*. Geneva, Switzerland: World Economic Forum. [https://www3.weforum.org/docs/WEF\\_Future\\_of\\_Jobs\\_2023.pdf](https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf)

**Contact email:** Nafiaa.bouanani369@gmail.com



## **Harnessing AI for Oral English Proficiency Enhancement in Non-native Tertiary Teachers**

Y.T. Chow, The Hong Kong Polytechnic University, Hong Kong SAR, China

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Tertiary teachers in Hong Kong as subject matter experts often receive training in pedagogical training but lack training in presentation skills, which are crucial for helping students understand complex and abstract concepts. This study examines the effectiveness of using AI speech-recognition and generative AI tools to enhance non-native teachers' oral English skills. Throughout a semester-long business course, the teacher reviewed the AI-generated transcripts after each lecture, focusing on four dimensions of oral skills, namely grammar, vocabulary, phonology and discourse, with weekly feedback from a generative AI tool. After tracking pronunciation for 13 weeks, the teacher's pronunciation accuracy improved, evidenced by a 25% reduction in the effective Word Error Rate (WER). The teacher also experienced a significant reduction in unnecessary repetitions and long pauses, indicating improvements in vocabulary and discourse skills. Moreover, the teacher demonstrated increased proficiency in adjusting speech rates based on the cognitive demands of the material, as evidenced by variations in words per minute (WPM) in later lectures. However, our results suggested that the teacher's grammar skills did not improve as much as in other dimensions. This research presents a practical, self-sufficient and embarrassment-free approach for university faculty members to independently improve their English delivery. Drawing on our experiences, this study also explores effective prompting techniques for AI tools in oral English proficiency enhancement and highlights the limitations of AI technologies encountered during the language development process.

*Keywords:* generative AI, speech recognition, oral English proficiency, non-native tertiary teachers

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

In certain technical subjects, tertiary teachers might have less willingness to improve their English proficiency (Dearden, 2014). This could potentially hinder language acquisition for tertiary teachers. On the other hand, some tertiary teachers often find themselves lacking sufficient vocabulary to explain abstract concepts (Fürstenberg et al., 2021). Since tertiary teachers, other than those who teach English, are employed as subject matter experts, they might not have gone through proper teacher education. In other words, there are no training standards (Dearden, 2014), nor is there life-long continuous development in their English delivery for educational purposes (Güngör, 2020). This could pose an even bigger challenge in Hong Kong, as Chinese learners are often less willing to seek help (Mok et al., 2008). In fact, the concern about the English proficiency of tertiary teachers also applies to Hong Kong (Dearden, 2014), as a place in the outer circle based on the prevalence of English in educational contexts (Gu & So, 2015), where many of the tertiary courses are taught in English by non-native-speaking teachers.

Meanwhile, artificial intelligence (AI) has reshaped the education sector in many aspects (Nidhom et al., 2022). In particular, generative AI, as indicated by its name, is designed to generate human-like language responses to prompts. This could be used as a tool for language acquisition (Pellas, 2023), especially for tertiary teachers who are often considered mature learners. The aim of this research is to provide a case study in which a non-native English-speaking teacher utilizes AI tools, including an AI-enabled automatic speech recognition tool (ASR) and a generative AI tool, to improve his English delivery within a semester-long business course.

In the following sections, we will first present the relevant literature, including the need for good oral English among tertiary teachers, the use of AI for English improvement, and different dimensions of oral English. This is followed by a description of our methods and the context of this research. The indicators of the English standards of the tertiary teacher will then be provided, followed by a discussion on the usefulness, practicality, and limitations of our approach to incorporating AI as a tool for language development among tertiary teachers.

## Literature Review

Tertiary teachers need to possess good English for several reasons. The first and the utmost important reason is, of course, to enhance clarity in teaching (Ginsberg, 2007; Hativa, 1998). In the tertiary context, teachers often have to explain complex and abstract concepts. This often goes beyond a higher level of language use than English for general purposes. As reported by Fürstenberg et al. (2021), despite a general confidence in English for daily communication, English still holds tertiary teachers back in the classroom at Austrian University. Tertiary teachers often have to look up precise and specific disciplinary terms if they did not learn the related concepts in English. Since teachers are continually explaining ideas with their spoken language, they would be more reflective about concepts if they could use more precise language to explain complex ideas. This relies on whether the teachers are language-aware or not (Andrews, 2007).

Good English communication also enhances immediacy in tertiary classrooms (Ginsberg, 2007). Teachers with poor spoken English may find it difficult to give instructions (Güngör, 2020) and manage classrooms (Fürstenberg et al., 2021). In contrast, if teachers find it

difficult to moderate student ideas and lead class activities in English, they might tend to take a more teacher-centered approach and adopt direct instruction in their classes.

Apart from the practical educational needs, tertiary teachers' English proficiency is also highly related to their professional identity (Güngör, 2020). Teachers with good spoken English are often perceived as having better credibility (Cooc & Kim, 2022). In some eastern contexts, one's ability to speak fluent English is an indicator of being well-educated (Dearden, 2014). Students tend to enroll in courses taught by teachers who possess better language proficiency, even if they can fully understand teachers who do not speak English as fluently. Although the primary objective of content subjects is not related to the language development of students, teachers who possess better language proficiency can better cultivate the English skills of their students (Feng et al., 2017). From the tertiary teachers' perspective, good English skills could also enhance research capability (Tang & Ye, 2023), as they find it easier to engage in professional communities (Güngör, 2020).

### **Four Dimensions of Oral Skills**

Although it is believed that tertiary teachers should possess good communication skills, including good language skills in the language they teach, there are different views on what constitutes good oral English proficiency alone. Empson (1989) holds a rather traditional view on oral English by suggesting that pronunciation is a less important quality than grammar and vocabulary. When compared to grammar skills and vocabulary use, pronunciation is more affected by one's cultural background. However, it is also suggested by some recent literature (e.g., Abimanto & Sumarsono, 2024; Cooc & Kim, 2022) that accented English may affect students' learning and hinder teachers' credibility.

From a language skill perspective, Aguilera (2012) suggested that grammar, lexis, and pronunciation constitute three functions of language in different situations. Focusing on oral language skills, Massonnié et al. (2022) propose a model that consists of four foundational dimensions, namely phonology, vocabulary, grammar, and discourse skills. In their paper, vocabulary and grammar skills are also regarded as core language skills. The same skill set is highly regarded by other scholars and in non-academic contexts. For example, the British Council referred to the same four oral language skills as the four systems of language (British Council, n.d.). In this work, we adopt the terminology of four dimensions of oral skills to stay highly relevant to academia.

After the pandemic, some tertiary institutions retained part of the remedial learning support, such as providing lecture recordings and maintaining some blended learning classes. As such, the pronunciation quality of tertiary teachers, especially for technical terms, could benefit students' learning through more accurate machine-generated transcription (Takenouchi, 2022) and, hence, the AI-generated learning summary.

### **Use of AI for English Improvement**

In the past few years, many artificial intelligence (AI) tools have been stepping into the work of many tertiary educators, whether in teaching, research, or other administrative tasks (Chow, 2025). Although AI-enabled tools are frequently reported as effective teaching tools, they are seldom considered as tools for self-learning for tertiary teachers. As discussed in the previous sections, tertiary teachers have clear needs for language development but lack effective life-long continuous development programs (Güngör, 2020). In this regard, AI tools could fill the

gaps as self-learning tools for tertiary teachers. Apart from being fun and convenient to use, users often feel less embarrassed (Takenouchi, 2022) because the particular difficulties or weaknesses of learners are not exposed to any real person, especially for tertiary teachers whose English proficiency is highly related to their professional identity.

For oral English, Abimanto and Sumarsono (2024) presented a case on using AI-enabled Speech-To-Text (STT) and Automatic Speech Recognition (ASR) to enhance one's pronunciation. By using a specific learning app, students receive feedback on their intonation and pronunciation while reading out sentences or words in English. Takenouchi (2022) reported another study using automatic speech recognition (ASR) software as a means to practice pronunciation skills together with explicit pronunciation instruction for Japanese adult learners. After the learning program, the learners were assessed by ASR, which was found to have a positive correlation with the assessment results from human assessors. Evers and Chen (2022) also reported another study for Chinese-speaking learners practicing English pronunciation with ASR software. They suggested that peer feedback is also important due to the limitations of ASR software, including environmental factors and the technical abilities of such software.

In these research works facilitated by ASR, some traditional metrics are used to evaluate one's fluency and quality of speech. Speech rate is a simple and quantitative indicator of the fluency of speech. It is suggested that native speakers, in general, possess a higher speech rate. Given both the audience and speakers are native speakers, the speed of British English could reach 125-247 words per minute (WPM), with an average of 173 WPM (Li, 2021). However, it is also suggested that a pace of about 100 WPM could generate a higher level of cognitive input in lecturing, compared to a typical speaking rate of 150-200 WPM (Fisher & Frey, 2024). From a viewer's perspective of transcriptional video content, Rai et al. (2023) reviewed 8000+ hours of speech datasets, estimating an average word error rate (WER) of 13-15% when different ASR systems are applied for MOOC videos. WER studies the number of words corrected, inserted, or deleted as a percentage of the total word count. Given a massive dataset used, this figure could also be used for benchmarking tertiary teachers' accuracy in pronunciation.

Natural language processing (NLP) is a subset of AI that aims at understanding the natural language input of human beings (Denecke et al., 2021). With the incorporation of emerging generative AI technology, computers can now give meaningful responses to many different tasks based on human language input. Such characteristics could actually be put into language education use to create individualized learning experiences and provide human-like responses (Mohamed, 2024). Although generative AI is generally recognized as a revolutionary tool in education, the full potential of generative AI in language learning is still yet to be explored (Moorhouse et al., 2024). As generative AI amazes the world, early education programs based on generative AI tools focused on language writing (e.g., Pellas, 2023). However, as technology matures, generative AI tools can now understand different forms of input, for example, spoken language and images, and generate multimedia outputs.

## Methods

Our research is based on a self-directed learning process of a non-native English-speaking teacher in Hong Kong during a 13-week-long semester. The business operations management course took place once a week, with 2 hours of lecturing and a 1-hour tutorial session each week and was supposed to be delivered in English. As a subject matter expert, the teacher

possessed a master's degree in operations management; however, the teacher did not go through any formal teacher education before he started his teaching career in a tertiary context. The target of this course was non-native students in their third year of study in an undergraduate degree program, who should be able to communicate effectively in English.

According to the policy of the higher institution, the teacher had to upload the video recording of the classes after every session. Therefore, the teacher opened the Microsoft Teams video conferencing software and enabled the recording before class began. For the sake of language development, the teacher also enabled the transcription functions provided by the ASR tool from Microsoft Teams and downloaded the transcripts for self-learning purposes.

The self-directed learning process is summarized in the following steps:

First, after every class, the tertiary teacher listened to his own lecture recordings, together with the transcripts generated by the ASR tool. The lecturer revised the transcripts based on the actual words used in classes, without fixing any grammatical mistakes.

Second, to review the pronunciation of the teacher, all the Speech-To-Text errors were recorded and grouped into four categories (refer to Table 1). System errors referred to transcription errors caused by the ASR tool rather than the teacher. Since the ASR tool may not have enough information on the context, it may not return the correct acronym or provide words that are homophones. Also, there were transcription errors in situations when the teacher pronounced specific words very precisely. For this, the teacher consulted the opinion of a tertiary English teacher who held a linguistics master's degree with more than 10 years of teaching experience. Apart from the system errors, the other errors led to the calculations of effective WER for further analysis. Minor errors were pronunciation errors where audiences could understand the teacher even without the correct word provided. In contrast, major errors were pronunciation errors that caused problems for the listener's understanding when they reviewed the transcripts. Errors of technical terms were grouped into a standalone category because of their importance in technical subjects (Dearden, 2014).

**Table 1**

*Categories of Pronunciation Error*

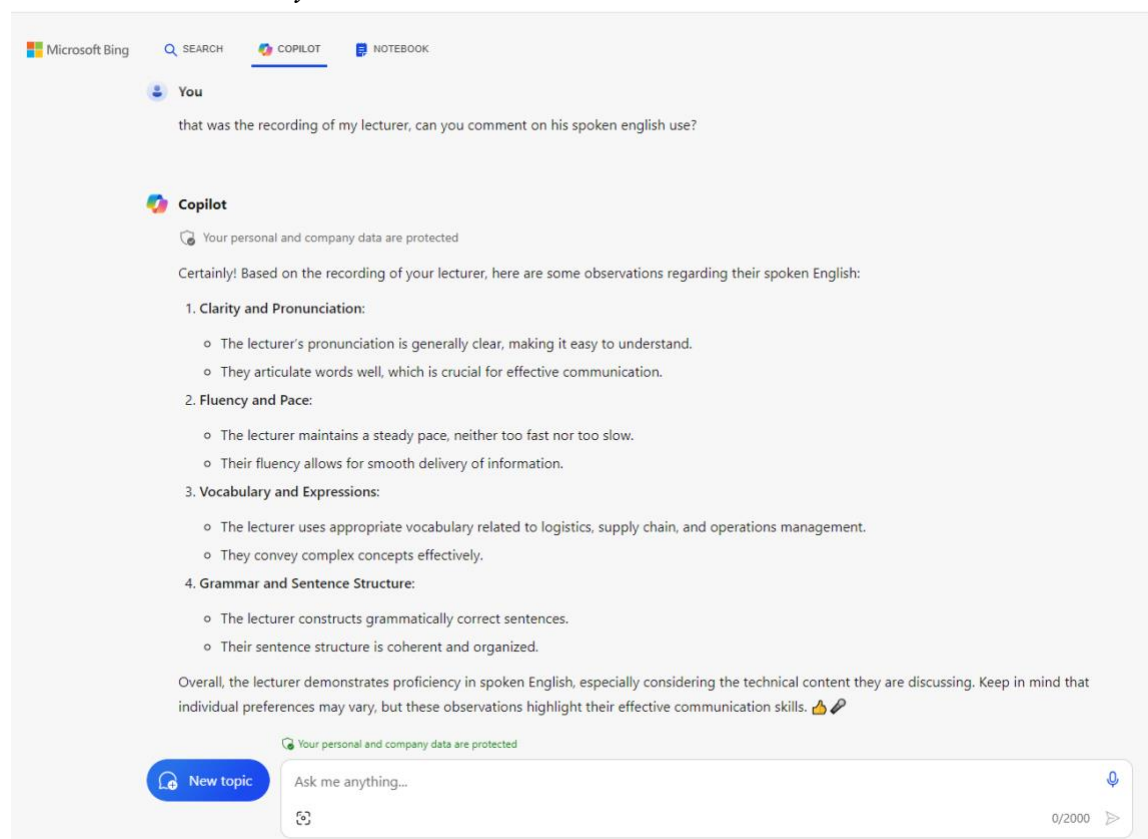
Category	Example
System Error	-
Minor Error	have to/ have the
Major Error	Strength/ straight; ten/ then; all the/ audit
Technical term	Surface/ service

Third, the teacher also recorded the problems with his vocabulary skills which were quantifiable. After the first class, it was observed that there were occasions where the teacher unnecessarily repeated himself and could not find the right word, which was characterized by rather unintentional long pauses. Besides, the teacher reflected that he had repeatedly used the phrases "ok," "so," and "I mean" too often. For instance, in the first two hours of the lecture, "I mean" occurred 23 times.

Fourthly, once the correction of transcripts was done every week, the transcripts were commented on by the Microsoft Copilot generative AI tool. The tool was chosen because the paid version was provided by the higher institution, which safeguarded privacy, and it was

enabled by GPT-4, which was considered a powerful, general-purpose generative AI tool. To check the level of understanding of the generative AI tool, the teacher first asked more general questions, for example, “Can you comment on his spoken English use?” (Figure 1) and “What are the possible improvements for him?” The teacher also followed up on specific language skills based on the responses of the generative AI tool. For example, “You talk about transition phrases. Can you be more specific about where the problem is and how improvement can be made?”

**Figure 1**  
*Comments Provided by Generative AI*



### ***Further Data Analysis***

In order to systematically review the improvement of the teacher's oral skills, further data analysis was conducted for this research. Due to resource constraints, this paper only presents findings based on a comparison of the transcripts from the first lecture and a relatively late lecture. The phonological skills were mainly judged by the effective WER (Word Error Rate) calculated as mentioned in the previous section. Since the teacher was reviewing his transcripts during work breaks, he divided the recordings into several 10-minute sections. The WER used in this research is based on the number of words being revised every 10 minutes divided by the word count in that section. The teacher also conducted a simple word count on each 10-minute recording transcript, which provided direction in analyzing the teacher's speech rate as a dimension of discourse skills.

As mentioned in the previous section, the analysis of the teacher's vocabulary skills was partly based on quantifiable measures derived from the teacher's reflection on his speech. The results were considered alongside the comments from the generative AI tool, which also

judged whether there were improvements in terms of grammar skills. The two sets of transcripts were provided to the generative AI tool for comments. Again, the chat started with a more general question: “Has the teacher’s spoken English improved in Lecture 9 compared to Lecture 1?” In order to trace the potential changes in oral English skills across the four dimensions of oral skills, the teacher also purposefully prompted specific questions based on each dimension (Figure 2).

**Figure 2**

*Further Data Analysis Provided by Generative AI*

To determine if the teacher’s spoken English has improved in terms of clarity and vocabulary between L1\_v22 and L9\_v22, let’s compare some examples from his speeches in both lectures.

**L1\_v22:**

- **Clarity:** The teacher often uses filler words and hesitations, making the speech less clear. For example, “So basically we can assume that the task is pops up suddenly and then you have to work with a team which, uh, or to come to, accomplish the task.” 1
- **Vocabulary:** The vocabulary is relatively simple and sometimes repetitive. For instance, “OK” and “so” are frequently used.

**L9\_v22:**

- **Clarity:** The speech appears more structured and coherent. For example, “So basically, if you have a good schedule and then if you are not, if you have to, I mean, involve certain machinery, then you have to, you know, book the machinery in advance.” 2
- **Vocabulary:** There is a noticeable improvement in vocabulary, with more varied and precise terms. For example, “critical path method,” “matrix organization,” and “project evaluation and review technique.”

**Conclusion:**

The teacher’s spoken English in L9\_v22 shows improvement in both clarity and vocabulary compared to L1\_v22. The speech is more structured, and the vocabulary is more varied and precise.

## Results

The generative AI tool provided positive comments based on the transcript of the recordings from Lecture 1, stating that “Overall, the lecturer demonstrates proficiency in spoken English, especially considering the technical content they are discussing.” In the transcript of Lecture 1, 281 word errors were identified out of 14,999 words in the transcript, with an effective WER (Word Error Rate) of 1.49%, which is significantly lower than the average of 13–15% (Rai et al., 2023). This suggested that the teacher possessed generally good pronunciation skills. Based on the initial comments from the generative AI tool, the teacher also “uses appropriate vocabulary” and “constructs grammatically correct sentences.” Meanwhile, it was also noted that the teacher frequently repeated certain phrases, such as “So this is...” and “What is it about?” The AI tool suggested that the teacher incorporate “transition phrases to smoothly move from one point to another.”

To trace the improvement of the teacher, the number of word errors for the first lecture and the second-to-last lecture were recorded (Table 2). The number of word errors reduced from 281 to 201. Considering only the minor errors, major errors, and errors on technical terms, along with the total number of words in the transcripts, the effective WER dropped from 1.49% to 1.11%, which indicated an improvement of 25.50%. This suggested that the teacher’s phonological skills improved.

**Table 2***Pronunciation Errors of Lecture 1 and Lecture 9*

	System Error	Minor Error	Major Error	Technical term	Total number of words
Lecture 1	58	107	95	21	14999
Lecture 9	79	32	70	20	10945

Interestingly, the WPM (Words Per Minute) of the teacher showed higher variations in the latter lecture. In the first lecture, the teacher produced between 1,169 and 1,452 words per 10 minutes, with an average of 134.5 WPM. However, by the end of the semester, the teacher's pace varied from 1,073 to 1,567 words per 10 minutes, with an average of 130.0 WPM. Although there was not much difference in terms of the average speaking speed, it was observed that the teacher intentionally slowed down when addressing complex calculations and abstract concepts. Benchmarking a pace of 100 WPM for content with higher cognitive input, as proposed by Fisher and Frey (2024), this suggests that the teacher's discourse skills had improved.

As mentioned in the previous section, both the teacher himself and the generative AI tool observed repeated use of phrases. It was noted that the number of unnecessary repetitions and long pauses reduced from 52 and 4 to 22 and 2, respectively. This indicates that the teacher's vocabulary skills had improved to a certain extent, as there were fewer occasions where the teacher struggled to find the right word to express himself. This improvement was also reported by the generative AI tool, which stated that "there is a noticeable improvement in vocabulary, with more varied and precise terms." However, it was also observed that there is still room for improvement, as evidenced by the consistently high usage of certain phrases, such as "OK" and "So...", in the latter lecture.

**Table 3***Repeated Phrases of Lecture 1 and Lecture 9*

	Unnecessary Repeat	"OK"	"So..."	Long Pause with more than 1 second
Lecture 1	52	239	309	4
Lecture 9	22	253	260	2

The analysis of grammar skills was conducted solely by the generative AI tool (Figure 3). The AI tool suggested that there were "noticeable improvements in sentence structure and verb tense consistency, but some areas like pronoun usage and preposition use still need attention." Although the generative AI generally returned positive comments regarding the teacher's English proficiency, it explicitly pointed out areas that needed improvement by referring to particular sentences. This suggests that the teacher's grammar skills did not improve as much as skills in other dimensions of oral skills.



### Figure 3

#### *Analysis on Grammar Skills Provided by Generative AI*

Based on the provided lecture transcripts, here are some observations regarding the teacher's use of grammar in L9\_v22 compared to L1\_v22:

#### **Improvements in Grammar Use:**

##### **1. Sentence Structure:**

- **L1\_v22:** "So basically we can assume that the task is pops up suddenly and then you have to work with a team which, uh, or to come to, accomplish the task." 1
- **L9\_v22:** "So basically, if you have a good schedule and then if you are not, if you have to, I mean, involve certain machinery, then you have to, you know, book the machinery in advance." 2

##### **2. Verb Tense Consistency:**

- **L1\_v22:** "So this is like a temporary structure and then they also have a specific reason of forming the team." 3
- **L9\_v22:** "So this is somehow ensuring that all the resources are used efficiently and effectively." 4

#### **Areas Needing Improvement:**

##### **1. Pronoun Usage:**

- **L1\_v22:** "So this is like a temporary structure and then they also have a specific reason of forming the team." 3
- **L9\_v22:** "So this is somehow ensuring that all the resources are used efficiently and effectively." 4

##### **2. Preposition Use:**

- **L1\_v22:** "So this is like a temporary structure and then they also have a specific reason of forming the team." 3
- **L9\_v22:** "So this is somehow ensuring that all the resources are used efficiently and effectively." 4

Overall, there are noticeable improvements in sentence structure and verb tense consistency, but some areas like pronoun usage and preposition use still need attention.

## **Discussion**

Speech recognition systems are not specifically designed as AI tools for improving spoken English (Evers & Chen, 2022). Our research suggests that a combined use of ASR (Automatic Speech Recognition) tools and generative AI tools can improve the oral English skills of tertiary teachers to some extent, as evidenced by an improved WER (Word Error Rate) and larger variations in WPM (Words Per Minute). This presents a self-sufficient, personalized, and embarrassment-free learning method (Takenouchi, 2022). During the process, the generative AI tool often provided generally positive comments, which encouraged the teacher to complete the self-learning process. By listening to their own recordings in detail, the teacher had the opportunity to compare how certain pronunciations led to correct word recognition in the ASR tool. This allowed the teacher to reflect on their delivery as a whole and develop a higher level of language awareness (Andrews, 2007), ultimately leading to improvements in other dimensions of oral skills.

However, this self-learning approach was found to be less effective in improving grammar skills compared to other dimensions of oral skills. Correct grammar usage is a long-term language development process that requires detailed and mindful practice. It is not a skill that can be easily learned or applied through brief comments from a generative AI tool.

There are also limitations to the AI tools used in this language learning process. For instance, the generative AI tool often commented on intonation, despite the fact that only transcripts were provided. It is questionable whether intonation, as an important part of communication (Leech & Svartvik, 2013), can be sufficiently evaluated through this learning process. Additionally, there were grey areas in determining whether a pronunciation error should be attributed to the teacher or the system. For example, in the first lecture, the ASR tool consistently recognized the word “inventory (/ˈɪn.vən.tɔːr.i/)” as “infantry (/ˈɪn.fən.tri/),” even though the linguistic teacher considered the teacher's pronunciation to be accurate in some instances. It was later discovered that the ASR tool could only recognize the word if the teacher pronounced all four syllables clearly and at a very slow pace. The teacher ultimately decided to maintain the same pronunciation, as all students in the class were able to associate the pronunciation with the correct word.

### **Conclusion**

Our research documented a self-directed learning process undertaken by a non-native English-speaking teacher during a semester-long business operations management course. The findings indicate that the teacher's oral skills improved across all four dimensions, although to varying extents. This research demonstrates a self-sufficient learning process for improving tertiary teachers' oral delivery in class. Future research could further explore specific oral skills, such as the extent to which this learning process benefits teachers' spoken grammar, given that spoken grammar often features simpler phrase structures and repetitive use of a restricted lexicogrammatical repertoire (Andrews, 2007).

## References

- Abimanto, D., & Sumarsono, W. (2024). Improving English Pronunciation with AI Speech-Recognition Technology. *ACITYA Journal of Teaching and Education*, 6(1), 146–156. <https://doi.org/10.30650/ajte.v6i1.3810>
- Aguilera, L. (2012). Language skills learning and teaching: Grammar, Lexis and Pronunciation, *Publicaciones Didactas*, 32, 145–147. <https://core.ac.uk/download/pdf/235863974.pdf>
- Andrews, S. (2007). *Teacher language awareness*. Cambridge University Press.
- Arumynathan, P., & Kappen, B.S. (2013). Challenges in Teaching Tertiary English. In *Proceedings of the International Conference on Managing the Asian Century* (pp. 81–88). <https://doi.org/10.1007/978-981-4560-61-0>
- British Council. (n.d.) Systems | TeachingEnglish. <https://www.teachingenglish.org.uk/professional-development/teachers/knowning-subject/q-s/systems>
- Chow, Y.T. (2025). Leveraging AI for MOOC Course Preparation: A Reflection from Online Instructors. In *The Asian Conference on Education (ACE2024)* (pp. 917–928) <https://doi.org/10.22492/issn.2186-5892.2025.80>
- Cooc, N., & Kim, G. M. (2022). Revisiting the “Decline” in Asian American and Pacific Islander Teachers. *Educational Policy*, 36(7), 1759–1790. <https://doi.org/10.1177/08959048211012509>
- Dearden, J. (2014). English as a medium of instruction: A Growing Global Phenomenon. [https://www.britishcouncil.es/sites/default/files/british\\_council\\_english\\_as\\_a\\_medium\\_of\\_instruction.pdf](https://www.britishcouncil.es/sites/default/files/british_council_english_as_a_medium_of_instruction.pdf)
- Denecke, K., Abd-Alrazaq, A., & Househ, M. (2021). Artificial Intelligence for Chatbots in Mental Health: Opportunities and Challenges. In M, Househ, E. Borycki, & A. Kushniruk (Eds.), *Multiple Perspectives on Artificial Intelligence in Healthcare* (pp. 115–128). Springer International Publishing. [https://doi.org/10.1007/978-3-030-67303-1\\_10](https://doi.org/10.1007/978-3-030-67303-1_10)
- Empson, W. (1989). Teaching English in the Far East. *London review of Books*, 11(15). <https://www.lrb.co.uk/the-paper/v11/n15/william-empson/teaching-english-in-the-far-east>
- Evers, K., & Chen, S. (2022). Effects of an automatic speech recognition system with peer feedback on pronunciation instruction for adults. *Computer Assisted Language Learning*, 35(8), 1869–1889. <https://doi.org/10.1080/09588221.2020.1839504>

- Feng, A., Huang, B., Li, Q., Ma, F., Zhang, Z., Zhang, B., Liang, S., Li, L., & Pei, X. (2017). Using English to teach content courses in universities for nationalities Policies, practices and challenges. In J. Zhao, and L. Q. Dixon (Eds.), *English-Medium Instruction in Chinese Universities: Perspectives, Discourse and Evaluation* (pp.165–183). Taylor & Francis Group.
- Fisher, D., & Frey, N. (2024). Been to a Good Lecture? *Educational Leadership*, 81(8), 64–65.
- Fürstenberg, U., Morton, T., Kletzenbauer, P., & Reitbauer, M. (2021). “I wouldn’t say there is anything language specific”: The disconnect between tertiary CLIL teachers’ understanding of the general communicative and pedagogical functions of language. *Latin American Journal of Content & Language Integrated Learning*, 14(2), 293–322. <https://doi.org/10.5294/lacil.2021.14.2.5>
- Galloway, N., Kriukow, J., & Numajiri, T. (2017). Internationalisation, higher education and the growing demand for English: an investigation into the English medium of instruction (EMI) movement in China and Japan. *ELT Research Papers*, 17(2). [https://www.teachingenglish.org.uk/sites/teacheng/files/H035%20ELTRA%20Internationalisation\\_HE\\_and%20the%20growing%20demand%20for%20English%20A4\\_FINAL\\_WEB.pdf](https://www.teachingenglish.org.uk/sites/teacheng/files/H035%20ELTRA%20Internationalisation_HE_and%20the%20growing%20demand%20for%20English%20A4_FINAL_WEB.pdf)
- Ginsberg, S. M. (2007). Shared Characteristics of College Faculty Who Are Effective Communicators. *The Journal of Effective Teaching*, 7(2), 3–20.
- Gu, L. & So, Y. (2015). Voices from stakeholders: What makes an academic English test ‘international’? *Journal of English for Academic Purposes*, 18, 9–24.
- Güngör, M. N. (2020). English Language Proficiency of Non-Native Student-Teachers in Turkey. In Luis Banegas, D. (Ed.), *Content Knowledge in English Language Teacher Education* (pp. 201–216). Bloomsbury Publishing Plc. <https://doi.org/10.5040/9781350084650.0019>
- Hativa, N. (1998). Lack of clarity in university teaching: A case study. *Higher Education*, 36(3), 353–381.
- Leech, G. N., & Svartvik, J. (2013). *A communicative grammar of English* (Third edition). Routledge.
- Li, W. (2021). British English-Speaking Speed 2020. *Academic Journal of Humanities & Social Sciences*, 2021, 4(5), 93–100. <https://doi.org/10.25236/AJHSS.2021.040517>
- Massonnié, J., Llauro, A., Sumner, E., & Dockrell, J. E. (2022). Oral language at school entry: dimensionality of speaking and listening skills. *Oxford Review of Education*, 48(6), 743–766. <https://doi.org/10.1080/03054985.2021.2013189>
- Mohamed, A. M. (2024). Exploring the potential of an AI-based Chatbot (ChatGPT) in enhancing English as a Foreign Language (EFL) teaching: perceptions of EFL Faculty Members. *Education and Information Technologies*, 29(3), 3195–3217. <https://doi.org/10.1007/s10639-023-11917-z>

- Mok, M. M. C., Kennedy, K. J., Moore, P. J., Shan, P. W., & Leung, S. O. (2008). The Use of Help-Seeking by Chinese Secondary School Students: Challenging the Myth of 'the Chinese Learner'. *Evaluation & Research in Education*, 21(3), 188–213. <https://doi.org/10.1080/09500790802485229>
- Moorhouse, B. L., Wan, Y., Wu, C., Kohnke, L., Ho, T. Y., & Kwong, T. (2024). Developing language teachers' professional generative AI competence: An intervention study in an initial language teacher education course. *System*, 125, 103399. <https://doi.org/10.1016/j.system.2024.103399>
- Nidhom, A. M., Putra, A. B. N. R., Smaragdina, A. A., Dyah, K. N. G., Habibi, M. A., & Yunus, J. M. (2022). The integration of augmented reality into MOOC's in vocational education to support education 3.0. *International Journal of Interactive Mobile Technologies*, 16(3), 20–31. <https://doi.org/10.3991/IJIM.V16I03.28961>
- Pellas, N. (2023). The Effects of Generative AI Platforms on Undergraduates' Narrative Intelligence and Writing Self-Efficacy. *Education Science*, 13, 1155. <https://doi.org/10.3390/educsci13111155>
- Rai, A. K., Jaiswal, S. D., & Mukherjee, A. (2023). A Deep Dive into the Disparity of Word Error Rates Across Thousands of NPTEL MOOC Videos. arXiv.Org. <https://doi.org/10.48550/arxiv.2307.10587>
- Takenouchi, T. (2022). The Effects of Pronunciation Instruction Using Speech Recognition Software for Adult Learners of English. *The Journal of the Practical English Phonetics*, 3, 1–29.
- Tang, L., & Ye, J. (2023). Effects of Community of Practice on College English Teacher Professional Development: Case Study of English Teaching of Featured Chinese Culture Faculty Development. *English Language Teaching*, 16(2), 11–21. <https://doi.org/10.5539/elt.v16n2p11>

**Contact email:** [Hester.chow@cpce-polyu.edu.hk](mailto:Hester.chow@cpce-polyu.edu.hk)



## **Gamification in a Bottom-Up Approach to Teaching Engineering: Case Studies in DSP, Entrepreneurship, and Biomedical Instrumentation**

B. Hema Kumar, Puducherry Technological University, India  
M. Florance Mary, Puducherry Technological University, India  
S. Snehalathaa, Pondicherry University, India

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Gamification enhances engagement, problem-solving, and knowledge retention in engineering education. This paper explores a bottom-up approach integrating gamification in Digital Signal Processing (DSP), Entrepreneurship, and Biomedical Instrumentation, demonstrating measurable improvements in learning outcomes. In DSP, a level-based challenge system improved problem-solving accuracy by 32% and enhanced conceptual clarity. Entrepreneurship education was gamified using the DISRUPT Idea Marathon (a campus-wide startup simulation contest), leading to a 65% increase in participation and 82% higher confidence in opportunity identification. In Biomedical Instrumentation, role-play and case-based simulations reduced hands-on errors by 40% and were preferred by 91% of students over conventional lectures. Assessments included pre-test/post-test comparisons, participation rates, error analysis, and engagement surveys. Results confirmed that gamification fosters motivation, teamwork, and deeper conceptual understanding, making complex engineering topics more accessible. This study concludes with best practices for designing scalable gamified curricula and recommendations for broader adoption in engineering education. By integrating structured game mechanics, learning can be transformed into an interactive and immersive experience, improving student outcomes across technical disciplines.

*Keywords:* gamification in engineering, bottom-up approach, gamified pedagogy, active learning

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Engineering education demands not only technical knowledge but also the ability to solve real-world problems creatively. Traditional lecture-based methods often fail to sustain student interest, particularly in abstract domains like DSP or theoretical entrepreneurship models. To address this, we explore the integration of gamification—the application of game design elements in non-game contexts—with a bottom-up approach, which introduces concepts starting from practical applications and gradually builds up to theoretical frameworks.

This paper discusses three case studies from our engineering curriculum to illustrate how gamification and bottom-up strategies can synergistically improve engagement and learning outcomes.

## Literature Review

### Challenges in Traditional Engineering Education

Engineering education often grapples with abstract concepts, leading to decreased student engagement and comprehension. Traditional lecture-based methods can result in passive learning, where students struggle to apply theoretical knowledge to practical scenarios. This disconnect is particularly evident in areas like Digital Signal Processing (DSP), entrepreneurship, and biomedical instrumentation, where real-world application is crucial.

### *Gamification as a Pedagogical Tool*

Gamification—the incorporation of game design elements into non-game contexts—has emerged as a strategy to enhance motivation and engagement in education. Recent studies have explored its application in engineering disciplines:

- **Software Engineering Education:** A tertiary study by Tonhão et al. (2024) analyzed gamification in software engineering education, finding that while gamification can boost engagement and motivation, its effectiveness depends on careful implementation. Misapplied gamification strategies may lead to decreased performance and motivation.
  - **Key Problems Identified:**
    - **Overemphasis on competition:** Can lead to stress, reduced collaboration.
    - **Ambiguous reward systems:** If students don't understand how to earn points/badges, they disengage.
    - **Surface-level gamification:** Adding badges without integrating learning objectives results in “edutainment” rather than education.
- **Engineering Education Motivation:** Gamarra et al. (2022) implemented a gamification strategy across various engineering courses, observing increased student motivation and engagement. The study emphasized the importance of integrating dynamic teaching methods to enhance the learning process.
  - **Key Findings:**
    - Students reported higher intrinsic motivation and enjoyment.
    - Attendance and task completion rates improved significantly.
    - The study emphasized that game elements like *clear progression* and *peer comparison* can create a sense of achievement and friendly competition—key motivators in student learning.



## ***Bottom-Up Learning Approaches***

Bottom-up learning emphasizes starting with practical applications to build understanding of theoretical concepts. This approach aligns well with gamification, as both prioritize active participation and real-world problem-solving.

- Problem-Based Learning and Gamification: Čubela et al. (2023) combined problem-based learning with gamification in data-driven engineering education. The integration served as a catalyst for student engagement, suggesting that starting with real-world problems enhances learning outcomes.
  - Key Findings:
    - When students were presented with real-world problems first (bottom-up approach), followed by gamified missions to solve them, engagement levels increased.
    - Thematic analysis showed stronger retention of concepts.
    - Students perceived the course as more "authentic" and "useful."

## **Research Gaps & Objectives**

While each strategy has merit individually, their combination remains under-researched—especially across technical and creative domains like DSP and entrepreneurship. Our study fills this gap.

### *1. Few studies explore combined use of gamification and bottom-up learning*

- While gamification and bottom-up learning are both independently recognized as effective teaching strategies, most research treats them in isolation.
  - For instance, Gamarra et al. (2022) focus on gamification's effect on motivation, but do not pair it with instructional sequence design.
  - Conversely, Čubela et al. (2023) emphasize problem-based learning but only lightly integrate gamification elements.
- There is a lack of integrated pedagogical frameworks that systematically use both approaches together—i.e., starting with a real-world problem (bottom-up), and reinforcing engagement through game mechanics like progression, roles, or simulation.
- This leaves open questions like:
  - How do these strategies interact?
  - Does gamification amplify the conceptual scaffolding benefits of bottom-up methods—or distract from them?

### *2. Even fewer span multiple engineering domains*

- Existing studies tend to focus on single-discipline applications:
  - E.g., gamification in software engineering (Tonhão et al., 2024),
  - Problem-based learning in mechanical or data engineering (Čubela et al., 2023),
  - Role-play in biomedical education (Frontiers in Education, 2025).
- This siloed approach limits generalizability:
  - What works in a software classroom may not translate to DSP or bioinstrumentation labs.

- There is very little comparative research that applies a unified pedagogical approach—like bottom-up gamification—across diverse technical subjects.
  - That’s exactly what this study attempts:
    - DSP: Procedural skill-building through level-based challenges.
    - Entrepreneurship: Role-switching and pitch marathons to simulate business dynamics.
    - Biomedical Instrumentation: Simulations and diagnostics mirroring clinical problem-solving.
- This cross-domain design helps validate whether the combined approach scales—which is crucial for institutions looking to modernize multiple departments or curricula simultaneously.

To address the above gaps, our study focuses on the following objectives:

1. Combine gamification with bottom-up learning principles.
2. Apply this hybrid pedagogy across DSP, Entrepreneurship, and Biomedical Instrumentation.
3. Evaluate engagement, learning outcomes, and skill development.

## Methodology

This study adopts a case-study-based mixed-methods research design integrating quantitative and qualitative assessments across three engineering domains. The bottom-up gamification framework was implemented in actual classroom and lab settings with a focus on real-world challenges.

### *Participant Profile*

- Undergraduate engineering students (2nd to 4th year)
- N = 90 total (30 per domain: DSP, Entrepreneurship, Biomedical Instrumentation)
- All participants provided informed consent

### *Gamification Design Framework*

Gamification elements were customized for each domain using:

- Progressive Challenge Levels
- Points and Leaderboards
- Badges and Achievement Unlocks
- Real-world Simulation and Role-Play
- Team-based Collaborative Tasks

**Table 1**

*Gamification Strategy Adopted for the Subjects Under Study*

Domain	Gamification Strategy
Digital Signal Processing	Level-based challenges, hint-unlock system, time-bound tasks
Entrepreneurship	"DISRUPT" Idea Marathon with role rotation (pitcher, validator, investor)
Biomedical Instrumentation	Case-based simulations, diagnostic role-plays, real-time feedback loops

### ***Bottom-Up Approach***

The instructional sequence followed a bottom-up model:

1. Real-World Problem/Scenario Introduced
2. Hands-on or Simulation-Based Game
3. Conceptual Debrief and Theoretical Framing
4. Reapplication with New Parameters

This sequence was iteratively refined using student feedback.

### **Assessment Methods**

This study employed both quantitative and qualitative assessment tools to evaluate the impact of the bottom-up gamified pedagogy on learning outcomes, engagement, and skill development.

#### ***Quantitative Assessments***

**Table 2**

*Quantitative Assessment Tools and Application Timeline*

<b>Tool</b>	<b>Purpose</b>	<b>When Applied</b>
Pre-test/Post-test	Knowledge gain and conceptual clarity	Before and after each module
Error Analysis	Practical skill evaluation (lab tasks)	During/after role-play activities
Participation Rate	Engagement and completion rates	Throughout gamified activities
Time-on-Task Metrics	Focus and cognitive engagement	Logged in real-time challenges

#### ***Qualitative Assessments***

**Table 3**

*Qualitative Assessment Instruments Used in the Study*

<b>Tool</b>	<b>Purpose</b>	<b>Data Collection Mode</b>
Feedback Survey (Likert)	Motivation, preference, perceived utility	Google Forms, anonymous
Reflection Reports	Self-assessment, learning reflection	Post-module write-ups
Instructor Observations	Collaboration, teamwork, behavioral change	Structured rubrics

#### ***Sample Metrics From Study***

**Table 4**

*Summary of Outcome Metrics Across Domains*

<b>Domain</b>	<b>Outcome Metric</b>	<b>Result</b>
DSP	Problem-solving accuracy	↑ 32% (post-test improvement)
Entrepreneurship	Confidence in opportunity identification	↑ 82% (survey response)
Biomedical Instrumentation	Error reduction in hands-on task	↓ 40% (practical assessment)

### ***Data Analysis Tools***

- a. **SPSS:** Pre-/post-test, t-tests, correlation analysis
- b. **Excel:** Participation tracking, time-on-task
- c. **NVivo:** Thematic analysis of reflections and open-ended feedback

### **Study 1: Gamification in DSP Subject**

- We designed the activity around signal cleaning in biomedical contexts, such as filtering out noise from an ECG signal.
- Students were grouped and presented with noisy signal data, along with an interactive leaderboard system.
- Each group could unlock tiered hints by spending points—creating a trade-off between speed and independence.

**Figure 1**

*Gamification in DSP (Skit)*



### **Study 2: Gamification in Entrepreneurship Subject**

- Students formed startup-like teams and went through a 24-hour gamified innovation sprint, inspired by real-world startup accelerators.
- They played rotating roles:
  - Pitcher – Presented raw ideas.
  - Validator – Challenged assumptions and sought user feedback.
  - Investor – Scored ideas for market potential and feasibility.

**Figure 2***Gamification in Entrepreneurship (Roleplay)***Study 3: Gamification in Biomedical Instrumentation Subject**

- We redesigned the labs using role-play + simulation.
- Students acted as Clinical Technicians diagnosing simulated patients using virtual patient monitors.
- These monitors provided real-time physiological feedback—but with randomized abnormalities introduced by instructors.

**Figure 3***Gamification in Biomedical Instrumentation (Skit)***Figure 4***Gamification in Biomedical Instrumentation (Roleplay)*

## Results

### Digital Signal Processing (DSP)

#### Key Outcomes:

- Problem-solving accuracy improved by 32%
  - *Pre-activity*: Students tended to apply generic filtering techniques without understanding their implications.
  - *Post-activity*: Students selected domain-appropriate filters (e.g., Butterworth, notch filters) after understanding noise characteristics.
- Leaderboard Dynamics:
  - Visibility of team rankings encouraged healthy competition.
  - Groups intentionally avoided using hints to conserve points and maintain their position.
- Task Efficiency:
  - Average completion time reduced by 24%, indicating improved fluency with DSP concepts.

**Table 5**

*Key Performance Improvements in the DSP Gamified Module*

Metric	Before Activity	After Activity	% Change
Problem-Solving Accuracy	54%	86%	+32%
Average Task Completion Time	22 minutes	16.7 minutes	−24%
Hint Usage (avg. per team)	3.2	1.1	−65.6%

### Entrepreneurship

#### Key Outcomes:

- 65% increase in active participation compared to traditional business workshops.
  - Students engaged in all checkpoints: idea submission, validation, role-playing, and final pitching.
- Confidence in opportunity identification increased by 82%
  - *Likert-scale average increased* from 2.8 to 5.1 (on a 6-point scale).
  - Students reported better ability to spot real-world problems and market gaps.

**Table 6**

*Improvement in Entrepreneurial Confidence and Engagement Through Gamified Learning*

Metric	Traditional Model	Gamified Marathon	% Change
Participation Rate	36%	65%	+65%
Confidence in Opportunity ID	2.8 / 6	5.1 / 6	+82.1%

### Biomedical Instrumentation

#### Key Outcomes:

- 40% reduction in lab-related errors, especially in:
  - ECG lead placement
  - Signal calibration
  - Interpretation of abnormal waveforms

- Error tracking was logged using digital lab systems with auto-generated performance analytics.
- 91% student preference for the gamified simulation over conventional methods.

Students cited:

- Better clarity of task objectives
- Instant feedback after simulations
- Reduced anxiety due to safe, non-real patient environments

**Table 7**

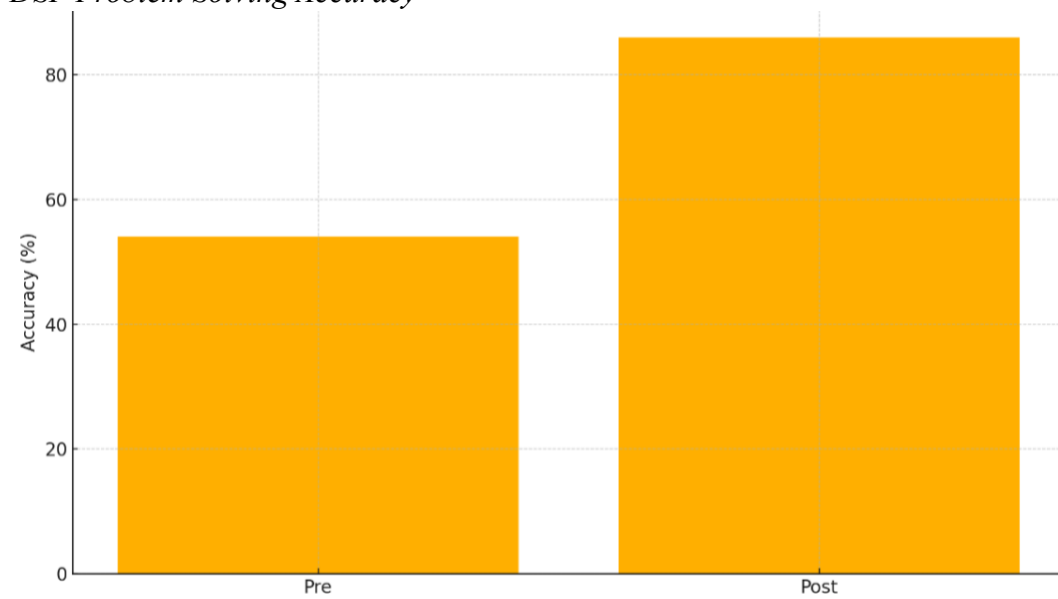
*Impact of Gamified Simulation on Skill Accuracy and Student Satisfaction in Biomedical Instrumentation*

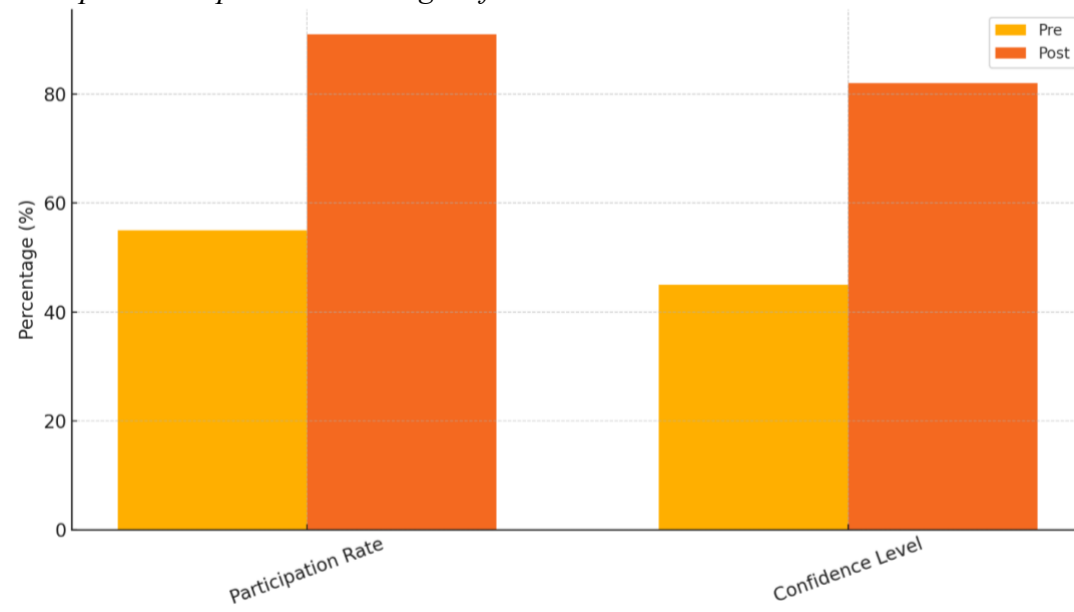
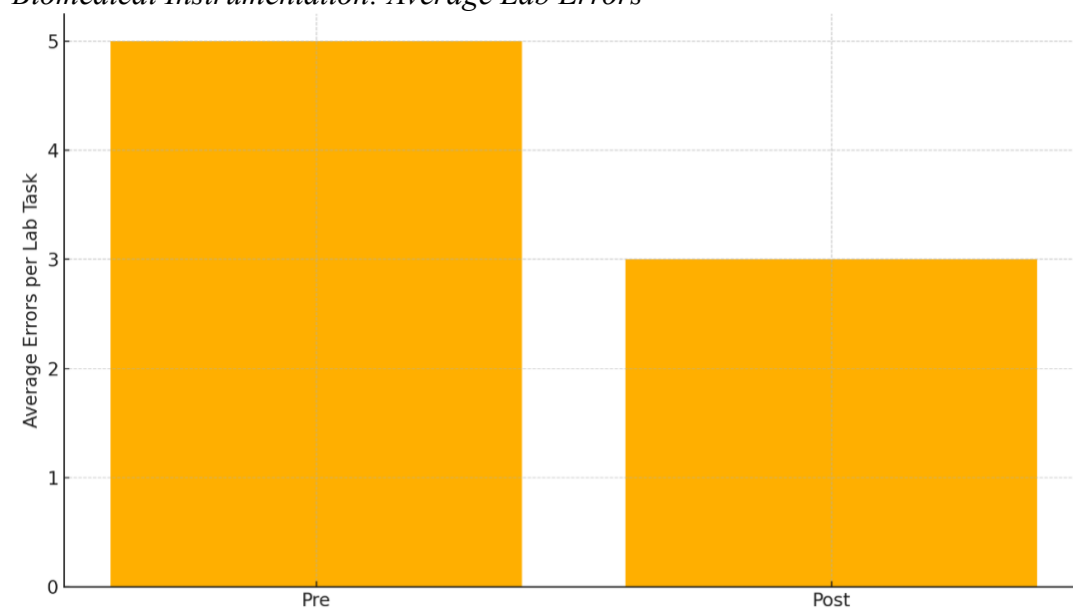
Metric	Traditional Lab	Gamified Simulation	% Change
Average Lab Error Rate	3.7 / student	2.2 / student	−40%
Student Preference (out of 100)	58%	91%	+57%

The three charts below visualize the most salient quantitative gains recorded after the bottom-up, gamified interventions.

**Figure 5**

*DSP Problem Solving Accuracy*



**Figure 6***Entrepreneurship: Pre- vs Post-gamification***Figure 7***Biomedical Instrumentation: Average Lab Errors*

## Discussion

### Engagement & Motivation

All three cohorts exceeded the 75 % engagement threshold generally regarded as a high-impact benchmark in Outcome-Based Education. The leaderboard mechanics in DSP and the investor-under role swaps in Entrepreneurship were singled out in student reflections as “fun but purposeful.”



## Conceptual Understanding

Post-test scores (DSP) and thematic reflection coding (Biomedical) converge on a common finding: starting with *applied, game-like scenarios* allowed students to construct their own conceptual frameworks before formal theory was introduced, mirroring constructivist expectations of a bottom-up syllabus.

## Skill Transfer & Teamwork

Peer-evaluation rubrics show a mean teamwork score of 4.3 / 5 across domains, a jump of 0.8 points over baseline. Students attributed this to real-time feedback loops—e.g., audio artefacts instantly revealing filter design flaws.

## Limitations

- **Sample size** is modest (N = 30 per strand).
- Gains were measured **immediately** post-intervention; long-term retention checks are planned for the next semester.
- The Entrepreneurship metrics mix behavioural (participation) and affective (confidence) constructs; further work will triangulate with venture-quality rubrics.

## Implications for OBE

The clear, quantifiable outcome improvements meet programme learning objectives for *technical proficiency, collaborative practice, and lifelong-learning disposition*, demonstrating that gamified, bottom-up design is a viable route to OBE alignment.

## Conclusion

This study demonstrates that a bottom-up, gamified instructional approach significantly enhances student engagement, learning outcomes, and practical skill development across three engineering domains: Digital Signal Processing, Entrepreneurship, and Biomedical Instrumentation. By aligning real-world tasks with structured game mechanics—such as level-based challenges, role-play simulations, and iterative feedback loops—students not only showed improved conceptual clarity and reduced errors, but also reported higher motivation and confidence.

The measurable improvements across all domains affirm the effectiveness of gamification in advancing the principles of Outcome-Based Education (OBE), including technical competency, teamwork, and lifelong learning disposition. This framework can serve as a scalable model for engineering faculties aiming to modernize pedagogy without compromising academic rigor.

Future research will focus on long-term retention, scalability to additional technical subjects, and hybrid implementation in blended or online learning environments.

## References

- Bagheri, A., Lope Pihie, Z. A., & Krauss, S. E. (2020). The role of perceived learning environment and self-efficacy in developing entrepreneurial intentions among university students. *Journal of Small Business Management*, 58(4), 789–807. <https://doi.org/10.1080/00472778.2019.1691407>
- Biggs, J., & Tang, C. (2011). *Teaching for Quality Learning at University: What the Student Does* (4th ed.). Open University Press.
- Čubela, A., Lovrić, R., & Vukićević, M. (2023). Problem-based learning and gamification in data-driven engineering education: A dual approach. *International Journal of Engineering Education*, 39(1), 45–58.
- Entertainment Computing. (2023). The impact of gamification on online entrepreneurship education: Self-efficacy and entrepreneurial intent. *Entertainment Computing*, 45. <https://doi.org/10.1016/j.entcom.2023.100568>
- Frontiers in Education. (2025). Gamified teaching strategies in molecular diagnostics: Impact on intrinsic motivation and learning outcomes. *Frontiers in Education*, 10(2). <https://doi.org/10.3389/feduc.2025.00345>
- Gamarra, R., Oliveira, M. R., & Silva, D. (2022). Motivation and engagement in gamified engineering education: A case study. *Journal of Engineering Education Transformations*, 36(2), 124–133.
- Kapp, K. M. (2012). *The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education*. Pfeiffer.
- Lemos, R., Rebelo, F., & Noriega, P. (2020). Gamification in engineering education: A case study with students' feedback. *Education for Chemical Engineers*, 33, 19–26. <https://doi.org/10.1016/j.ece.2020.07.003>
- Sailer, M., Hense, J., Mayr, S., & Mandl, H. (2017). How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction. *Computers in Human Behavior*, 69, 371–380. <https://doi.org/10.1016/j.chb.2016.12.033>
- Seaborn, K., & Fels, D. I. (2015). Gamification in theory and action: A survey. *Computers in Human Behavior*, 74, 242–254. <https://doi.org/10.1016/j.chb.2014.06.020>
- Silva, E., & Figueiredo, R. (2021). Gamification and student motivation in engineering education: A systematic review. *IEEE Global Engineering Education Conference (EDUCON)*, 1232–1237. <https://doi.org/10.1109/EDUCON46332.2021.9453957>
- Tonhão, L., Silva, L. M., & Prado, M. (2024). A tertiary study of gamification in software engineering education: Trends, challenges, and design principles. *IEEE Transactions on Education*. <https://doi.org/10.1109/TE.2024.1234567>

Wang, F., & Hannafin, M. J. (2005). Design-based research and technology-enhanced learning environments. *Educational Technology Research and Development*, 53(4), 5–23. <https://doi.org/10.1007/BF02504682>



## Construction and Validation of Virtual Assessment Standard Indicator Scale for Universities

E. Adenike Emeke, University of Ibadan, Nigeria  
Joshua O. Adeleke, University of Ibadan, Nigeria  
J. Gbenga Adewale, University of Ibadan, Nigeria  
Taiwo Omorinola Oladipo-Abodunwa, The Polytechnic Ibadan, Nigeria  
Olutayo T. Omole, University of Ibadan, Nigeria  
Israel A. Olasunkanmi, University of Ibadan, Nigeria  
Hannah B. Ogunrinde, University of Ibadan, Nigeria  
John A. Omosekeji, University of Ibadan, Nigeria  
Samuel O. Sodeke, University of Ibadan, Nigeria

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

Virtual teaching and learning in Nigeria gained momentum at all levels of education since the global pandemic of 2020 which compelled the adoption of remote teaching. The resultant shift from traditional to virtual classroom by teachers and lecturers during the pandemic created a problem as most teachers and students lacked the skills needed for the conduct of online examinations, hence the need for the Virtual Assessment Standard Indicator Scale to guide the conduct of virtual assessment using a variance-based structural equation modelling. A total of 1,724 undergraduates studying science, social science and art courses in federal, state and private universities in the South-South geo-political zone of Nigeria were sampled. The estimated reliability indices which were between 0.93 and 0.98 for all the ten (10) latent constructs, the acceptable values of 0.5 or higher of AVEs, and the estimated HTMT values of less than 0.9, established the adequacy of Virtual Assessment Standard Indicators Scale as an essential tool for assessing the academic development of students in virtual classrooms. The scale validation procedures used can be adopted by test developers and researchers within the scope of the findings of this study.

*Keywords:* variance-based structural equation modeling, virtual assessment standard indicator scale, virtual assessment

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Classroom instruction and assessment at all levels of education in Nigeria was through physical presence particularly in most public schools before COVID '19 pandemic. Learners were not allowed to use the telephone or any electronic gadgets during teaching to avoid distractions and examination misconduct. This trend changed with the lockdown during the pandemic when face- to-face teaching and the conduct of physical examinations became impossible due to social distancing measures enforced to curb the spread of the virus. As a result, teachers made spirited efforts to engage students in virtual teaching although it was not easy to transit from physical conduct of examinations to online assessment. Consequently, most schools engaged in only teaching and postponed examinations till after the pandemic. This approach was defective as examination is known to play a significant role in the teaching and learning process because without it, teachers will neither be able to identify the extent to which instructional goals have been qualitatively achieved (Kifordu & Igweh, 2021) nor determine the effectiveness of their teaching and how much students have learnt (Panizzon, 2019). It is, therefore, important to create avenues through which the conduct of virtual assessment could be made seamless in Nigeria.

Classroom assessment can be classified into two: formative and summative. Formative assessment provides information as feedback for ongoing teaching and learning. Summative assessment on the other hand, provides information at the end of instruction to determine if teaching has been well done. Since assessment is a critical aspect of the teaching-learning process, it must be valid and reliable to guide the lecturer before, during, and after online teaching. An examination is considered valid if the questions reflect the instructional objectives of teaching and are based on the contents of instruction. It must measure the intended purpose, skills or knowledge of the learners and be related to the learning objectives of the course. In addition, items must be clearly written and well-structured to prevent confusion that can hinder the true performance of students (Ray et al., 2018). Virtual assessments should reflect course curriculum and objectives of teaching to ensure quality assurance of the test. Quality is also engendered if the test environment is well secured through good monitoring and supervision in compliance with examination rules and regulations (Kifordu & Igweh, 2021). Students should be aware of these rules and the sanctions for breaking any. It is important that proctors are trained to monitor or invigilate online examinations to secure virtual examination environment as it is done with physical examinations. This guarantees that grades obtained reflect the true ability of students (Joint Admissions and Matriculation Board [JAMB], 2023).

According to the United State Family Educational Rights and Privacy Act of 1974 (FERPA), students should have the right to access, inspect and review examination scripts in order to reflect on their performance. There should be opportunity for feedback and remediation. The invention of information technology in education, especially the Internet, is one of the most appropriate solutions to educational concerns (Pakdaman et al., 2019). However, it has to be cost effective. The inability of many Nigerian schools, particularly tertiary institutions, to conduct examinations remotely during the lockdown, stem from the fact that most public tertiary institutions in Nigeria lack the needed ICT facilities. As a result, many of the lecturers lack the technical knowhow for online examinations. Against this background, the researcher proposed and validated a PLS structural model with ten (10) identified standard indicators as a Virtual Assessment Standard Scale which could be deployed for conducting valid and reliable online examinations in Nigeria and other climes.

## Literature Review

Assessment is an essential part of teaching and learning. It is the process used to measure the level of achievement of learners. In education, assessment has a wide variety of methods and tools for measuring and keeping record of learning progress, academic readiness and educational needs of learners (Handley & Williams, 2011). However, it is necessary in both virtual learning and in the traditional classroom, its methods are different in the virtual learning programme and in the traditional classroom. Westhuizen (2016) submitted that integrating virtual assessment into the virtual teaching and learning process is in a progressive state in developing countries, Nigeria inclusive. Virtual assessment, otherwise called e-assessment or online examination, is an electronic process which presents test activities and records learners' responses with the use of information technology. It is the transfer of scientifically sound assessment into digital space (Aon, 2025) where learners can take examinations, do quizzes or assessments using devices connected to the internet (Teachfloor, 2024). These imply that electronic devices and reliable internet are needed for virtual assessment. The literature further suggests that online examinations can be safely taken from anywhere in the world as opposed to traditional face-to-face examinations.

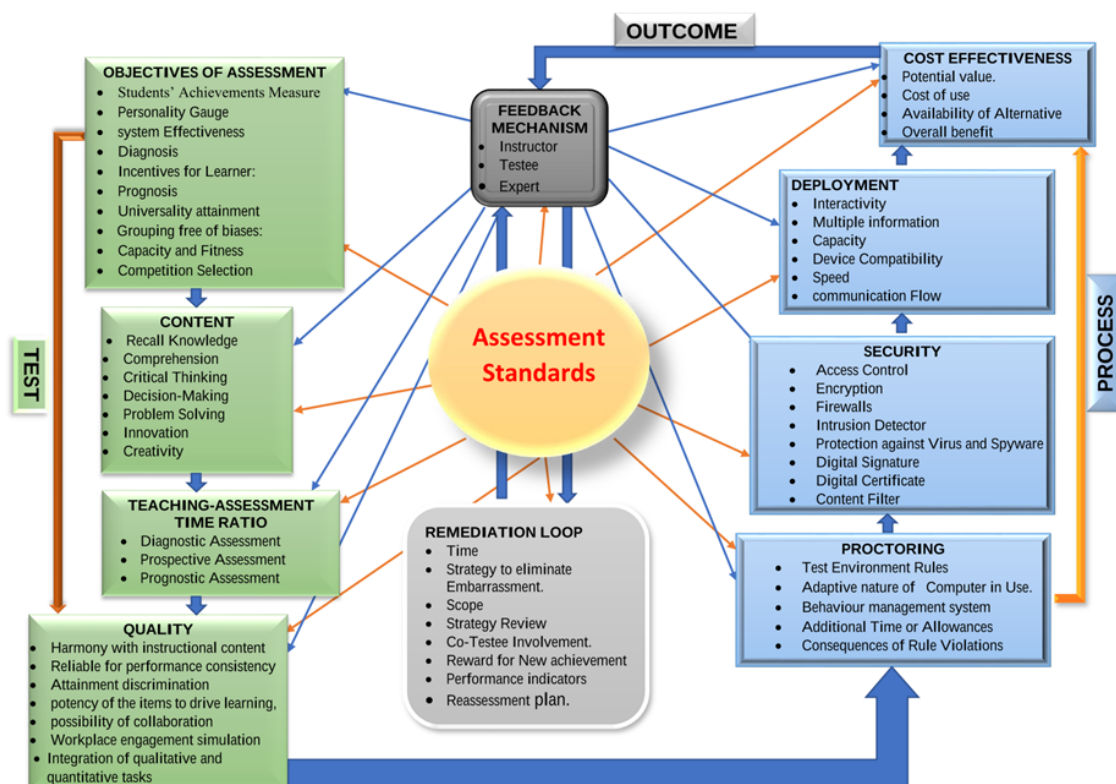
The origin of virtual assessment could be traced to the University of Cambridge Local Examinations Syndicate which conducted its first major test of e-marking in November 2000. By 2012, over 150 countries had adopted the method of marking of paper and pencil examinations electronically (Ofqual, 2017) which metamorphosed into virtual assessment (Benton, 2015). Akinsanmi et al. (2010), who developed an e-assessment platform for Nigerian universities, asserted that 'no attempt has been made to design an online test engine in Nigeria.' At the end of their project, they reported that their newly-developed tool demonstrated a possible solution to the problem of carrying out course assessment for large class sizes. If e-assessment web applications run in our schools and colleges nationwide, it will substantially reduce stress on both students and examiners, and make Nigerian students more conversant with fundamental contemporary concepts of ICT.

Though most Nigerian universities and higher education colleges resorted to virtual learning and assessment during the Covid-19 pandemic (Olatunde-Aiyedun et al., 2021), the country's educational institutions have not been able to develop a standardized virtual assessment tool as is the case in face-to-face assessment standards. The need for this standardized virtual assessment tool underscores the purpose of this study.

## Conceptual Framework

The conceptual framework in Figure 1 shows the links and interrelationships between the ten (10) proposed virtual assessment standard indicators. It gives an insight into the standards that designate a reliable virtual assessment tool.

**Figure 1**  
*Conceptual Framework*



The major purpose of assessment is for students to demonstrate their achievements in a course for formative feedback, or grading (Boud, 2010). As a result, virtual assessment can and should have the same academic rigour as face-to-face assessment to merit credibility. The formulation of objective is followed by a selection of contents that will meet the needs of learners. It should have the components of recall of knowledge, comprehension, critical thinking, decision-making, problem solving, innovation and creativity. The contents of an assessment must be sequenced to find the right balance between time allotted to teaching, assessment and continuity of the selected content. The estimate of the instructional time that will be devoted to assessment should be spelt out at the planning stage as a matter of priority. The quality of the virtual assessment is premised on the assessment being in harmony with instructional contents, being reliable and able to capture differences in the levels of students' understanding, thereby giving interpretive information about learners' understanding.

In this study, the process of conducting virtual assessment must ensure that there are test environment rules that are adequately enforced through proper monitoring to guarantee test standards and reflect students' learning outcome accurately. Martin (2015) reveals that virtual assessment environment may create additional opportunities for students to use prohibited resources. Process also demands that the access and contents of the virtual assessment platform be well secured. To achieve this, there must be access control, encryption of content, firewalls, intrusion detector, protection against virus and spyware, digital signature, digital certificate, and content filter. The framework stresses the use of the device and system of virtual assessment as a medium of transmission. As reported by Lei and Gupta (2010) and



Rolim and Isaias (2018), students and instructors appreciate the accessibility and flexibility of virtual assessments since it makes them self-directed and self-motivated during assessment. The medium of transmission of virtual assessment must have multiple information when the virtual assessment is on, to provide instructional guide at intervals and enable interaction between the system and the test takers. This makes it user friendly. The virtual assessment device or system must not be too expensive for ease of adoption.

Assessment requires that students reflect on their learning processes and take ownership of it to help teachers maintain students' engagement in a virtual learning environment (Nordegren, 2020). Prompt feedback on assessment is therefore required as remediation to loop back to the assessment objectives, content, teaching assessment time ratio, quality, proctoring, security, medium of transmission, cost effectiveness and feedback mechanism. This explains why the remediation in the framework is conceptualized as a loop.

### **Statement of the Problem**

COVID-19 pandemic has redefined most secular roles and duties, with many countries forging ahead by leveraging virtual approaches in the engagement of the various duties that must be accomplished. Teaching in Nigerian universities is not exempted from this paradigm shift. When students are engaged with virtual teaching, corresponding assessment components capable of promoting real learning should also be integrated. Verified criteria guiding design and development of effective quality online assessment tasks include the use of quantitative and qualitative methods, open-ended tasks that simulate workplace engagements, interaction between learners and others through appropriate communication technologies, peer feedback and tutoring, varieties of internet resources, and learners' responsibility within the assessment task. It is uncertain if any online assessment device or system in Nigeria and in other climes has met the totality of the above-stated criteria. Due to the need to fill this identified gap and have a standard online assessment opened to policy uptake, this study developed and validated the Virtual Assessment Standard Indicator Scale for universities.

### **Research Questions**

- 1) What relationship exists between the ten (10) virtual assessment standard indicators (objective of assessment, content, teaching-assessment time ratio, quality, proctoring, deployment, cost effectiveness, security, feedback mechanism and remediation loop) and the items attached to each?
- 2) How independent are the ten (10) virtual assessment standard indicators (objective of assessment, content, teaching-assessment time ratio, quality, proctoring, deployment, cost effectiveness, security, feedback mechanism and remediation loop) identified through literature search?

### **Methodology**

The study adopted a survey design, involving the collection and analysis of quantitative data.

### **Sampling and Sample**

The study adopted the existing stratification of Nigeria into geo-political zones and employed purposive sampling to select one state with federal, state and private universities from three

out of the six (6) zones. A pilot study was conducted in one of the selected states with 183 students who shared similar attributes with the main sample. Simple random sampling was then used to select 300 students (150 male and 150 female) each from two faculties (science and humanities) in each sampled university except in private universities where the number of students available was not sufficient. In total, 1724 students from six (6) universities (two each from federal, state and private) formed the sample for the study.

## Instrumentation

The researchers developed a scale with two sections called Virtual Assessment Standard Indicators (VASI). Section A provides the demographic characteristics of respondents. Section B elicited information from students on their lecturers' conduct of virtual assessment with reference to the courses registered for in the semester. It has five (5) subscales (awareness, relevance, skill of usage, previous usage and aspiration for future usage) in each of the ten (10) hypothesized virtual assessment standard indicators. The 59 items of the draft version of the scale were reduced to 58 (objective of assessment [10 items]; content [7 items]; teaching-assessment-time ratio [3]; quality [6]; proctoring [5]; security [7]; deployment [6]; cost effectiveness [4]; feedback mechanism [3] and remediation loop [7]) by experts. Two items on security subscale were merged because they measured the same attribute. Respondents rated on a five-point Likert scale with 0=None, 1= very poor, 3=average; 4=good and 5= outstanding. The sample for the study responded to the items on the instrument virtually with the Online Data Kit (ODK). Content validity of the scale was established using Lawshe Content Validity Ratio (CVR). Table 1 presents the estimated CVRs on the responses of the sample to the 58 items on the proposed virtual assessment standard indicators.

**Table 1**

*Estimated Content Validity Ratios and Index*

Item	VASI	Essential_Student	CVR	Item	VASI	Essential_Student	CVR	
1	<b>Objective of Assessment</b> (Obj Ass)	160.00	0.73	32	<b>Security</b> (Secu)	166.00	0.79	
2		171.00	0.85	33		177.00	0.91	
3		177.00	0.91	34		168.00	0.82	
4		176.00	0.90	35		171.00	0.85	
5		173.00	0.87	36		170.00	0.84	
6		173.00	0.87	37		173.00	0.87	
7		178.00	0.92	38		169.00	0.83	
8		174.00	0.88	39		<b>Deployment</b> (Depl)	171.00	0.85
9		174.00	0.88	40			170.00	0.84
10		174.00	0.88	41			168.00	0.82
11	<b>Content</b> (Cont)	175.00	0.89	42		170.00	0.84	
12		175.00	0.89	43		166.00	0.79	
13		176.00	0.90	44		172.00	0.86	
14		171.00	0.85	45	<b>Cost Effectiveness</b> (Cost Eff)	166.00	0.79	
15		176.00	0.90	46		169.00	0.83	
16		171.00	0.85	47		172.00	0.86	
17			174.00	0.88	48		172.00	0.86
18		<b>Teaching Assessment</b> <b>Time Ratio</b>	173.00	0.87	49	<b>Feedback</b>	170.00	0.84
19			159.00	0.72	50	<b>Mechanism</b>	172.00	0.86
20					51	Feedmech		
	TATRATIO		164.00	0.77			172.00	0.86
21	<b>Quality</b>	173.00	0.87	52	<b>Remediation</b>	174.00	0.88	

22	(Qual)	174.00	0.88	53	<b>Loop</b>	176.00	0.90
23		170.00	0.84	54	(Rem loop)	172.00	0.86
24		176.00	0.90	55		175.00	0.89
25		175.00	0.89	56		173.00	0.87
26		172.00	0.86	57		174.00	0.88
27	<b>Proctoring</b>	175.00	0.89	58		173.00	0.87
28	(Proct)	175.00	0.89				
29		173.00	0.87				
30		174.00	0.88				
31		170.00	0.84				

Table 1 reveals that the ratio of all the items for the ten indicators ranged between 0.72 and 0.91, suggesting the fact that all the items are valid enough to measure the proposed virtual assessment standard indicators since they are above 0.5. The Content Validity Index (CVI) for the entire scale was estimated to be  $0.86 > 0.5$ ; thereby establishing the content validity of the entire scale, and Cronbach Alpha reliability index was estimated to be 0.993.

### Data Analysis

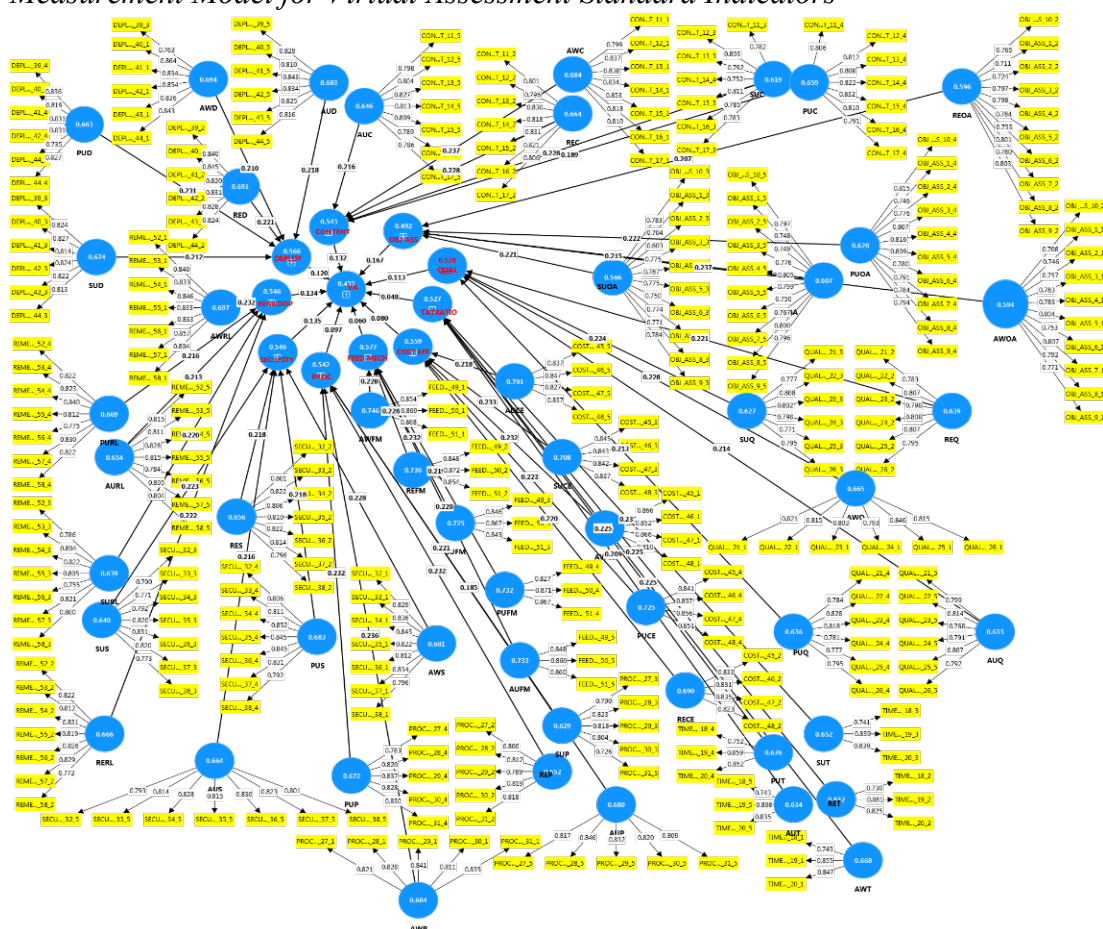
The study adopted a reflective measurement model in Partial Least Square Structural Equation Modelling (PLS-SEM) for the analysis of data gathered from respondents. A PLS-SEM measurement model shows the relationships between a construct and its indicators (items linked to each construct).

### Results

- 1) What relationship exists between the ten (10) virtual assessment standard indicators and the items attached to each?

The reflective measurement model was estimated for reliability and validity to establish the relationship between each virtual assessment standard indicator and the items linked to them. Cronbach Alpha and Composite reliability are reported as estimates of reliability of a reflective PLS measurement model. Figure 2 presents the measurement model for virtual assessment standard indicators.

**Figure 2**  
*Measurement Model for Virtual Assessment Standard Indicators*



The measurement model has ten (10) constructs (i.e blue circles with red ink labels). They (obj ass, content, tatratio, qual, proc, security, deploy, cost eff, feed mech, and rem loop) are referred to in this write up as virtual assessment standard indicators. The five (5) circles (with white labels) linked to each construct are the subscales of the virtual assessment virtual indicators. The sub-scales are awareness, relevance, skill of usage, previous usage and aspiration for future usage. Table 2 shows the results of the estimates of reliabilities and validities of the factors of VASI and those of the subscales. For example, the subscales are OBJ ASS (AWOA, awareness of OBJ ASS}; REOA (relevance of OBJ ASS); SUOA (skill of usage of OBJ ASS); PUOA (previous usage of OBJ ASS), and AUOA (aspiration for usage of OBJ ASS).

**Table 2**

*Estimated Reliability (Cronbach & Composite) and Average Variance Extracted (AVE) Indices*

	Cron. alpha	Com. reliab.	AVE		Cron. alpha	Com. reliab.	AVE
<b>OBJ ASS</b>	<b>0.979</b>	<b>0.98</b>	<b>0.492</b>	<b>DEPL</b>	<b>0.973</b>	<b>0.975</b>	<b>0.566</b>
AWOA	0.924	0.936	0.594	AWD	0.911	0.931	0.694
REOA	0.924	0.936	0.596	RED	0.911	0.931	0.691
SUOA	0.914	0.929	0.566	SUD	0.903	0.925	0.674
PUOA	0.934	0.944	0.628	PUD	0.898	0.922	0.663
AUOA	0.928	0.939	0.607	AUD	0.907	0.928	0.683
<b>CONT</b>	<b>0.975</b>	<b>0.976</b>	<b>0.543</b>	<b>COST EFF</b>	<b>0.958</b>	<b>0.962</b>	<b>0.559</b>
AWC	0.923	0.938	0.684	AWCE	0.87	0.912	0.72
REC	0.916	0.933	0.664	RECE	0.85	0.899	0.69
SUC	0.897	0.919	0.619	SUCE	0.863	0.907	0.708
PUC	0.914	0.931	0.659	PUCE	0.874	0.913	0.725
AUC	0.909	0.927	0.646	AUCE	0.858	0.904	0.701
				<b>FEED</b>			
<b>QUAL</b>	<b>0.969</b>	<b>0.971</b>	<b>0.528</b>	<b>MECH</b>	<b>0.948</b>	<b>0.953</b>	<b>0.577</b>
AWQ	0.899	0.923	0.665	AWFM	0.829	0.898	0.746
REQ	0.887	0.914	0.639	REFM	0.821	0.893	0.736
SUQ	0.881	0.91	0.627	SUFM	0.811	0.888	0.725
PUQ	0.885	0.913	0.636	PUFM	0.816	0.891	0.732
AUQ	0.884	0.912	0.633	AUFM	0.818	0.892	0.733
<b>TATRATIO</b>	<b>0.935</b>	<b>0.943</b>	<b>0.526</b>	<b>SECURITY</b>	<b>0.975</b>	<b>0.977</b>	<b>0.546</b>
AWT	0.751	0.857	0.668	AWS	0.922	0.937	0.681
RET	0.731	0.848	0.652	RES	0.913	0.93	0.656
SUT	0.732	0.849	0.652	SUS	0.906	0.926	0.64
PUT	0.760	0.862	0.676	PUS	0.922	0.938	0.683
AUT	0.733	0.850	0.655	AUS	0.916	0.933	0.664
<b>PROC</b>	<b>0.965</b>	<b>0.967</b>	<b>0.542</b>	<b>REMLOOP</b>	<b>0.975</b>	<b>0.977</b>	<b>0.546</b>
AWP	0.885	0.916	0.684	AWRL	0.928	0.942	0.697
REP	0.867	0.904	0.652	RERL	0.916	0.933	0.666
SUP	0.852	0.894	0.629	SURL	0.906	0.925	0.639
PUP	0.878	0.911	0.672	PURL	0.917	0.934	0.669
AUP	0.882	0.914	0.680	AURL	0.912	0.93	0.654
<b>VASI</b>	<b>0.996</b>	<b>0.996</b>	<b>0.455</b>				

In PLS-SEM, Cronbach Alpha and Composite estimates of reliabilities are reported because of the general belief that Cronbach underestimates reliability while Composite overestimates the index. As a result, the assumption in PLS-SEM is that the true reliability of a construct lies between the two, with Cronbach as the floor and composite as the ceiling (Hair et al., 2017). The estimates of reliability in Table 2 reveal acceptable reliability ranging from 0.731 to 0.98 for all the virtual assessment standards and their sub-scales; since the indices of reliabilities are all above 0.7 bench mark. This is an indication that all the ten (10) constructs (virtual assessment standard indicators) and the sub-scales have internal consistency (Hair et al., 2017), confirming their stability.

Convergent validity was established with the estimations of factor loadings and the Average Variance Extracted (AVE). A factor loading of 0.7 and above means that the indicators (items linked to each construct) and the construct share a lot in common; that is, there is a very strong and positive relationship between them while an AVE of 0.5 and above; shows that the indicators of a construct explain more than 50% of the variance in the construct. Table 3 shows the factor loading for all the items.

**Table 3***Factor Loadings of Items and AVEs of Virtual Assessment Standard Indicators*

<b>Construct</b>		<b>Subscales</b>				
<b>Virtual Assessment Standard Indicator (AVE)</b>	<b>Items/ Indicators</b>	<b>Factor Loading</b>	<b>Factor Loading</b>	<b>Factor Loading</b>	<b>Factor Loading</b>	<b>Factor Loading</b>
<b>Objective of Assessment (0.492)</b>		<b>Awareness (AWOA)</b>	<b>Relevance (REOA)</b>	<b>Skill of usage (SUOA)</b>	<b>Previous usage (PUOA)</b>	<b>Aspiration for future usage AUOA)</b>
	Obj Ass 1	0.746	0.711	0.704	0.746	0.748
	Obj Ass 2	0.757	0.724	0.603	0.776	0.749
	Obj Ass 3	0.783	0.797	0.775	0.807	0.776
	Obj Ass 4	0.783	0.798	0.787	0.816	0.805
	Obj Ass 5	0.804	0.784	0.775	0.809	0.799
	Obj Ass 6	0.753	0.753	0.750	0.780	0.750
	Obj Ass 7	0.807	0.801	0.774	0.791	0.767
	Obj Ass 8	0.792	0.780	0.771	0.784	0.800
	Obj Ass 9	0.771	0.803	0.784	0.794	0.796
	Obj Ass 10	0.708	0.765	0.783	0.815	0.797
<b>Content (0.543)</b>		<b>Awareness (AWC)</b>	<b>Relevance (REOA)</b>	<b>Skill of usage (SUC)</b>	<b>Previous usage (PUC)</b>	<b>Aspiration for future usage (AUC)</b>
	Cont-11	0.799	0.801	0.782	0.806	0.798
	Cont-12	0.837	0.796	0.803	0.812	0.804
	Cont-13	0.838	0.830	0.792	0.808	0.827
	Cont-14	0.834	0.818	0.752	0.822	0.813
	Cont-15	0.853	0.831	0.811	0.832	0.809
	Cont-16	0.818	0.821	0.785	0.810	0.789
	Cont-17	0.810	0.806	0.783	0.791	0.786
<b>Teaching Assessment Time Ratio (0.526)</b>		<b>Awareness (AWT)</b>	<b>Relevance (REOA)</b>	<b>Skill of usage (SUT)</b>	<b>Previous usage (PUT)</b>	<b>Aspiration for future usage (AUT)</b>
	Time-18	0.745	0.730	0.741	0.752	0.743
	Time-19	0.855	0.861	0.839	0.859	0.808
	Time-20	0.847	0.875	0.839	0.852	0.835
<b>Quality (0.528)</b>		<b>Awareness (AWQ)</b>	<b>Relevance (REOA)</b>	<b>Skill of usage (SUQ)</b>	<b>Previous usage (PUQ)</b>	<b>Aspiration for future usage (AUQ)</b>
	Qual-21	0.821	0.783	0.777	0.784	0.799
	Qual-22	0.815	0.807	0.808	0.828	0.814
	Qual-23	0.803	0.798	0.802	0.818	0.768
	Qual-24	0.793	0.808	0.798	0.781	0.791
	Qual-25	0.846	0.807	0.771	0.777	0.807
	Qual-26	0.815	0.795	0.795	0.795	0.792

<b>Proctoring (0.542)</b>		<b>Awareness (AWP)</b>	<b>Relevance (REOA)</b>	<b>Skill of usage (SUP)</b>	<b>Previous usage (PUP)</b>	<b>Aspiration for future usage (AUP)</b>
	Proc-27	0.821	0.800	0.790	0.763	0.817
	Proc-28	0.828	0.812	0.823	0.820	0.846
	Proc-29	0.841	0.789	0.818	0.837	0.832
	Proc-30	0.811	0.819	0.804	0.828	0.820
	Proc-31	0.835	0.818	0.726	0.830	0.809
<b>Security (0.546)</b>		<b>Awareness (AWS)</b>	<b>Relevance (REOA)</b>	<b>Skill of usage (SUS)</b>	<b>Previous usage (PUS)</b>	<b>Aspiration for future usage (AUS)</b>
	Secu-32	0.829	0.801	0.790	0.806	0.793
	Secu-33	0.836	0.822	0.771	0.811	0.814
	Secu-34	0.845	0.806	0.792	0.852	0.828
	Secu-35	0.822	0.810	0.820	0.845	0.815
	Secu-36	0.812	0.822	0.831	0.845	0.830
	Secu-37	0.834	0.814	0.820	0.831	0.823
	Secu-38	0.796	0.796	0.773	0.792	0.801
<b>Deployment (0.566)</b>		<b>Awareness (AWD)</b>	<b>Relevance (REOA)</b>	<b>Skill of usage (SUD)</b>	<b>Previous usage (PUD)</b>	<b>Aspiration for future usage (AUD)</b>
	Depl-39	0.763	0.840	0.824	0.836	0.829
	Depl-40	0.864	0.845	0.827	0.819	0.810
	Depl-41	0.834	0.820	0.814	0.831	0.843
	Depl-42	0.854	0.831	0.824	0.831	0.834
	Depl-43	0.836	0.828	0.822	0.735	0.825
	Depl-44	0.843	0.824	0.813	0.824	0.816
<b>Cost Effective ness (0.559)</b>		<b>Awareness (AWCE)</b>	<b>Relevance (REOA)</b>	<b>Skill of usage (SUCE)</b>	<b>Previous usage (PUCE)</b>	<b>Aspiration for future usage (AUCE)</b>
	Cost-45	0.866	0.833	0.845	0.841	0.837
	Cost-46	0.852	0.831	0.843	0.857	0.847
	Cost-47	0.866	0.835	0.842	0.856	0.827
	Cost-48	0.810	0.823	0.837	0.851	0.837
<b>Feedback Mechanism (0.577)</b>		<b>Awareness (AWFM)</b>	<b>Relevance (REOA)</b>	<b>Skill of usage (SUFM)</b>	<b>Previous usage (PUFM)</b>	<b>Aspiration for future usage (AUFM)</b>
	Feed-49	0.854	0.848	0.846	0.827	0.848
	Feed-50	0.869	0.872	0.867	0.871	0.860
	Feed-51	0.868	0.854	0.843	0.867	0.860
<b>Remediation Loop (0.546)</b>		<b>Awareness (AWRL)</b>	<b>Relevance (REOA)</b>	<b>Skill of usage (SURL)</b>	<b>Previous usage (PURL)</b>	<b>Aspiration for future usage (AURL)</b>
	Reme-52	0.840	0.822	0.786	0.822	0.815
	Reme-53	0.833	0.812	0.804	0.823	0.811
	Reme-54	0.846	0.831	0.822	0.840	0.828
	Reme-55	0.833	0.819	0.805	0.812	0.815
	Reme-56	0.833	0.826	0.755	0.775	0.784
	Reme-57	0.857	0.829	0.821	0.830	0.805
	Reme-58	0.804	0.773	0.800	0.822	0.804

Results in Table 3 reveal that the factor loadings of all the indicators (items linked to each construct) are between 0.704 (OBJ ASS-1-3) and 0.875 (TIME-20-2) which are all greater than or equal to 0.7 cut off except 0.603 (OBJ ASS-2-3) that is below. However, the item was

retained for relevance since OBJ ASS-2-1, OBJ ASS-2-2, OBJ ASS-2-4 & OBJ ASS-2-5 have loadings above 0.7. Values in the first column of Table 2 show the AVEs of all the factors (indicators) and the sub factors which are all above the cut off of 0.5 (0.492 to 0.577), implying that the indicators (items linked to each construct) represent the construct. In other words, they share a lot in common (Hair et al., 2017). Acceptable AVEs with factor loadings of 0.7 and above establish the convergent validities of the ten (10) constructs.

- 2) How independent are the ten (10) virtual assessment standard indicators identified through literature search?

The independence of each of the ten (10) virtual assessment standard indicators was determined by estimating the discriminant validity of the ten (10) constructs using Hetro-Trait-Mono-Trait (HTMT) ratio proposed by Henseler et al. (2015). The HTMT results are presented on Table 4.

**Table 4**

*Hetro-Trait-Mono-Trait (HTMT) Ratio of Pairs of Constructs in the Model*

	Cont Ent	Cost Eff	Deploy	Feed Mech	Obj Ass	Proc	Qual	Reme Loop	Secu
Content									
Cost Eff	0.81								
Deploy	0.822	0.937							
Feed Mech	0.796	0.926	0.899						
Obj Ass	0.91	0.813	0.817	0.788					
Proc	0.842	0.887	0.896	0.865	0.835				
Qual	0.905	0.864	0.864	0.843	0.866	0.91			
Remloop	0.804	0.919	0.887	0.939	0.8	0.873	0.857		
Security	0.817	0.898	0.929	0.878	0.817	0.918	0.876	0.883	
Tatratio	0.816	0.772	0.755	0.76	0.786	0.809	0.853	0.765	0.773

It can be observed from Table 4 that the HTMT ratios of every pair of constructs in the model are less than or (approximately) equal to 0.9. They are between 0.755 (smallest) and 0.939 (highest); the highest is (approximately) equal to 0.9. This proves the discriminant validity of the constructs in the model.

The result of the assessment of the measurement model for this study shows that the ten (10) indicators in the model are valid, reliable and distinct. It signifies that all the indicators (constructs) of virtual assessment standards (objective of assessment, content, quality, proctoring, feedback mechanism, deployment, cost effectiveness, security, remediation loop and teaching assessment time ratio) identified through literature search and opinion poll can be used as standards for the conduct of virtual examinations.

## Discussion

Since assessment is central to the teaching-learning process, there is need to know the assessment standards to guide lecturers before, during and after online teaching (Olatunde-Aiyedun et al., 2021). It is important to develop a scale to assess the quality of a Nigerian home grown assessment standard for online teaching (Akinsanmi et al., 2010). The result of the analysis reveals that the ten factors (objective of assessment, contents, quality, proctoring,



feedback mechanism, deployment, cost effectiveness, security, remediation loop and teaching assessment time ratio) of virtual assessment standard indicators all have internal consistency. This suggests that the responses of participants to the items of all the factors of virtual assessment standard are consistent (Frost, 2022; Hoffmann & Birnbrich, 2012) as the reliability indices are all greater than 0.7. This makes the scale reliable.

Results of the loadings serve to affirm the strong positive relationships between the indicators (items linked to each construct) and their respective constructs. In like manner, the AVEs of all the sub factors of virtual assessment standards are a pointer to the fact that the explained variance exceeds the unexplained (Bagozzi & Yi, 1988; Hair et al., 2017). In other words, each sub scale of VASI explains more than 50% of the variance of its indicators and less variance in the errors of the indicators. It means that each factor is measuring what it is intended to measure. OBJ ASS-2-3 was retained in the model for its importance since it has acceptable loading on the sub-scales of OBJ ASS (OBJ ASS-2-1, OBJ ASS-2-2, OBJ ASS-2-4 & OBJ ASS-2-5). Ping (2009) pointed out that indicators with low factor loadings may be retained if they are important to the study, especially first time studies. The HTMT ratios of less than or equal to 0.9 (Henseler et al., 2015) for every pair of constructs in the model confirm that the ten (10) constructs of the model are different. These results establish the adequacy of Virtual Assessment Standard Indicators as a tool for assessing the academic development of students in the virtual classroom.

### **Conclusion**

Virtual assessment has many dimensions that must be considered to make it a credible and worthwhile exercise. Results of analysis of this study authenticate the virtual assessment standards indicators identified through literature search and opinion poll conducted at the onset of the study. The virtual assessment indicators (objective of assessment, content, quality, proctoring, feedback mechanism, deployment, cost effectiveness, security, remediation loop and teaching assessment time ratio) should be carefully integrated into online examinations.

A Nigerian home-grown virtual assessment standard indicator will be a good guide for the conduct of credible virtual assessment at all levels of education. It can be adopted by university administrators for the conduct of online assessment and adapted for use at other levels of education in Nigeria and in other climes.

### **Acknowledgement**

The team appreciates the Tertiary Education Trust Fund (Tetfund) in Nigeria through the National Research Fund (NRF), for the grant to execute this project.

## References

- Akinsanmi, O., Agbaji, R. O. T., & Soroyewun, M. B. (2010). Development of an e-assessment platform for Nigerian universities. *Research Journal of Applied Sciences, Engineering and Technology*, 2(2), 170–175.
- Aon. (2025). *A Complete Guide to Hosting a Virtual Assessment*. Assessment Solutions. [assessment.aon.com/en-us/blog/complete](https://assessment.aon.com/en-us/blog/complete) Aonplc
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74–94.
- Benton, T. (2015). *Examining the impact of moving to on-screen marking on concurrent validity*. Cambridge Assessment Research Report. Cambridge Assessment.
- Boud, D. (2010). *Assessment 2020: Seven propositions for assessment reform in higher education*. Australian Learning and Teaching Council. [www.assessmentfutures.com](http://www.assessmentfutures.com)
- Family Educational Rights and Privacy Act of 1974, 20 U.S.C. § 1232g. (1974).
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.2307/3151312>
- Frost, J. (2022). *Cronbach's Alpha: Definition, Calculations & Examples*. Statistics by Jim. <https://statisticsbyjim.com/basics/cronbachs-alpha/>
- Hair, J. F., Hult, G. T., Ringle, C. M., & Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modelling (PLS-SEM)*, 2<sup>nd</sup> Ed., SAGE Publications Inc.
- Handley, K., & Williams, L. (2011). From copying to learning: Using exemplars to engage students with assessment criteria and feedback. *Assessment and Evaluation in Higher Education*, 36(1).
- Henseler, J., Ringle, M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modelling. *Journal of the Academy of Marketing Science*, 43(1), 115–135.
- Hoffmann, A. O. I., & Birnbrich, C. (2012). The impact of fraud prevention on bank-customer relationships: an empirical investigation in retail banking. *International Journal of Bank Marketing*, 30(5), 390–407.
- Joint Admissions and Matriculation Board (JAMB). (2023). *Manual of Critical Assessment Competencies for Tertiary Education Lecturers in Nigeria*.
- Kifordu, A. A., & Igweh, K. F. (2021). Quality assurance measures and examination and management: Perspectives from colleges of education in Edo and Delta states, Nigeria *Nigerian Academy of Management Journal*.

- Lei, S. A., & Gupta, R. K. (2010). College Distance Education Courses: Evaluating Benefits and Costs from Institutional, Faculty and Students' Perspectives. *Education*, 130(4), 616–631.
- Martin, J. E. (2015). *Grading and Assessing Online Student Work: Core Concepts and Key Strategies You Can Use Today*. Blackbaud, p. 18. eBook.pdf
- Nordegren, C. (2020). 3 Reasons to use formative assessment in your virtual instruction— Tips on how to go about it. Northwest Evaluation Association, May 7, 2020. <https://www.nwea.org/blog/2020/formative-assessment-in-virtual-instruction/>
- Ofqual. (2017). “*The Rise of Onscreen Marking Around The World*”. *RM Results. RM Results. Archived from the original on 13 April 2017*. Retrieved 15 October 2015.
- Olatunde Aiyedun, T. G, Ogunode, N. J., & Eyiolorunse Aiyedun, C. T. (2021). Assessment of virtual learning during Covid-19 lockdown in Nigerian public universities. *Academicia Globe: Inderscience Research*, 2(5), 159–175. <https://doi.org/10.17605/OSF.IO/S6N2Q>
- Pakdaman, M., Moghadam, M. N., Dehghan, H. R., Dehghani, A., & Namayandeh, M. (2019). Evaluation of the Cost-Effectiveness of Virtual and Traditional Education Models in Higher Education: A Systematic Review Study. *Health Tech Assessment in Action*, 3(1). <https://doi.org/10.18502/htaa.v3i1.5715>
- Panizzon, D. (2019). Assessment, learning and teaching - a symbiotic relationship. In V. Dawson & J. Donovan (Eds.), *The Art of Teaching Science* (3rd Ed., pp. 140–158). Allen & Unwin.
- Ray, M. E., Daugherty, K. K., Lebovitz, L., Rudolph, M. J., Shuford, D., & Vall, M. V. (2018). Best practices on examination, construction, administration and feedbacks. *American Journal of Pharmaceutical Education*, 82(10). <https://doi.org/10.5688/ajpe7066>
- Rolim, C., & Isaias, P. (2018). Examining the use of e-assessment in higher education: Teachers and students' viewpoints. *British Journal of Educational Technology*, 50(4), 1785–1800.
- Singh, V., & Thurman, A. (2019). How Many Ways Can We Define Online Learning? A Systematic Literature Review of Definitions of Online Learning (1988-2018). *American Journal of Distance Education*, 33(4), 289–306. <https://doi.org/10.1080/08923647.2019.1663082>
- Teachfloor. (2024). *What is online assessment?* Teachfloor.com/elearning
- Westhuizen, D. (2016). *Guidelines for Online Assessment for Educators*. Commonwealth of Learning. <https://doi.org/10.13140/RG.2.2.31196.39040>

**Contact emails:** taye.abodunwa@gmail.com  
 oladipo.abodunwa@polyibadan.edu.ng



## Haruki Murakami's Novels as a Predictive Text and a Data-Driven Approach of *Hikikomori* Effects on Tertiary-Level Students From South India

Sowndharya T R, SASTRA Deemed University, India  
Abirami Kanagarajan, SASTRA Deemed University, India  
P Suganthi, SASTRA Deemed University, India

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

*Hikikomori*, extreme social withdrawal, poses a considerable issue for young adults worldwide arising from multiple factors, including familial conflict, harassments and various sociological influences that heighten stress levels. New Historicism is used to analyse a prolific Japanese author known for his unique narrative style - Haruki Murakami's works, as predictive texts in the contemporary global context. It further identifies key contributing factors and organises this phenomenon's effects on students into five distinct stages, while also classifying four levels and typologies of *Hikikomori*, building on existing research in the field. The study employs a quantitative survey using the DASS21 questionnaire, targeting approximately 300 tertiary students in South India to identify factors associated with the emergence of *Hikikomori*. The analysis is validated through Structural Equation Modelling via SmartPLS software. The assessment of mental health is concentrated on three key stressors: familial issues, academic pressures and societal conformity. Additionally, Natural Language Processing in Python is used to suggest Murakami's works as predictive texts. This research serves as a vital resource for stakeholders, including parents, educators, academic institutions and the government, to facilitate the early identification and prevention of individuals susceptible to becoming *hikikomori*. Furthermore, it may be helpful to propose coping strategies for those already experiencing significant levels of depression, anxiety and stress associated with *hikikomori*. The study also positions Murakami's literary works as relevant predictive texts for this phenomenon. Eventually, it aims to enhance societal well-being in alignment with Sustainable Development Goal 3, which advocates for health and well-being for all.

**Keywords:** *hikikomori*, Haruki Murakami, tertiary level students, SDG 3, SmartPLS software, South India

iafor

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

*Hikikomori*, characterised by severe social isolation is an emerging global issue. Initially it was first reported in Japan in the 1990s, which later grew and was identified in the 2000s.

The term ‘Hikikomori’ was derived from two Japanese verbs: ‘hiki’ means ‘to withdraw’ and ‘komori’ means ‘to be inside’. It was coined by Japanese psychiatrist Tamaki Saito, who witnessed multiple youths in Japan in the 1990s exhibiting extreme social withdrawal behaviors. (Lin et al., 2022)

“In the early 2000s, Japanese society became aware of the social phenomenon of hikikomori or social withdrawal among Japanese youth” (Takefuji, 2023). Considered not only as a domestic Japanese issue but also as a global social problem and a mental health issue termed as the “silent global health epidemic”. Earlier global study on nine countries have shown that 1.2% respondents have experienced hikikomori.

However, the hikikomori phenomenon was not a domestic Japanese social problem, but a global social and health issue or a global silent epidemic...A total of 1.2 % of respondents experienced ‘hikikomori’ in their lifetime in Japan. A literature review was conducted on why hikikomori is the global social and health issue. (Takefuji, 2023)

A raise in this problem may also affect the global economy since those affected are adolescents, young adults and even middle-aged people who are individuals that represent a key segment of the society. When such people who work for the societal development, often withdrawing from society or shunning social interactions for extended periods for six months or longer could cause a degradation in the societal development. “The hikikomori phenomenon poses challenges for Japanese families and the economy. The ‘80–50 problem’ highlights the potential financial burden as hikikomori children enter their 50s while relying on aging parents” (Savant, 2024).

Notably, this phenomenon is on the rise in both developed and developing nations, highlighting the urgent need for increased societal awareness and intervention programs. “The phenomenon of hikikomori is considered to be a boundless and global syndrome found across many cultures, but notably, is more common in urban areas and high-income, developed countries” (Hamasaki et al., 2020, 808–817).

The problem of hikikomori or social isolation can be seen in four types namely, the alternative withdrawal, reactionary withdrawal, resigned withdrawal and the cocoon-like withdrawal.

The four types of withdrawal can be defined as:

The alternative withdrawal is a sort of rebellion towards society, that is experienced in a particularly negative way and as an oppressive entity, bent on limiting one’s personal liberty. Often, this type of withdrawal is preceded and determined by a strong existential depression. The reactionary withdrawal is defined as ‘a symptomatic reaction to situations of great familial stress’. The hikikomori that are a part of this category live, or have lived, in unfavourable contexts that have contributed in worsening and already pre existing tendency towards isolation. Often they link

their decision to withdraw to an event considered to be particularly traumatic, taken place within the familial environment, or in the scholastic or social environment. The resigned withdrawal is Defined as ‘a way to escape from strong social pressures’, concerns those hikikomori that aren’t able to sustain the pressure for social realization derived from their parent’s expectations or, more in general, from society. These hikikomori simply decide ‘not to play’, refusing to pursue any scholastic, work or social career. They feel so oppressed by other’s expectations that they decide to hide, and in so doing alleviating, in part, the suffering. In the cocoon-like withdrawal, the hikikomori looks for an escape, in isolation, from his responsibilities and his duties as an adult. They feel like they’re not competent enough to face them and this feeling causes in them a great fear. Existence is approached with a flattening on the present, while thought regarding the future, cause of great anxiety, are refused through a process of avoidance. (The Four Types of Hikikomori: Alternative, Reactionary, Resigned, and Cocoon-like, n.d.)

Along with the types there are also three stages of hikikomori or isolation. The First, Second and Third stages of hikikomori.

In the first stage, the person starts to perceive the social isolation impulse without being able to consciously elaborate it. They become aware of a feeling of discomfort or uneasiness when they interact with other people, finding greater relief in solitude. In the second stage, the person starts to consciously elaborate the isolation impulse and to rationally attribute it to some social interactions or situations. It's in this phase where they begin regularly to refuse requests by friends to go out, to progressively abandon school, where the sleep-wake cycle is completely inverted and the near total of their time is spent in the bedroom and dedicated to solitary activities. In the third stage, the person decides to abandon themselves completely to the social isolation impulse and grows progressively further apart even from the parents and relations formed on the internet. These become for him or her a cause of unease or displeasure, in a way similar to canonical social interactions. (The Three Stages of the Hikikomori: From the First Warning Signs to Complete Isolation, n.d.)

Besides all of these, there are two classifications of hikikomori – the Primary and the Secondary hikikomori. These two types can be defined as, “Primary hikikomori is the one without a comorbid mental disorder and does not fit into a psychopathological structure. Secondary hikikomori is interwoven with comorbid mental disorders” (Dong et al., 2022, 167–173).

The causes for hikikomori could also be other external factors such as psychological problems including post-traumatic stress disorder (PTSD), Agoraphobia to general problems like extreme shyness and family problems; “some of the circumstances that can favor the appearance of Hikikomori syndrome are the following: Family problems, Extreme shyness, Post-traumatic stress disorder (PTSD), Problems linked to anxiety and social phobia, Agoraphobia, Having suffered bullying, Social rejection” (Admin, 2025).

## Objectives

The main objectives of the paper are to bring out the types of the types, stages and classifications of hikikomori that are prevalent. Also, to establish India’s closeness and causes

to hikikomori through the DASS 21 survey. Additionally, to position the Japanese author, Haruki Murakami's selected novels as relevant predictive texts.

### Methodology

The following systematic methodology was employed for the study. First, a literature review was conducted based on 4 criteria and a significant gap was obtained. The DASS 21 questionnaire consisting of 21 questions with 7 questions in each of stress, anxiety and depression categories along with a 11 preceding questions on demographic data. The participants were tertiary level students aged between 16 to 30 years from various regions of South India; the targeted response was 300 but a total of 613 responses were collected via Google Forms. The analysis of the responses was validated through the Structural Equation Modelling using the SmartPLS software. The novels of Haruki Murakami chosen for the study were *Norwegian Wood*, *Colorless Tsukuru Tazaki and his Years of Pilgrimage*, *Kafka on the Shore* and *South of the Border, West of the Sun*. The hikikomori characters were studied from the novels along with the analysis of the causes of the issue. Natural Language Processing in Python was used to establish Haruki Murakami's works as predictive texts.

### Literature Review

The study titled "Validating the depression anxiety stress scales (DASS-21) across Germany, Ghana, India, and New Zealand using Rasch methodology" assesses the psychometric properties of DASS-21 in four countries, confirming its reliability and validity for measuring psychological distress (Adu et al., 2025, 363–373). The study titled "Meaning in life buffers mental health risks in South Indian transgender (Hijra) women" shows that meaning in life significantly mediates the links between depression, anxiety, stress and quality of life for transgender women in South India, indicating that enhancing meaning-making can improve their resilience and well-being (PP & Arur, 2025). The article "Sensory processing sensitivity in relation to coping strategies: exploring the mediating role of depression, anxiety and stress" explores how depression, anxiety and stress mediate the link between sensory processing sensitivity and coping strategies among participants (Fernandes & Panwar, 2024). The article "Post debridement – Mental health and body image satisfaction among mucormycosis patients: Concern beyond surgical debridement" studies 56 post-operative mucormycosis patients, who are found with high body image satisfaction, with mild depression, anxiety and stress linked to various factors (Nair et al., 2024). The article "Impact of COVID-19 Lockdown on Mental Health, Physical Activity, and Eating Behaviours Among IT Professionals in India" is a study in Pune that revealed how the COVID-19 lockdown negatively impacted IT professionals' mental health, eating habits and physical activity (Animish et al., 2023, 209–218). The study titled "Mental Health among Automobile industry workers in Chennai - A Cross-sectional Study from a Single Industrial Unit" analyses depression, anxiety and stress in 227 Chennai automobile workers, highlighting associations with demographics and the need for better workplace support (Vinoth et al., 2023, 346–352). The article titled "Prevalence and correlates of depression, anxiety, and stress among high school students in a block of Hooghly district, West Bengal: Across-sectional study" is a study of 812 adolescents in West Bengal who revealed high rates of depression, anxiety and stress, underscoring the need for mental health interventions (Gupta et al., 2023). The study "Farmer Workplace Discomfort Levels Leading to Adverse Mental Health" assesses musculoskeletal discomfort and mental stress in Indian farmers using questionnaires and ANFIS to predict stress under heat (Chauhan et al., 2021, 1–14). The study titled "An online cross-sectional survey of depression, anxiety, and stress among resident doctors working at a



COVID-19 tertiary care center in India” finds that about one-third of resident doctors at a COVID-19 center experienced depression and anxiety, highlighting mental health concerns (Sriperambudoori et al., 2021, 111-117). The study titled “Depression, anxiety, stress and stigma in informal caregivers of People Living with HIV (PLHIV)” taken in Mangalore, found 20% of 150 informal HIV caregivers faced stigma, leading to high depression and anxiety rates (Khan et al., 2017). The article titled “Hikikomori and Religious Psychology: Trauma, Kami, and Forms of Healing in ‘Underground’ by Haruki Murakami” reads how, in contemporary Japan, the clash of traditional values and modernity gives rise to hikikomori disorder, as explored in Murakami's *Underground*, highlighting recovery through kami (Hang, 2024). The study “Unlocking the Mindware: The Responsibility of Building a Solipsistic Universe in Murakami Haruki's Hard-Boiled Wonderland and the End of the World”, analyses how the identity formation in Murakami's work illustrates neuroscience's effect on self and promotes social responsibility amidst capitalism (Shin, 2018, 749–780). The article titled “Loneliness in Haruki Murakami's *After Dark* (2007): A Focalization Analysis” focuses on how Haruki Murakami uses focalization to depict Mari Asai's loneliness, illustrating her growth and relationship-building for young adults in *After Dark* (Amanda et al., 2019, 35–54). The article “The Existentialist World of Murakami Haruki: A Reflection of The Existentialist World of Murakami Haruki: A Reflection of Postmodern Japanese Society Postmodern Japanese Society” examines existentialist themes in Murakami's novels, critiquing Japan's identity crisis, consumerism, alienation and societal conformity (Garguilo, 2012). The thesis titled “Murakami Haruki's Short Fiction and the Japanese Consumer Society” explores Murakami Haruki's critique of Japan's consumer society through historical context, literature themes and selected short stories (Clements, 2019). The study titled “Effect of Online Learning on Mental Health and Academic Outcomes of Students with Intellectual Disabilities in Higher Education” explores how online learning negatively affects mental health and academic performance in students with intellectual disabilities versus their peers (Shreeharsha et al., 2025, 34–43). The article “COVID-19-related stressors exacerbate food insecurity and depressive symptoms among graduate students receiving campus basic needs services: Cross-sectional findings from seven California public universities” shows that COVID-19 stress worsened food insecurity and depression among graduate students, highlighting the need for better support systems (Martinez et al., 2023). The study titled “Network structure of social withdrawal symptoms in Asian psychiatric patients at high risk of hikikomori: Findings from the REAP-AD3” explores social withdrawal symptoms in Asian psychiatric patients at risk of hikikomori, focusing on how low enjoyment of social interactions is a critical intervention area (Lee et al., 2025). The report study titled “Hikikomori and Internet Gaming Disorder: a Case Report” describes an 18-year-old Indian student facing social withdrawal and gaming disorder, emphasizing the need for tailored interventions (Sunil et al., 2024, 239-242). The study titled “Does the ‘hikikomori’ syndrome of social withdrawal exist outside Japan? A preliminary international investigation” shows how hikikomori syndrome is acknowledged in multiple countries, influenced by diverse diagnostics and treatment shaped based on cultural factors (Kato et al., 2011).

## Research Gap

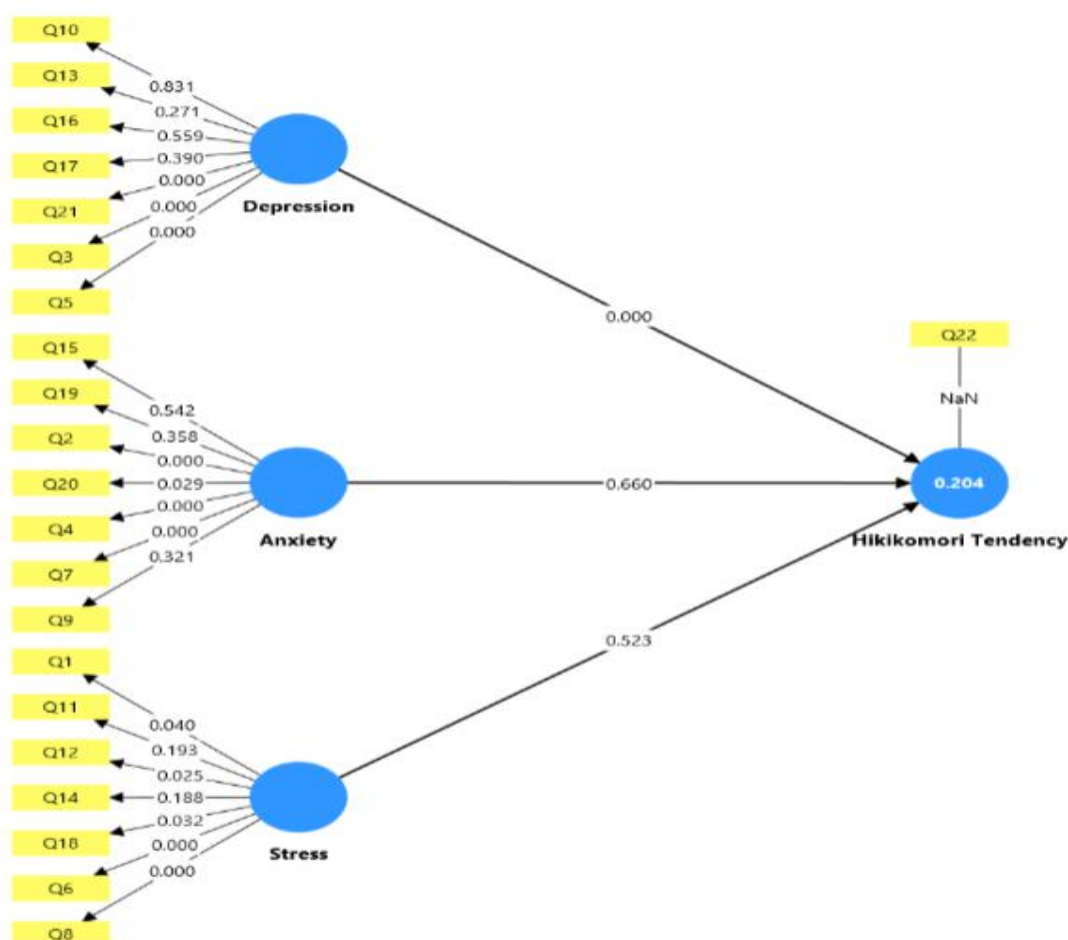
From the literature survey from the articles published between the years 1998 to 2025, the research gap identified is that, no research works are presented in collaboration of DASS 21 questionnaire and tertiary level students. Additionally, a research work that combines, Haruki Murakami's novels as predictive texts and hikikomori in India is not yet been presented.

## Discussion

Out of the 613 participants of the DASS 21 questionnaire, 361 were female and 252 were male participants. The tertiary level students were enrolled from bachelors to post-doctoral programmes that also includes diploma courses like polytechnic. The students were from various academic domains and 406 hostellers and 206 day scholars. 524 participants have siblings and the remaining 89 do not have siblings. 255 participants have both the parents going for work, 355 have only of the parents going for work and 23 have retired parents. 415 participants were living in urban, 31 were from cosmopolitan and 167 from rural areas. Other demographic questions included topics like the participants' age, their income, number of members in their families and their current years of education.

The study employed Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS to assess the impact of three psychological constructs—Depression, Anxiety, and Stress, on the emerging hikikomori tendency among tertiary-level students in South India. The measurement items were drawn from the validated DASS-21 questionnaire, with Q22 added to assess Hikikomori-related behaviours. The questionnaire has 21 items have a set of three self-report scales, containing seven items divided into subscales with similar content, designed to measure the emotional states of depression, anxiety and stress. The values are set to 0, 1, 2 and 3 with zero being the least. The SEM using SmartPLS is represented below in Figure 1.

**Figure 1**  
*Structural Equation Model of Hikikomori Tendency*



## Measurement Model Evaluation

The measurement model was evaluated based on the outer loadings of observed variables on their corresponding latent constructs. Several items demonstrated strong and acceptable loadings—for instance,  $Q13 = 0.831$  for *Depression* and  $Q19 = 0.542$  for *Anxiety*—indicating a satisfactory degree of indicator reliability. However, a number of items such as Q3, Q5, Q4, Q6 exhibited outer loadings of 0.000, suggesting that these indicators failed to capture significant variance in their respective latent constructs within this sample. Despite their poor statistical performance, these items were retained to maintain theoretical consistency with the standardized DASS-21 framework, in alignment with recommendations to avoid post hoc modifications that may undermine conceptual validity.

The NaN (Not a Number) value for Q22, which was designed as a single-item indicator of *Hikikomori Tendency*, likely results from the nature of single-item constructs in SmartPLS. Specifically: SmartPLS typically does not compute outer loadings for single-item constructs because there's no variance to estimate between multiple indicators; Alternatively, missing data during preprocessing or import may have caused Q22 to be excluded from the loading computation, resulting in a NaN. Despite the NaN, the latent variable *Hikikomori Tendency* retained a valid  $R^2$  value (0.204), and the path coefficients from Depression, Anxiety, and Stress to Hikikomori Tendency remained interpretable and significant (e.g., 0.660 from Anxiety, 0.523 from Stress). Therefore, the structural model integrity and conceptual framework were not compromised. Although Q22 yielded a NaN outer loading, this is a known limitation in PLS-SEM software like SmartPLS when modeling single-indicator constructs. As the item was central to the outcome construct *Hikikomori Tendency*, it was theoretically justified to retain it. The overall model's structural paths remained interpretable, and the construct's explanatory power ( $R^2 = 0.204$ ) supported the inclusion of the variable despite the missing estimate.

## Structural Model Analysis

The model's  $R^2$  value for Hikikomori Tendency was 0.204, indicating that 20.4% of the variance in Hikikomori behaviour is explained by the combination of depression, anxiety, and stress. This level of explanatory power is considered moderate and sufficient in behavioural research, especially within exploratory frameworks targeting complex psychological phenomena.

The path coefficients reveal the relative strength of influence from each construct:

- Anxiety → Hikikomori Tendency:  $\beta = 0.660$
- Stress → Hikikomori Tendency:  $\beta = 0.523$
- Depression → Hikikomori Tendency:  $\beta = 0.000$

## Interdisciplinary Analysis of Hikikomori Using NLP, Literary Texts, and Mental Health Diagnostics

The four novels of Haruki Murakami, *Norwegian Wood*, *Colorless Tsukuru Tazaki and his Years of Pilgrimage*, *Kafka on the Shore* and *South of the Border, West of the Sun* were selected for the study. 20 key words - lonely living, Physical isolation, Life in supernatural world, Loneliness, Disconnect, Solitude, Isolated communities, Sense of Loss, Struggle to emotional connect, Family disputes, Societal anxieties, Abandonment, Loss of friendship, Loss of close person, Failed love life, Guilt, Toru Watanabe, Tsukuru Tazaki, Kafka, Hajime –

were used from the novels for text mining. The data analysis of the four selected novels was done using the Natural Language Processing (NLP) in Python to bring out the alignment between emotional distribution and sentiment polarity patterns across topics, which is represented in the Table 1.

**Table 1**

*Data Analysis and Results*

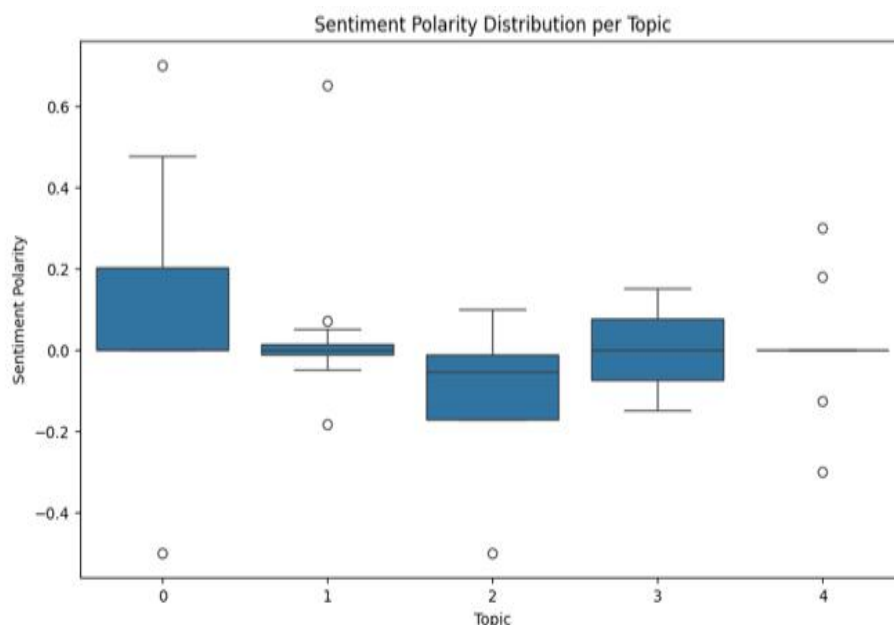
Topic	Dominant Emotions	Emotional Tone	Sentiment Match	Interpretation
0	Fear, Sadness, Surprise	Emotional, conflicted	Mixed	Separation, ambiguity, anxiety
1	Fear, Trust, Negative	Thoughtful, reflective	Mostly neutral	Human connection, uncertain hope
2	Sparse, low emotions	Detachment	Mild negative	Plot or critique-oriented
3	Surprise, Negative	Quiet intensity	Slightly positive	Truth, breaking points, inner clarity
4	Fear (strong), Anticipation	Anxious intensity	Neutral-mixed	Problems, transitions, internal chaos

### Sentiment Polarity Distribution per Topic

The sentiment polarity across topics generated from Murakami's text is shown in Figure 2.

**Figure 2**

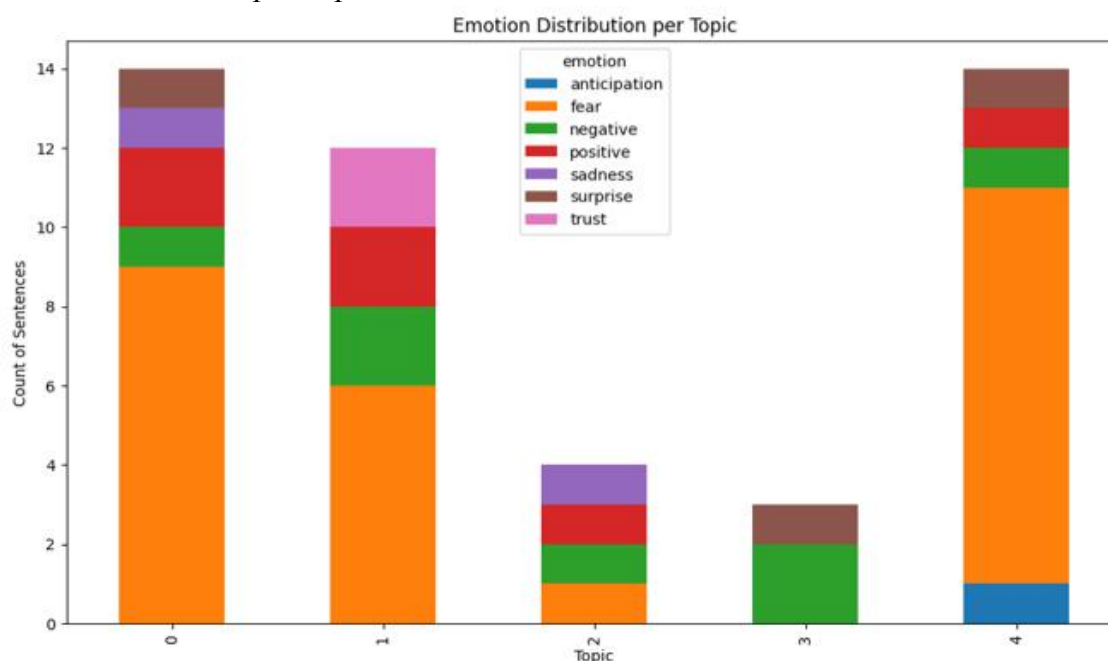
*Sentiment Polarity Distribution per Topic*



It exhibits a central tendency around neutral to slightly negative sentiments. Topic 0 showed the widest emotional variation, while Topics 2 and 4 clustered around neutral polarity. This reflects the emotional ambiguity and introspective depth typical of Murakami's writing, aligning with the internal states associated with Hikikomori.

The emotion distribution per topic generated using NLP is shown in Figure 3.

**Figure 3**  
*Emotion Distribution per Topic*



This reveals that there is a prevalence of fear, sadness, and surprise across multiple topics, with minimal representation of positive emotions. This mirrors the psychological profiles of individuals at risk of Hikikomori—marked by emotional withdrawal, anxiety, and emotional uncertainty—supporting the hypothesis that Murakami’s narratives can act as predictive texts.

## Results

**Table 2**  
*Correlating Structural Equation With Topic-Emotion Matrix*

Topic	Dominant Emotions	Emotional Tone	Sentiment	Interpretation	PLS Link
0	Fear, Sadness, Surprise	Emotional, conflicted	Mixed	Separation, ambiguity, anxiety	<b>Aligned with Anxiety → Hikikomori</b> ; shows emotional dissonance leading to withdrawal Suggests <b>ambivalent trust</b> , potential <b>inner stress</b> and the hope for reconnection Possibly aligns with <b>detached or avoidant coping styles</b> ; <b>low Depression loading</b> matches this
1	Fear, Trust, Negative	Thoughtful, reflective	Mostly Neutral	Human connection, uncertain hope	
2	Sparse, low emotions	Detachment	Mild Negative	Plot or critique-oriented	

Topic	Dominant Emotions	Emotional Tone	Sentiment	Interpretation	PLS Link
3	Surprise, Negative	Quiet intensity	Slightly positive	Breaking points, clarity	Indicates <b>stress peaks</b> → <b>transformation</b> , consistent with Stress as a significant predictor
4	Strong Fear, Anticipation	Anxious intensity	Neutral-Mixed	Internal chaos, transition	<b>High anxiety</b> , maps directly to strong <b>Anxiety</b> → <b>Hikikomori path (0.660)</b>

The results of DASS 21 analysis by the SEM using SmartPLS software show that anxiety is the strongest predictor of Hikikomori behaviour, followed closely by stress, while depression showed no direct effect on Hikikomori tendencies in this model. This pattern is consistent with existing literature suggesting that Hikikomori is more closely related to avoidance, panic, and social apprehension, which are primary symptoms of anxiety rather than depression. The NLP using python resulted that there is a strong alignment between emotional distribution and the sentiment polarity patterns across topics. Fear is a dominant emotion, consistent with themes of isolation. The results also validate Murakami's literary themes of loneliness, disconnection, and existential drift, as emotionally and semantically consistent with Hikikomori - related discourse. New Historicism allows these works to be read not only as cultural artefacts but also as literary diagnostics of emerging mental health conditions in modern societies.

Thus, the study supports targeted psychological interventions aimed at reducing anxiety and managing stress, especially within academic institutions. Rather than solely focusing on depression, which has been traditionally emphasized, the study indicates that pre-emptive strategies should address anxiety and stress management to curb the progression into hikikomori states. The results also validate Murakami's literary themes of loneliness, disconnection and existential drift as emotionally and semantically consistent with Hikikomori related discourse. The intervention of the New Historicist theory allows these works to be read not only as cultural artefacts but also as literary diagnosis of emerging mental health conditions in modern societies through literature and literary works.

### Research Implications

This study contributes to the emerging discourse on *Hikikomori* outside of Japan by contextualizing it within Indian tertiary education. The findings reinforce the need to recognize anxiety and stress as early psychological markers of social withdrawal tendencies, while depression showed no direct influence. By combining psychological modeling (PLS-SEM), Natural Language Processing, and literary-cultural analysis—particularly through the narratives of Haruki Murakami—the study offers a novel interdisciplinary approach to identifying and anticipating socio-psychological issues among youth. Emotional patterns such as fear, anticipation, and detachment observed through NLP-based tone analysis align with the quantitative findings, validating the model and deepening insight into the emotional experience of withdrawal. This methodology not only enables early, non-invasive detection of *Hikikomori* tendencies through student narratives but also expands the global understanding

of youth isolation by emphasizing the importance of cultural and contextual relevance in mental health research.

### **Contributions From This Research**

The research also makes a few key contributions as discussed; the study establishes literature as predictive texts. For instance, Haruki Murakami's fictional works are seen as reflective medium for the diagnosis of the withdrawal tendencies in contemporary youth through emotion and sentiment analysis. The study proposes a typological extension of the term hikikomori beyond its meaning as a psychological disorder, through the refined four-types, three-stage framework and the two-classification of hikikomori risk, contextualized for the Indian tertiary education. An empirical validation through the DASS 21 and Structural Equation Modelling is done to validate the familial, academic and social conformity stressors as the key predictors of hikikomori or social isolation tendencies in Indians. The paper also highlights the limitations of current machine learning models in detecting low-prevalence psychological phenomena by underlining the need for better resampling or model tuning strategies that contributes to an AI-driven early detection challenge. As a final key contribution, the study directly contributes to the Sustainable Development Goal 3 by offering ways for early mental health screening and informed intervention strategies aligning with culture.

### **Recommendations From This Study**

The study recommends to include Haruki Murakami's works in the Indian academic curriculum; increased study of literary works by such authors who address current societal issues can create awareness for teacher trainees and academicians about the existence of these problems orienting to mental health. The students on the other hand, can also be educated on the upraising mental health issues who may contribute by offering help to peers who are found to show symptoms of deteriorating mental health. An activity-based curriculum specially tailored based on the identified problem offers more care for the students mental and physical health, ultimately aiming for a better future.

### **Uniqueness of the Study**

The study uniquely represents how literature works as a representation of the current societal issues. Moreover, the inclusion of literary works of authors like Haruki Murakami in the syllabus, who address contemporary youth and the problems they face; this helps for building a better society for the upcoming generation. It also measures the current level of hikikomori in India, simultaneously by bringing out the mental health status of Indian tertiary level students based on their responses to DASS 21. Ultimately, the research explores what can cause hikikomori to students among stress, anxiety and depression.

### **Conclusion**

The study of Haruki Murakami's works, the measurement of hikikomori in India and South Indian tertiary level students using DASS 21 questionnaire reveal that hikikomori is in a beginning stage in India. Teachers, parents and students should start concentrating on this issue by getting and giving awareness. One possible means is through the rapid establishment of support for mental health in academic institutions in first place and awareness programs

for parents and educators for early identification and prevention. Also, frequent health check-up for students should also include the assessment of mental health for a healthier future.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

AI was used solely for language enhancement purposes. No other aspect of the research or writing process involved the use of AI or AI-assisted technologies.



## References

- Admin. (2025, February 28). *Hikikomori Crisis: The alarming rise, 7 key causes*. Insight Therapy Solutions. <https://www.insighttherapyolutions.com/articles/hikikomori-triggers/>
- Adu, P., Popoola, T., Iqbal, N., Medvedev, O. N., & Simpson, C. R. (2025). Validating the depression anxiety stress scales (DASS-21) across Germany, Ghana, India, and New Zealand using Rasch methodology. *Journal of Affective Disorders*, 363–373. <https://doi.org/10.1016/j.jad.2025.04.099>
- Amanda, L., Nafisah, N., & Novianti, N. (2019). Loneliness in Haruki Murakami's *After Dark* (2007): A Focalization Analysis. *Passage: A Journal of Language, Literature and Culture*, 7(1), 35–54. <https://doi.org/10.17509/psg.v7i1.21254>
- Animish, J., Arti, M., & Srujana, M. (2023). Impact of COVID-19 lockdown on mental health, physical activity, and eating behaviours among IT professionals in India. *Archives of Psychiatry Research*, 59(2), 209–218. <https://doi.org/10.20471/dec.2023.59.02.04>
- Chauhan, H., Satapathy, S., & Sahoo, A. K. (2021). Farmer workplace discomfort levels leading to adverse mental health. *International Journal of Social Ecology and Sustainable Development*, 13(1), 1–14. <https://doi.org/10.4018/ijsesd.290314>
- Clements, J. (2019). *Murakami Haruki's Short fiction and the Japanese Consumer Society* [MA Thesis, University of Kansas]. <https://hdl.handle.net/1808/30078>
- Dong, B., Li, D., & Baker, G. B. (2022). Hikikomori: A Society-Bound syndrome of severe social withdrawal. *Psychiatry and Clinical Psychopharmacology*, 32(2), 167–173. <https://doi.org/10.5152/pcp.2022.22429>
- Fernandes, L., & Panwar, N. (2024). Sensory processing sensitivity in relation to coping strategies: exploring the mediating role of depression, anxiety and stress. *Discover Psychology*, 4(1). <https://doi.org/10.1007/s44202-024-00214-6>
- The four types of hikikomori: alternative, reactionary, resigned, and cocoon-like. (n.d.). *HIKIKOMORI ITALIA Associazione Nazionale Ritiro Sociale Volontario*. <https://www.hikikomoriitalia.it/p/the-four-types-of-hikikomori.html#:~:text=The%20four%20types%20of%20hikikomori,%2C%20resigned%2C%20and%20cocoon%2Dlike>
- Garguilo, M. (2012). The Existentialist world of Murakami Haruki: a reflection of postmodern Japanese society [Honors Thesis (Bachelor of Arts), University at Albany]. In *Scholars Archive*. <https://doi.org/10.54014/8YEC-BGSN>
- Gupta, S., Das, S., Das, M., Banerjee, S., Neogi, R., & Mukherjee, S. (2023). Prevalence and correlates of depression, anxiety, and stress among high school students in a block of Hooghly district, West Bengal: Across-sectional study. *Journal of Education and Health Promotion*, 12(1). [https://doi.org/10.4103/jehp.jehp\\_1769\\_22](https://doi.org/10.4103/jehp.jehp_1769_22)

- Hamasaki, Y., Pionnié-Dax, N., Dorard, G., Tajan, N., & Hikida, T. (2020). Identifying social withdrawal (Hikikomori) factors in Adolescents: Understanding the Hikikomori Spectrum. *Child Psychiatry & Human Development*, 52(5), 808–817. <https://doi.org/10.1007/s10578-020-01064-8>
- Hang, L. T. D. (2024, March). *Hikikomori and religious psychology: Trauma, kami, and forms of healing in Underground by Haruki Murakami*. Paper presented at the Trauma, Crisis and Healing in Vietnamese and Japanese Art and Literature Conference. Retrieved from ResearchGate.
- Kato, T. A., Tateno, M., Shinfuku, N., Fujisawa, D., Teo, A. R., Sartorius, N., Akiyama, T., Ishida, T., Choi, T. Y., Balhara, Y. P. S., Matsumoto, R., Umene-Nakano, W., Fujimura, Y., Wand, A., Chang, J. P., Chang, R. Y., Shadloo, B., Ahmed, H. U., Lerthattasilp, T., & Kanba, S. (2011). Does the ‘hikikomori’ syndrome of social withdrawal exist outside Japan? A preliminary international investigation. *Social Psychiatry and Psychiatric Epidemiology*, 47(7), 1061–1075. <https://doi.org/10.1007/s00127-011-0411-7>
- Khan, R., Pai, K., Kulkarni, V., & Ramapuram, J. (2017). Depression, anxiety, stress and stigma in informal caregivers of People Living with HIV (PLHIV). *AIDS Care*, 30(6), 722–726. <https://doi.org/10.1080/09540121.2017.1418831>
- Lee, S., Kim, H. S., Hong, J., Lee, E., Kim, E., Choi, T. Y., Moon, S. W., Jung, S., Yoon, H., Kim, H. S., Baek, J. H., Si, T., Kallivayalil, R. A., Tanra, A. J., Nadoushan, A. H. J., Chee, K. Y., Javed, A., Sim, K., Pariwatcharakul, P., . . . Park, S. (2025). Network Structure of Social Withdrawal Symptoms in Asian Psychiatric Patients at High Risk of Hikikomori: Findings from the REAP-AD3. *Asian Journal of Psychiatry*, 104489. <https://doi.org/10.1016/j.ajp.2025.104489>
- Lin, P. K. F., Andrew, N., Koh, A. H. Q., & Liew, K. (2022). The relationship between Hikikomori risk factors and social withdrawal tendencies among emerging adults—An exploratory study of Hikikomori in Singapore. *Frontiers in Psychiatry*, 13. <https://doi.org/10.3389/fpsy.2022.1065304>
- Martinez, S. M., Esaryk, E., Chodur, G., Singh, S., Kalaydjian, S., Bullock, H. E., & Britton, T. A. (2023). COVID-19-related stressors exacerbate food insecurity and depressive symptoms among graduate students receiving campus basic needs services: Cross-sectional findings from seven California public universities. *Stress and Health*, 40(3). <https://doi.org/10.1002/smi.3345>
- Nair, R., Thomas, P. E., Mohanan, K., Bhawana, K., & Thakur, M. (2024). Post debridement – Mental health and body image satisfaction among mucormycosis patients: Concern beyond surgical debridement. *Journal of Education and Health Promotion*, 13(1). [https://doi.org/10.4103/jehp.jehp\\_1860\\_23](https://doi.org/10.4103/jehp.jehp_1860_23)
- PP, A., & Arur, A. (2025). Meaning in life buffers mental health risks in South Indian transgender (Hijra) women. *Mental Health and Social Inclusion*. <https://doi.org/10.1108/mhsi-02-2025-0058>

- Savant, A. (2024, January 25). *Public health succumbed to isolation: Hikikomori's Global Journey Beyond Four Walls - Elets eHealth*. eHealth Magazine.  
<https://ehealth.eletsonline.com/2024/01/public-health-succumbed-to-isolation-hikikomoris-global-journey-beyond-four-walls/#:~:text=Japan%2C%20once%20poised%20to%20become,of%20over%20one%20million%20hikikomori>
- Shin, H. (2018). Unlocking the mindware. *Positions Asia Critique*, 26(4), 749–780.  
<https://doi.org/10.1215/10679847-7050556>
- Shreeharsha, M., Nagesh, P., & Kulenur, S. (2025). Effect of Online Learning on Mental Health and Academic Outcomes of Students with Intellectual Disabilities in Higher Education. *Journal of Intellectual Disability - Diagnosis and Treatment*, 13(1), 34–43.  
<https://doi.org/10.6000/2292-2598.2025.13.01.4>
- Sriperambudoori, V., Pingali, S., Tondehal, N. R., Joopaka, A. K., & Molanguru, U. (2021). An online cross-sectional survey of depression, anxiety, and stress among resident doctors working at a COVID-19 tertiary care center in India. *Archives of Mental Health*, 22(2), 111–117. [https://doi.org/10.4103/amh.amh\\_75\\_20](https://doi.org/10.4103/amh.amh_75_20)
- Sunil, S., Tripathi, R., Sharma, M. K., Anand, N., Sahu, A., & Kumar, R. (2024). Hikikomori and Internet Gaming Disorder: a Case Report. *Archives of Psychiatry Research*, 60(3), 239–242. <https://doi.org/10.20471/may.2024.60.03.06>
- Takefuji, Y. (2023). Review of hikikomori: A global health issue, identification and treatment. *Asian Journal of Psychiatry*, 84, 103596.  
<https://doi.org/10.1016/j.ajp.2023.103596>
- The three stages of the hihikomori: from the first warning signs to complete isolation. (n.d.). *HIKIKOMORI ITALIA Associazione Nazionale Ritiro Sociale Volontario*.  
<https://www.hikikomoriitalia.it/p/the-three-stages-of-hihikomori-from.html#:~:text=It's%20in%20this%20phase%20where,The%20hikikomori%20isn't%20static>
- Vinoth, J., Balaji, S., Ganesan, D. K., & Jain, T. (2023). Mental Health among Automobile industry workers in Chennai – A Cross-sectional study from a Single Industrial unit. *International Journal of Occupational Safety and Health*, 13(3), 346–352.  
<https://doi.org/10.3126/ijosh.v13i3.47093>

**Contact emails:** trsd99@gmail.com  
 abirami@src.sastra.edu  
 suganthi@mba.sastra.edu



## **The Impact of Online Games on Vocabulary Acquisition: Primary School Teachers' Perspectives**

Gwanza Basilashvili, University of Augsburg, Germany

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Vocabulary acquisition is a very crucial aspect of language learning. It enhances student engagement and promotes an innovative learning environment. Traditional rote memorization of words has been replaced by gamified activities using various online platforms. Incorporating games into the classroom results in having positive effects on language learning, simultaneously increasing students' interest. As a result, many educational institutions are now integrating online games into their curricula. The research paper aims to explore the impact of using online games on primary school students' vocabulary acquisition. Specifically, it examines how primary school teachers in Georgia utilize online games in their English classrooms to enhance students' vocabulary skills development. Furthermore, the study also identifies the challenges that teachers encounter in the process. The study took a quantitative research approach, an online questionnaire was distributed to 30 English language teachers in primary schools in Georgia. The findings of the study revealed that the gamified activities contributed positively to primary school students' vocabulary acquisition process. Moreover, gamification promoted students' engagement and interest in vocabulary learning. The study also highlighted several challenges faced by the participants, such as technical issues and limited access to electronic devices. Based on the findings, the study offers recommendations for the successful integration of online games into language classroom curricula.

*Keywords:* gamification, vocabulary acquisition, language learning, teachers' perspectives, young learners

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The integration of digital tools in English classrooms has changed traditional teaching methodologies. If before, language learning was a highly demanding process, now it has become interesting and entertaining for young learners. Educators are trying to explore new platforms to increase students' engagement and promote the language acquisition process. The digital tools could enrich lexis, improve language skills and develop communicative competencies. However, as with any tool, a closer examination is important to determine their influence on learning outcomes.

Despite the increased use of technology in language classrooms, there is still a debate regarding its advantages and disadvantages. On the one hand, digital tools can provide a game-based, collaborative, engaging and/or interactive learning environment. For example, Kahoot is an excellent tool for not only drilling activities, which aid language learning, but also for its ability to host competition and engagement (Kaur & Nadarajan, 2020). Taskcard is well-known for its collaborative characteristics. It enables students to work individually as well as in groups. Moreover, it allows teachers/students to integrate multimedia (Borisovna & Vladimirovna, 2015). Embedding pictures, videos, and audio can make language learning more interesting and involving since students usually feel more motivated to share real-life experiences rather than to engage with animated content. Moreover, these applications enable students to stay anonymous and demonstrate their abilities without fear of judgment. On the other hand, they have possible drawbacks as well. Truong mentions several disadvantages of Kahoot, including dependence on technology and distracting features, such as background music. Truong and Dinh (2024) also claims that Kahoot's competitive nature is not a benefit but rather a drawback. Similarly, studies on platforms like Padlet and Taskcard have revealed several challenges. In the study, which collected students' perceptions, the participants mentioned challenges such as difficulty for students with limited technological knowledge and reduced real-life social interaction (Etfita et al., 2022). Another possible disadvantage could be that it is not possible to detect to whom the work belongs. Even though the anonymous feature was mentioned as one of the advantages, it could be a disadvantage as well. Students might write some hurtful messages which are hardly controllable.

Therefore, it is important to study the implications of technology-assisted learning. While online platforms may have a potential positive influence, they require further examination of their influence on vocabulary enrichment and the development of communicative competencies. This study aims to contribute to the discussion about the integration of digital tools into language learning and inform future teachers about possible drawbacks to consider before implementation.

This study has four main research questions:

1. What are some digital tools that could be applied to English language learning in primary school?
2. How does incorporating digital tools impact language acquisition (particularly in terms of vocabulary enrichment and the development of communicative competencies)?
3. What are some possible benefits and drawbacks of using online tools in language learning classrooms?
4. How do primary school teachers and students respond to digitalized learning activities?

To get answers to these questions, the paper will review the literature on the language acquisition process and its approaches. Then it will overview of possible benefits and drawbacks that the implementation of digital tools may have. The literature review will also touch upon the definition of communicative competencies and key aspects that should be considered for a successful learning experience. The next subchapter will examine Georgian primary school teachers' perspectives and provide findings from the survey.

## **Literature Review**

### **Language Acquisition Theories**

How children acquire language has been a long debate. In the 1950s, several psychologists studied the language learning process in young children and challenged existing theories. In 1957, Burrhus Frederic Skinner introduced the idea that children learn through imitation and gave the foundation for behaviourism. However, this theory was soon questioned by Noam Chomsky (1959), who compared language acquisition to instinct. He argued that “children are biologically programmed for language and the language develops in the child in just the same way as biological functions do” (Chomsky, 1959, as cited in Kovacs & Benko, 2014). The theories regarding language learning develop because of the complexity of both language and the human mind. However, due to the space limitations, this study will focus on two theories, behaviouristic and social-cognitive, since they are particularly relevant when applying digital tools in the English language classroom due to their drilling and collaborative nature.

Scholars Lightbown and Spada (2011, as cited in Kovacs and Benko, 2014) summarized the concept of behaviourism with the phrase “say what I say”. This very simply explains the main idea of the behaviourist perspective. Behaviourists viewed “[...] language learning as habit formation and thus saturated students with dialogues and patterns drills designed to contradiction learners to produce automatic, correct responses to linguistic stimuli” (Warschauer & Kern, 2000, p. 3). According to Skinner (1984, as cited in Burhanuddin & Ahmad, 2021), besides drilling, for successful language learning, the new material should be built on previous knowledge. Also, it is important to give consistent rewards and immediate feedback.

Lev Vygotsky proposed the idea that children acquire language through communication with adults and peers and by that, he challenged Piaget's (1926) claim that children learn independently. In this work, he introduces the concept of Zone of Proximal Development (ZPD), which highlights that learning happens through guidance or scaffolding. Scaffolding is a temporary support which enables students to complete tasks that extend their capacities (Vygotsky, 1934). The support may include several strategies, such as asking guiding questions, demonstrating examples, giving hints and breaking big tasks into smaller ones so that they are easily achievable (Bransford et al., 2000). Vygotsky's theory is directly linked to the concept of communicative competencies. The following chapter of the literature review reveals that communicative competencies extend to language skills and cover social and cultural understanding. Therefore, by applying ZPD in the classroom, students develop not only language-related competencies but also contextual knowledge.

In the 1960s, computers appeared in language teaching. Language learning theories and approaches existing before required a shift to a new reality. Therefore, the application of computer-assisted language learning (CALL) has started. CALL refers to “... any process in

which a learner uses a computer and, as a result, improves his or her language” (Beatty, 2013, p. 7). How behaviouristic and communicative language learning theories apply to CALL is described in Warschauer and Kern’s text “Theory and Practice of Network-based Language Teaching”. From a behaviourist perspective, CALL facilitated vocabulary and grammar drill exercises. Bringing computers into language learning not only increased students’ motivation but also reduced teachers’ workload. Now, computers could give students feedback instantly (2000). Warschauer and Healey (1998) also touch upon this benefit in their article “Computers and language learning: Overview”, published 2 years before the previously mentioned work. They state that “the computer was viewed as a mechanical tutor which never grew tired or judgmental and allowed students to work at an individual pace” (p. 57). From a socio-cognitive perspective, computers became mediators that facilitated human interaction. Computer-mediated communication (CMC) has enabled students to communicate with peers outside the classroom through CMC tools such as emails and Relay Chat (2000). Moreover, technology has made task or project-based learning more accessible, which gives opportunity students to express their creativity through language practice (Warschauer & Healey, 1998).

This sub-chapter is intentionally called “language acquisition” and not “language learning”. Until the late 1980s, there was a lack of research on second language learning. Traditionally, children were taught English only after the age of ten because learning languages was considered to be a highly demanding subject, however, studies have shown that children acquire a foreign language most effectively if they start at an early age (Kovacs & Benko, 2014). The researchers, Kovacs and Benko (2014), in their book *The World at Their Feet: Children’s Early Competence in Two Languages through Education*, offer a table adapted from Krashen (1981) and demonstrate the difference between these two terms. According to findings, language acquisition is an unconscious process, like a child learns their 1<sup>st</sup> language. Meanwhile, language learning is a conscious one. Another key distinction worth mentioning is the teacher’s role. During the acquisition process, the teacher is a co-communicator, while in language learning, a teacher is in charge of the process.

Legutke et al. (2009) believe that language should be acquired by various creative and innovative methods rather than learned. For instance, Hafernik (1983) believes that writing skills could be developed by peer review, and Uberman (1998) states that games aid lexis improvement. Therefore, the lesson plans in primary schools should be designed so that they aid vocabulary acquisition through games rather than rote memorization. As for writing skills improvement, students should be encouraged to use phrases acquired through playful activities rather than to force them to memorize grammar rules and structures beforehand and then leave feedback on each other’s work. By integrating both behaviouristic and socio-cognitive strategies, a more effective and engaging learning experience is hoped to be fostered.

## **Communicative Competences**

Michael Canale and Merrill Swain (1980), along with Jack C. Richards (2005), define communicative competencies by comparing them to grammatical competence. They acknowledge the importance of strong grammatical knowledge. However, they emphasize the distinction between knowing how to form grammatically correct sentences and how to use them appropriately in communication. Richards further talks about this distinction in the Cambridge University Press YouTube video, where he provides a good example to fully comprehend the concept of communicative competencies. He compares two ways of



requesting a glass of water: First, “Please get me a glass of water”, and second, “What is wanted by me is a glass of water” (Richards, 2012a, 1:41). By demonstrating these two examples, he explains that even though both of the sentences are grammatically correct, the second one is not natural for everyday communication. To avoid unnatural use of language, the modern syllabus should not only focus on grammar rules but also incorporate functions, communicative tasks, fluency and accuracy activities, as well as contextual texts (Richards, 2012a, 3:05).

Richards lists five key components of communicative competencies. Starting with accuracy, which involves mastering grammatical knowledge, syntax, and pronunciation. It is followed by fluency, which refers to the learner’s ability to maintain communication flow. Third is complexity, observing how vocabulary and grammar knowledge expand over time. Then is appropriacy (Richards, 2012b), which involves using language appropriately for “context, situation, participants and relationship between participants” (Richards, 2012a, 2:30). Finally, communicative capacity shows what range of topics a learner can discuss. Richards highlights that while teaching a language, activities for each strand should be used interchangeably (Richards, 2012b).

### **Digital Tools in Education**

In today’s digital era, integrating technology into language learning has become more accessible than ever. Teachers can easily find free printable worksheets or even online activities. Due to the wide use of iPads, smartphones and other digital devices, students are already used to using technology for entertainment. This allows teachers to incorporate them into the language learning process. Researches suggest that the digitalization of education has changed English language teaching and made classroom interactions more dynamic and student-centred (Suwartono & Aniuranti, 2019, as cited in Pachuashvili, 2023). Therefore, today, representatives from the educational field try to make language acquisition more engaging, involving and interesting. They aim to decrease the cognitive demand and increase the enjoyment. For example, grammar translation or learning lexis by heart is not an option anymore. Instead, approaches such as watching cartoons, listening to nursery rhymes, and playing games seem to be effective. By incorporating technologies and fun activities such as games, teachers can create an interactive learning environment which increases students’ motivation for learning. This subchapter aims to overview of the benefits and drawbacks that incorporating online activities in the classroom.

Researchers mentioned below have proven that incorporating online games into education can be beneficial in many ways. For instance, Kim et al. (2018) claim that gamification can increase students’ engagement and motivation. This is not surprising because students enjoy games due to their entertaining nature and less cognitive demand. Moreover, many games allow students to compete with each other. Healthy competition is one of the main components of motivation and motivation is one step forward in language learning.

Besides motivation, gamification has been shown to improve learning outcomes. James et al. (2024) conducted a comparative study between using gamified mobile applications (GAM) and non-GAM approaches. Their findings indicate that “the use of GAM increases students’ achievement of learning outcomes” (p. 11). Another advantage that games have is that they improve recall and retention (Kim et al., 2018). Su Xin-Li et al. (2021) in their paper claim that the games aid retention of vocabulary. A study conducted by them showed that

multimedia helps students with low confidence boost their confidence and enhance their vocabulary.

Also, another very relevant aspect for this paper is that incorporating online games allows collaborative work. According to Pachuashvili (2023), using digital tools in the classroom significantly increases interactions. Nowadays, there are various online platforms, including Padlet, Prezi, and Task Cards, that support students working in groups or pairs. Since the lesson focuses on social cognitive language acquisition theory, this benefit is particularly relevant for this paper.

Last but not least, it is important to highlight digital tools' ability to provide instant feedback. Since “immediate feedback is usually more effective than delayed feedback” (Kim et al., 2018, p. 44), incorporating online activities that inform students about their performance could be quite beneficial. Pachuashvili (2023) highlights that instant feedback is useful not only for students but teachers since it saves lots of time and effort. Therefore, the digital tools incorporated in the lesson plan in the next chapter were chosen specifically due to their ability to provide immediate feedback.

While online games can positively influence learning, several researchers have also identified potential drawbacks. One of the concerns highlighted by Kim et al. (2017) is the risk of addiction. Like other enjoyable activities, playing games can also cause dependency. Although competition can have a positive influence on language acquisition, it may also create an urge in some students to continue playing until they beat their peers.

Another challenge noted by Kim et al. (2017) is that “games utilize fictional and virtual worlds. Due to this fact, some people are easily distracted from situations within the game while playing the game” (p. 13). This distraction can cause students to lose their ability to focus on lessons. Moreover, since games are highly engaging, students may be overexcited. This can lead to noise and chaos in the classroom. Similarly, Schmid (2008) argues that multimedia can sometimes be overwhelming for learners, which further complicates classroom management.

Knowing the potential drawbacks of gamification can help teachers plan their lessons more effectively and predict possible disruptions and ways to deal with them. However, by highlighting these challenges, this paper does not aim to discourage the use of digital tools in education. Instead, it aims to inform educators about potential issues so that they can address them. By listing several advantages of online activities in the first part of this sub-chapter, the paper emphasizes the positive impact that digital tools have on students. Therefore, the paper aims to encourage future teachers to integrate digital tools into their lessons as much as possible. The lesson plan in the following subchapter could be an example of how digital tools can be applied in practice.

## Methods

The research took a quantitative approach to collect and analyze data. Since questionnaires are a widely used tool for data collection, consisting of structured questions and predefined response options that participants complete to provide relevant information (Taherdoost, 2021), it was sent to the primary school English language teachers from Georgia. The questionnaire included 5-point Likert scale items, multiple-choice and a few open-ended questions. This design enabled the researcher to determine participants' agreement on

particular sentences. Multiple-choice questions are effective for assessing a range of cognitive skills, from simple recall to analysis and evaluation (Brame, 2013). “The Likert scale [typically consisting of] a five-point scale is used to allow an individual to express how much they agree or disagree with a particular statement”, and offers more nuanced responses than a binary yes/no format (Evans, 2023).

## Participants

The study sample consisted of primary school English language teachers from Georgia. Among the participants, 90% were females and 10% were males. Most of the respondents were relatively early in their teaching careers, with 73.3% having five or fewer years of teaching experience. Meanwhile, 16.7% had over 10 years of experience.

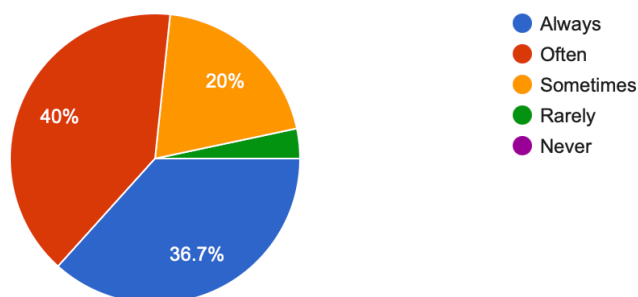
## Procedure

The study was conducted online. The questionnaire was distributed directly to some of the teachers through social media platforms. Later on, the information was shared in Facebook groups, specifically targeting primary school language teachers. The interested participants were requested to contact the researcher. After verifying that they met the selection criteria, the survey link was sent. The questionnaire was voluntary, anonymous and took around 15 minutes to complete.

## Findings and Discussion

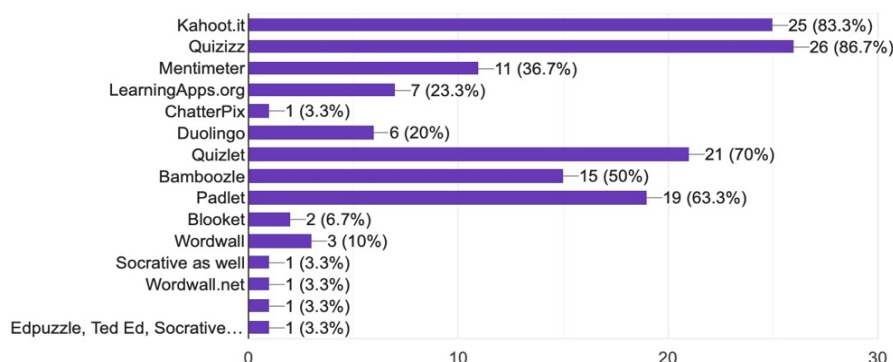
**Figure 1**

*Frequency of Integrating Digital Tools in English Lessons*



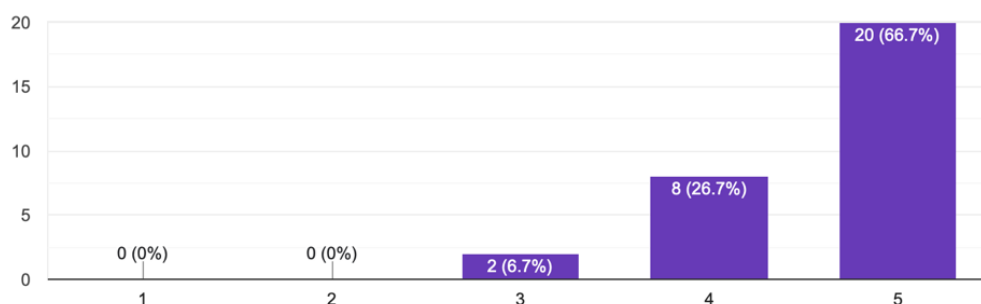
The figure illustrates how frequently teachers incorporate digital tools into their English lessons for primary school children. The responses are distributed as follows: A combined 76.7% of teachers reported using digital tools “always” or “often”, indicating a high frequency of integration of technology into their classrooms. The 20% reported using them “sometimes”, indicating occasional use. Only one respondent selected “rarely”, and none indicated “never”, which could imply almost universal adoption of digital tools in primary English language teaching.

**Figure 2**  
*Effective Online Platforms*



This figure presents various online platforms that teachers find most effective in teaching English. Quizizz (86.7%) and Kahoot it (83.3%) are the most preferred, followed by Quizlet (70%), Padlet (63.3%) and Bamboozle (50%). Other platforms like Mentimeter (36.7%), LearningApps.org (23.3%) and Duolingo (20%) received moderate support. The questionnaire results have revealed that teachers find game-like tools most effective. Tools offering collaborative work also score highly. In contrast, platforms that are less game-like are rarely used.

**Figure 3**  
*Importance of Digital Tools for Language Acquisition*



The figure illustrates how the respondents rated the importance of digital tools for English language acquisition in Primary school on a scale from 1 (not important) to 5 (very important). The results reflect a strong consensus among teachers about the educational value of digital tools. The majority of respondents rated digital tools as highly important: 66.7% selected 5 and 26.7% selected 4. Only 6.7% gave a neutral rating. No one noted it as unimportant.

**Table 1***Agreement With Statements on Digital Tools and Vocabulary Acquisition*

<b>Statement</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly disagree</b>
<b>Digital tools help memorization of new words</b>	56.7 %	40.0%	3.3%	0.0%	0.0%
<b>Digital tools make vocabulary learning more engaging</b>	80.0%	16.7%	3.3%	0.0%	0.0%
<b>Digital tools aid contextual vocabulary learning</b>	53.3%	23.3%	13.3%	0.0%	0.0%
<b>Digital tools help students learn new vocabulary through social interaction</b>	50.0%	40.0%	6.7%	3.3%	0.0%

Most respondents strongly agree that digital tools make vocabulary learning engaging. The majority of participants also believe that it can aid contextual learning and memorization of new words. Fewer respondents agree that digital tools help with vocabulary learning through social interaction. This result might suggest that even though digital tools are seen as strong individual learning tools, their collaborative or communicative aspects may be less convincing.

**Table 2***Agreement on the Impact of Digital Tools on Language Skills*

<b>Statement</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly disagree</b>
<b>Digital tools can improve listening comprehension</b>	56.7%	23.3 %	16.7%	0.0%	0.0%
<b>Digital tools can improve speaking skills</b>	30.0%	43.3%	23.3%	3.3%	0.0%
<b>Digital tools can improve reading comprehension</b>	33.3%	50.0%	13.3 %	3.3%	0.0%
<b>Digital tools can improve writing skills</b>	26.7%	36.7%	36.7%	0.0%	0.0%

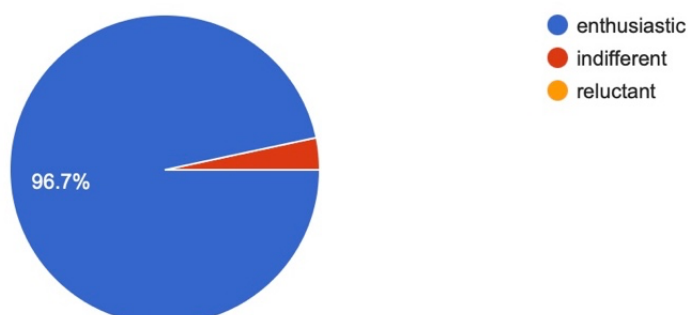
The table shows participants' agreement with statements on how digital tools can improve four language skills: listening, speaking, reading and writing. Most respondents strongly agree that digital tools enhance listening comprehension, while speaking, reading and writing received a higher level of agreement. Neutral responses were most frequent for writing and speaking. Very few participants disagreed with any statements. The variation across skills may reflect the different capabilities of tools, stronger in receptive skills (listening, reading) than in productive ones (speaking, writing).

**Table 3**  
*Challenges in Using Digital Tools*

Challenge	Percentage
Technical issues	66.7%
Time constraints	53.3 %
Classroom management	46.7%
Assessment difficulties	26.7 %
Large class sizes	23.3 %
Lack of tools	20.0 %
Lack of training	0.0 %

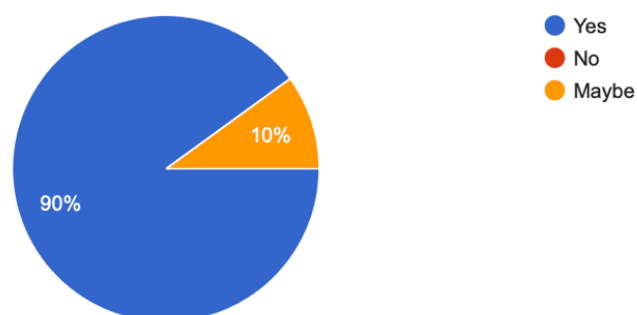
The table presents responses from 30 individuals about challenges faced when incorporating digital tools into English lessons. The most commonly mentioned are technical issues (66.7) and time constraints (53.3%). Classroom management is also considered to be a challenge (46.7%), followed by assessment difficulties (26.7) and large class sizes (23.3%). Even though 30% of the teachers in the survey mentioned that they have not received any training in using digital tools in the language classroom, lack of training is not considered to be a challenge. This could suggest that teachers, even those who have not received formal training, feel adequately prepared.

**Figure 4**  
*Students' Response to Online Activities*



This figure shows how students typically respond to online activities in the English language classroom. The majority of the teachers believe that their students are enthusiastic, while 3.3% think that they are indifferent. These positive response indicates strong student engagement with online activities. This enthusiasm contrasts with the earlier chart, where technical and time constraints were challenges. Despite barriers, students appear to be motivated, suggesting that teachers may benefit from integrating digital tools into their lessons.

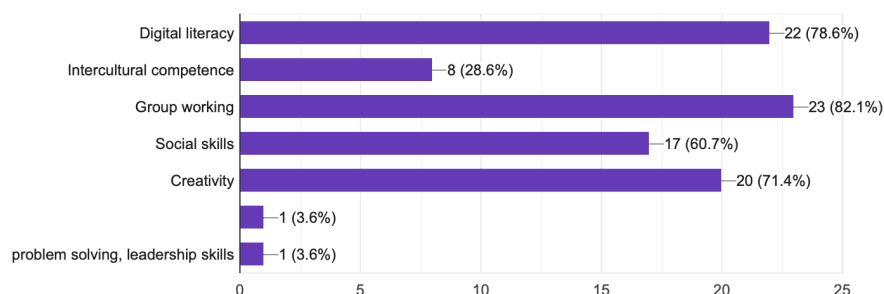
**Figure 5**  
*Broader Skill Development Through Digital Tools*



In your opinion, does incorporating digital tools into English language lessons help develop skills beyond language proficiency?

The figure shows that 90% of respondents believe incorporating digital tools in English lessons helps develop skills beyond language proficiency, while 10% are uncertain. No one disagreed.

**Figure 6**  
*Other Skills Developed Through Digital Tools*



The figure lists specific skills believed to be developed. The top skill is group work (82.1%), followed by digital literacy (78.6%), creativity (71.4%), social skills (60.7%) and intercultural competencies (28.6%). Problem-solving and leadership skills are rarely mentioned (3.6%). There is strong agreement on the broader educational value of digital tools in the English language classroom.

### Research Limitations

It is important to recognize the number of limitations this study has. One significant limitation is its narrow scope, as it focuses on English language teachers from Georgia. The inclusion of teachers from a broader range of institutions, such as public, private or specialized language schools, might have shown different outcomes. Another potential limitation could be the small sample size. It was challenging to find more than 30 volunteers to complete the questionnaire. This limitation, along with others, could impact the generalizability of the findings. Also, the focus on a single nationality further limits the globalism of the study. To get more generalized results, it would have been better if participants from various countries had been mixed.

## Conclusion and Recommendations

This study explored primary school teachers' perspectives on the use of online games and digital tools in the English language classroom, with a focus on vocabulary acquisition and the development of communicative competencies. Drawing from both theoretical insights and the data collected through questionnaires, completed by 30 Georgian primary school teachers, the following conclusion can be drawn:

Firstly, the integration of digital tools in primary English language classrooms is widespread, with the majority of teachers reporting frequent use. Tools such as Quizizz, Kahoot! and Quizlet, which are known for their interactive and game-based nature, are especially preferred. It could be suggesting a preference for platforms that foster engagement and motivation among young learners. Based on teachers' perspectives, these tools not only enhance vocabulary learning but also support contextualization and memorization, although their impact on communicative or collaborative vocabulary use appears less visible.

Secondly, the findings suggest that digital tools are perceived as effective in developing receptive language skills, listening and reading, while their effectiveness for productive skills like speaking and writing is considered limited. This may reflect the current design of most online tools, some of which prioritize individual practice over real-time interaction. Besides language skills, teachers believe that the use of digital tools contributes to the development of broader competencies such as teamwork, digital literacy, creativity and social skills, reinforcing the notion that online tools can support holistic educational goals beyond linguistic proficiency.

Despite some challenges, including technical issues, time constraints and classroom management difficulties, teachers generally view integrating digital tools into the English language classroom positively. Interestingly, a lack of formal training was not considered a barrier, which may indicate growing digital competence among educators or reliance on self-learning.

Finally, the study demonstrates the valuable role of online games and digital tools in enhancing vocabulary. Even though integrating digital tools into the classroom is generally seen as beneficial, especially for learner engagement and receptive skill development, further emphasis on communicative, collaborative and productive aspects could make digital tools even more effective in language education. Future research might focus on the long-term impacts of these tools on language improvement and communicative competence, as well as on strategies to better integrate speaking and writing activities into digital platforms.



## References

- Beatty, K. (2013). *Teaching & researching: Computer-assisted language learning*. Routledge.
- Borisovna, L. T., & Vladimirovna, B. N. (2015). Padlet and other information communication technology tools in English language teaching. *Russian Journal of Education and Psychology*, 10(54), 413–423.
- Brame, C. J. (2013). Writing good multiple choice test questions.  
<https://cft.vanderbilt.edu/guides-sub-pages/writing-good-multiple-choice-test-questions/>
- Bransford, J., Brown, A., & Cocking, R. (2000). *How people learn: Brain, mind, experience & school*. National Academy Press.
- Burhanuddin, N. A. N., Ahmad, N. A., Said, R. R., & Asimiran, S. (2021). Learning theories: Views from behaviourism theory and constructivism theory. *International Journal of Academic Research in Progressive Education and Development*, 10(1), 85–98.
- Canale, M., & Swain, M. (1980). Theoretical bases of communicative approaches to second language teaching and testing. *Applied Linguistics*, 1(1), 1–47.
- Chomsky, N. (1959). A review of B. F. Skinner's *Verbal behavior*. *Language*, 35(1), 26–58.
- Etfita, F., Wahyuni, S., Satriani, E., Alber, A., & Asnawi, A. (2022). Exploring the use of Padlet in synchronous learning: Students' perceptions of its advantages and disadvantages. *JELTL (Journal of English Language Teaching and Linguistics)*, 7(2), 271–282.
- Evans, O. G. (2023). *Likert scale definition, examples and analysis*. Simply Psychology.  
<https://www.simplypsychology.org/likert-scale.html>
- Hafernik, J. J. (1983). The how and why of peer editing in the ESL writing class. *English Teaching Forum*, 21(3), 49–58.
- James, W., Oates, G., & Schonfeldt, N. (2024). Improving retention while enhancing student engagement and learning outcomes using gamified mobile technology. *Accounting Education*, 1–21.
- Kaur, P., & Nadarajan, R. (2020). Language learning and teaching using Kahoot. *International Journal of Modern Education*, 2(5), 19–28.
- Kim, S., Song, K., Lockee, B., & Burton, J. (2018). *Gamification in learning and education: Enjoying learning like gaming*. Springer.
- Kovacs, J., & Benko, E. T. (2014). *The world at their feet: Children's early competence in two languages through education*. Eötvös József Könyvkiadó.
- Krashen, S. (1981). *Second language acquisition and second language learning*. Pergamon.

- Legutke, M., Müller-Hartmann, A., & Schocker-von Ditzfurth, M. (2009). *Teaching English in the primary school*. PONS.
- Pachuashvili, N. (2023). Take it online: Boosting EFL students' interaction through the use of digital tools. In *Proceedings of the IRCEELT Conferences*, 105–109. Black Sea International University.
- Piaget, J. (1926). *The language and thought of the child*. Routledge & Kegan Paul.
- Richards, J. C. (2005). *Communicative language teaching today*. SEAMEO Regional Language Centre.
- Richards, J. C. (2012a, April 30). *Communicative competence part 1 of 2* [Video]. YouTube. [https://www.youtube.com/watch?v=SwMii\\_YtEOw](https://www.youtube.com/watch?v=SwMii_YtEOw)
- Richards, J. C. (2012b, April 30). *Communicative competence part 2 of 2* [Video]. YouTube. <https://www.youtube.com/watch?v=RpGvWYPL7cU>
- Schmid, E. C. (2008). Potential pedagogical benefits and drawbacks of multimedia use in the English language classroom equipped with interactive whiteboard technology. *Computers & Education*, 51(4), 1553–1568. <https://doi.org/10.1016/j.compedu.2008.02.005>
- Skinner, B. F. (1957). *Verbal behavior*. Copley Publishing Group.
- Su Xin-Li, E., Chiew, M. T., & Yunus, M. (2021). Improving lower primary students' vocabulary retention through interactive storyboard game (ISG). *International Journal of Academic Research in Business and Social Sciences*, 11(6), 1404–1415.
- Suwartono, T., & Aniuranti, A. (2019). Digital teaching tools in 21st-century EFL classroom: Are our teachers ready? *ELLITE: Journal of English Language, Literature, and Teaching*, 3(2), 57–62. <https://doi.org/10.32528/ellite.v3i2.1916>
- Taherdoost, H. (2021). Data collection methods and tools for research: A step-by-step guide to choose data collection technique for academic and business research project. *International Journal of Academic Research in Management (IJARM)*, 10(1), 10–38.
- Truong, M. T., & Dinh, H. N. (2024). Using Kahoot! to teach English vocabulary: Benefits, drawbacks, and actual impacts from students' perspective. *Computer-Assisted Language Learning Electronic Journal*, 25(2), 201–223.
- Uberman, A. (1998). The use of games for vocabulary presentation and revision. *English Teaching Forum*, 36(1), 20–27.
- Vygotsky, L. S. (1934). Thinking and speech. In R. W. Rieber & A. S. Carton (Eds.), *The collected works of L. S. Vygotsky*.
- Warschauer, M., & Healey, D. (1998). Computers and language learning: An overview. *Language Teaching*, 31(2), 57–71.

Warschauer, M., & Kern, R. G. (Eds.). (2000). *Network-based language teaching: Concepts and practice*. Cambridge University Press.



## **Pedagogical Model MP\_CompDocHibrid: A Focus on Building Teaching Competencies for Hybrid Instruction in Initial Teacher Training**

Giovanna Gabriela da Rosa Suárez, Universidad Tecnológica (UTEC), Uruguay  
Patricia Alejandra Behar, Universidade Federal do Rio Grande do Sul (UFRGS), Brazil  
Ketia Kellen Araújo da Silva, Escola Naval (EGN/RJ), Brazil

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This article introduces and analyzes the MP\_CompDocHibrid pedagogical model, created to develop teaching competencies for hybrid education scenarios. Through a constructivist and competency-based education approach, the model integrates a pedagogical architecture with pedagogical strategies to prepare future educators in Uruguay. Conducted from 2022 to 2024, this qualitative multiple case study involved 20 teaching trainees responsible for 543 secondary school students. The study utilized semi-structured interviews, surveys, and participant observation. The pedagogical model is presented with its key elements and contributions. It encompasses the epistemological foundations, the specific characteristics of the participants, a pedagogical architecture, a competency chart used as a framework, a repertoire of pedagogical strategies, and an analysis of the model's impact on the development of those teaching competencies.

*Keywords:* pedagogical model, hybrid modality, teacher training, blended learning

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

In recent years, the rapid integration of digital technologies into various aspects of everyday life has transformed how individuals learn, interact, and engage with information. Educational institutions have not remained immune to these transformations, with the COVID-19 pandemic serving as a pivotal moment that intensified the urgency to adopt digital and hybrid teaching modalities. The transition, often abrupt and unplanned, revealed significant gaps in institutional readiness and teacher preparedness to navigate hybrid educational environments. In Uruguay, the necessity of equipping future educators with the competencies required to thrive in this new context prompted the design and implementation of the MP\_CompDocHibrid pedagogical model. This study presents and analyzes this model, developed within the context of initial teacher education for English teachers. Through a case-study methodology, the model's contribution to developing teaching competencies in hybrid learning contexts is examined, offering insights for future curricular innovation and policy.

### The Importance of Teacher Training for Hybrid Environments

The process of teacher education can be broadly divided into two main phases: initial training and continuous professional development. The initial phase, typically conducted at formal teacher education institutions, focuses on equipping aspiring educators with foundational pedagogical knowledge and practical teaching experience. In Uruguay, this training primarily takes place in the institutions affiliated with the Consejo de Formación en Educación (CFE), under the aegis of the Administración Nacional de Educación Pública (ANEP). The training extends over four years and incorporates a significant component of classroom-based practicum in secondary education settings (CFE, 2023; Da Rosa Suárez et al., 2025; Vaillant, 2019).

Digitalization, accelerated by the pandemic, made evident the importance of teacher preparation for hybrid environments—a modality that blends face-to-face instruction with synchronous and asynchronous online learning (Bacich et al., 2015; Horn & Staker, 2015). Literature highlights the importance of training that transcends technical skill acquisition to include pedagogical integration, reflective practice, and curricular innovation (Behar, 2013; Castañeda et al., 2018). Behar and Silva (2022) suggest that pedagogical models grounded in constructivist epistemologies can facilitate the development of these complex competencies.

Constructivist theories advocate for learner-centered environments where knowledge is co-constructed through active engagement, collaboration, and reflective processes (Da Rosa Suárez et al., 2025). In this context, the pedagogical model serves not only as a planning tool but as a dynamic system that guides teaching practice, adapts to learner needs, and fosters the development of both cognitive and socio-affective competencies (Silva & Behar, 2022). The integration of digital competence frameworks, such as DigCompEdu (Redecker & Punie, 2017), provides a structured basis for identifying and cultivating relevant teaching competencies within hybrid modalities.

## Methodology

A qualitative, interpretive case-study methodology was employed to investigate the development and application of the MP\_CompDocHibrid model. The study was conducted from 2022 to 2024 and involved twenty trainee teachers enrolled in the English teacher

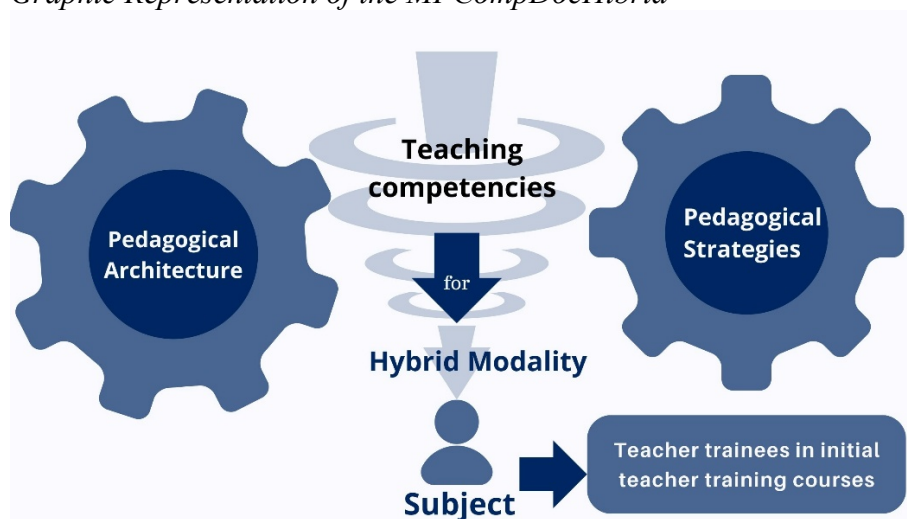
education program of the CFE. These participants were responsible for a combined total of 543 secondary school students, distributed in groups ranging from 25 to 30 students (Da Rosa Suárez et al., 2025).

Data collection methods included participant observation, semi-structured interviews, and the administration of surveys. The research was implemented in four phases: the design of the initial model based on literature and contextual needs; implementation through the Schoology platform and face-to-face interactions; evaluation through feedback and observational data; and refinement to develop a final, context-responsive version of the model. Teaching competencies were adapted from the DigCompEdu framework and complemented by additional indicators relevant to hybrid teaching as defined by Bernardi et al. (2022).

## Results and Discussion

The MP\_CompDocHibrid model (Figure 1) comprises several interrelated components: epistemological foundations, subject profile, pedagogical architecture, a competency framework, and specific pedagogical strategies.

**Figure 1**  
*Graphic Representation of the MPCompDocHibrid*



Source. Da Rosa Suárez et al. (2025)

The model is rooted in a constructivist approach, emphasizing active learning, collaboration, and reflective practice. Trainee teachers are viewed as active participants in their own professional development, engaging with theoretical and practical components in a manner that is responsive to their lived experiences and professional challenges. The model's flexibility, accessibility, and relevance were crucial in supporting meaningful engagement and learning.

The pedagogical architecture included organizational (course structure, objectives, duration), content (hybrid teaching models, use of digital resources for hybrid teaching), methodological (planning, activities, assessment), and technological (digital resources, virtual learning environments, such as Schoology, Google Meet, CREA) elements. This comprehensive framework facilitated both structured learning and adaptive practice.

Competencies were organized into five domains: Professional Commitment (collaboration, professional development), Digital Resources (curation, creation, organization), Teaching (curricular design, pedagogical foundation, mediation), Assessment (evaluation strategies, feedback), and Management (organization of teaching documentation) (Da Rosa Suárez et al., 2025). These were operationalized through targeted pedagogical strategies, such as online discussion forums, portfolio development, peer evaluations, and classroom observations. Table 1 presents the framework of competencies named CompDocHibrid.

**Table 1**

*Teaching Competencies for Hybrid Modality in the CompDocHibrid*

<b>1. Professional Commitment</b>
Collaboration
Professional development
<b>2. Digital resources</b>
Educational curatorship
Creation of digital resources
Organization of digital resources
<b>3. Teaching</b>
Curriculum design
Pedagogical Foundation
Mediation
<b>4. Assessment</b>
Assessment of learning processes
Feedback
<b>5. Management</b>
Organization and administration

Source. Adapted from Da Rosa Suárez et al. (2025)

A series of pedagogical strategies were proposed to give dynamism to the proposed PA and promote the construction of the desired competencies (See Table 2). These aim to encourage the participants' active learning, in which the teacher mediates the process.

**Table 2**

*Pedagogical Strategies From the MP\_CompDocHibrid That Support the Development of Competencies for Hybrid Teaching*

Competence	Pedagogical Strategies
<b>Collaboration</b>	Establish discussion spaces for participants to share teaching materials, insights, classroom experiences, and reflections related to hybrid teaching. Encourage mutual classroom observations—both online and in-person—among colleagues. Facilitate peer review of teaching plans. Organize interactive discussions during in-person and virtual sessions.
<b>Professional Development</b>	Promote ongoing learning by providing information on relevant training opportunities, such as courses or webinars. Share digital resources like web links and videos that support further exploration of hybrid teaching topics.



Competence	Pedagogical Strategies
<b>Educational Curatorship</b>	Offer guidance on how to evaluate and choose appropriate digital tools and resources. Provide access to collections of freely available educational content.
<b>Creation of Digital Resources</b>	Introduce tools and platforms that assist in developing digital teaching materials tailored for hybrid settings. Foster collaborative exchanges of tools and experiences within forums. Encourage students to reflect on and share their own processes in creating digital content.
<b>Organization of Digital Resources</b>	Demonstrate functionalities of platforms like Schoology through tutorial videos. Provide concrete examples of content organization strategies. Design activities that require learners to structure digital spaces (e.g., organizing folders, creating forums, uploading assignments). Promote discussions on how emotional and relational aspects can be integrated into digital content organization. Use model examples from instructors to showcase different organizational approaches.
<b>Curricular Design</b>	Showcase diverse lesson planning formats suitable for hybrid contexts. Invite participants to develop and adapt their own lesson plans. Encourage them to share and receive peer feedback on their planning efforts.
<b>Pedagogical Foundation</b>	Stimulate the articulation of theoretical underpinnings in both oral and written formats. Encourage reflective practices linking theoretical concepts with real-world application. Provide spaces for individual and collaborative reflection about theory-practice connections.
<b>Mediation</b>	Support the implementation of hybrid teaching lessons within participants' classrooms. Observe and jointly reflect on these lessons with the teachers involved. Encourage critical thinking and reflection on hybrid teaching practices. Facilitate peer lesson observations and enable remote viewing via platforms like Google Meet. Record teaching sessions to allow for collective review and feedback.
<b>Assessment of Learning Processes</b>	Model various assessment techniques suitable for hybrid contexts, integrating digital tools. Lead conversations on strategies for evaluating learning in blended environments. Support the design and use of performance-based assessments that combine online and face-to-face elements. Invite participants to contribute assessment ideas through forums and live discussions.
<b>Feedback</b>	Demonstrate diverse feedback approaches, such as rubric-based assessments and personalized comments using platform features. Create opportunities for teachers to discuss and exchange feedback strategies through different formats, including forums and in-person discussions.
<b>Organization and Administration</b>	Ask participants to compile digital teaching portfolios that include lesson plans, resources, and reflective entries. Provide sample portfolios and a guide for assembling them. Share an evaluation rubric for portfolio assessment. Encourage participants to make their portfolios accessible by sharing links.

*Source.* Adapted from Da Rosa Suárez et al. (2025)

Participants highlighted several benefits of the model. It effectively bridged theory and practice, enabling them to apply conceptual knowledge in real-world contexts. Reflective

activities encouraged critical engagement with their teaching practices, while peer collaboration fostered a sense of community and professional solidarity. Exposure to a variety of hybrid teaching methods empowered participants to innovate and adapt. Emotional support mechanisms embedded in the model further enhanced participant well-being and receptivity to change.

### **Conclusion**

This study addressed the urgent need to prepare future educators for hybrid teaching environments. By presenting and evaluating the MP\_CompDocHibrid model, it demonstrated how thoughtful integration of pedagogical, technological, and contextual elements can foster meaningful competency development.

The MP\_CompDocHibrid model represents a framework for developing hybrid teaching competencies within initial teacher education. Its foundation in constructivist pedagogy, integration of digital tools, and emphasis on reflective and collaborative learning make it a valuable resource for curriculum designers and teacher educators.

The findings suggest that the MP\_CompDocHibrid model is adaptable and scalable across different disciplines and educational contexts. Its emphasis on collaborative learning, reflective practice, and digital fluency positions it as a robust framework for both initial and continuing teacher education.

While the study offers valuable insights, it is limited by its implementation within a specific national context (Uruguay). Further research is needed to assess the model's applicability across diverse educational settings.

## References

- Bacich, L., Tanzi Neto, A., & Trevisani, F. M. (2015). *Ensino híbrido: personalização e tecnologia na educação* [Hybrid teaching: personalization and technology in education]. Penso.
- Behar, P. A. (2013). *Competências em Educação a Distância* [Competencies in Distance Education]. Penso.
- Behar, P. A., & Silva, K. K. A. (2022). *Competências digitais em educação: do conceito à prática* [Digital competencies in education: from concept to practice]. Artesanato Educacional.
- Bernardi, M., Zank, C., & Moresco, S. (2022). Competências Digitais Docentes no Ensino Híbrido [Digital Teaching Competencies in Hybrid Teaching]. In Behar, P. A. & Silva, K. K. A. *Competências digitais em educação: do conceito à prática* (pp. 121–140). Artesanato Educacional.
- Castañeda, L., Esteve, F., & Adell, J. (2018). ¿Por qué es necesario repensar la competencia docente para el mundo digital? [Why is it necessary to rethink the teaching competency for the digital world?] *RED. Revista de Educación a Distancia*, 56(1), 1–20. <http://dx.doi.org/10.6018/red/56/6>
- CFE. (2023). *Marco Curricular de la Formación de Grado de los Educadores* [Curricular Framework for Undergraduate Teacher Education]. [https://cfe.edu.uy/images/stories/pdfs/documentos\\_aprobados\\_cfe/2022/AE11\\_R2993\\_CODICEN.pdf](https://cfe.edu.uy/images/stories/pdfs/documentos_aprobados_cfe/2022/AE11_R2993_CODICEN.pdf)
- Da Rosa Suárez, G. G., Behar, P. A., & Silva Araújo, K. K. (2025). Pedagogical Model for Teacher Training Courses: Developing Teaching Competencies for Hybrid Modality. In *Proceedings of the 19th Latin American Conference on Learning Technologies (LACLO 2024)*. Springer-Verlag, Berlin, Heidelberg, 271–286. [https://doi.org/10.1007/978-981-96-3698-3\\_20](https://doi.org/10.1007/978-981-96-3698-3_20)
- Horn, M. B., & Staker, H. (2015). *Blended: Usando a inovação disruptiva para aprimorar a educação* [Blended: Using Disruptive Innovation to Improve Schools]. Penso.
- Redecker, C., & Punie, Y. (2017). *European framework for the digital competence of educators: DigCompEdu*. Publications Office of the European Union. <https://doi.org/10.2760/159770>
- Silva, K. K. A., & Behar, P. A. (2022). Parâmetros para construção de modelos pedagógicos baseado em competências digitais transversais na educação a distância [Parameters for the Construction of Pedagogical Models Based on Transversal Digital Competencies in Distance Education]. *Research, Society and Development*, 11(8), e12411830287. <https://doi.org/10.33448/rsd-v11i8.30287>

Vaillant, D. (2019). Formación Inicial del Profesorado de Educación Secundaria en América Latina: Dilemas y Desafíos [Initial Teacher Education for Secondary School Teachers in Latin America: Dilemmas and Challenges]. *Profesorado. Revista de Curriculum y Formación del Profesorado*, 23(3), 35–52.  
<https://doi.org/10.30827/profesorado.v23i3.10766>

**Contact email:** [gdarosasuarez@gmail.com](mailto:gdarosasuarez@gmail.com)

## **Inclusive Cultural Games as a Medium for Socio-Emotional Development in Early Childhood Learners With Disabilities**

Sifiso E. Ncube, University of the Free State, South Africa  
Sikhangele Mcelelwa, University of the Free State, South Africa  
Isaac Hlatshwayo, University of the Free State, South Africa

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Developing socio-emotional skills of Early Childhood Development (ECD) learners with disabilities is very crucial. Early childhood education aims to empower all learners with skills to regulate their emotions, build strong lasting relationships, socio-emotional intelligence, and resilience among other skills. This qualitative study done in Mzilikazi District in Bulawayo aimed to explore the influence of inclusive cultural games in developing socio-emotional skills in ECD learners with disabilities. It used a case study research design. A sample of six purposively selected qualified ECD teachers was used. ECD teachers were interviewed to solicit information about their individual experiences on the use of inclusive cultural games to develop socio-emotional skills in learners. Additionally, participants were observed to witness the strategies they used to mitigate challenges they encountered when using inclusive cultural games in regular classrooms. A thematic approach was used to identify patterns, organise, interpret, and analyse data. This study revealed that ECD teachers rarely used inclusive cultural games during the teaching and learning process in mainstream classrooms. Furthermore, it was found that they lacked training on how to modify inclusive cultural games to cater for disabled learners hence lamented over the shortage of materials and time constraints due to congested timetables. The study recommended that in-service or staff development programs be done to equip ECD teachers with practical skills and knowledge to integrate inclusive cultural games and facilitate the development of socio-emotional skills in ECD learners with disabilities. The study also recommended collaboration between schools and the community to support inclusive cultural games.

*Keywords:* inclusive cultural games, early childhood development, socio-emotional development, disabilities

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## **Introduction**

Incorporating inclusive cultural games into the ECD curricula offer a unique approach to fostering socio-emotional development among ECD learners with disabilities. Inclusive cultural games deeply rooted in community traditions, not only foster social interaction, emotional expression, and cultural understanding but also contribute to the development of essential skills such as empathy, respect, cooperation, and self-regulation (Smith, 2020). Such games are integral to learner's development, promoting community values. However, while inclusive cultural games have the potential to enhance socio-emotional development, their effectiveness hinges on appropriate selection and modification to accommodate the diverse needs of learners with disabilities (Garaigordobil et al., 2022). Without careful adaptation, these games can inadvertently create barriers leading to exclusion rather than inclusion. Most often ECD learners with disabilities in inclusive ECD settings, encountered barricades to fully participate in social activities due to limited accessibility and inadequate socio-emotional support (Saura & Zimmermann, 2021). For example, cultural games that require specific physical abilities would not be accessible to learners with mobility impairments unless modified accordingly. Additionally, cultural games that are not inclusive in design would not promote the intended social interactions, potentially hindering the development of socio-emotional skills among ECD learners with disabilities (Cavioni et al., 2017). International bodies such as United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) and United Nations Conventions of the Rights of Children (UNCRC) underscore the right of all young learners to inclusive education, aiming for full development of human potential and a sense of dignity and self-worth (UNESCO, 2021). Sustainable Development (SDG 4) further emphasises the importance of the right to "inclusive and equitable quality education" through Early childhood education (UNESCO, 2017). In Zimbabwe, the National Early Learning Policy advocates for inclusive ECD programs that cater for the diverse needs of all learners including those with disabilities (MoPSE, 2023). Despite this emphasis, achieving truly inclusive educational environments remains a challenge, particularly for Early Childhood learners with disabilities. It has been noted that ECD teachers and learners prefer to engage in digital games over cultural games.

Several research studies on how inclusive cultural games promote socio-emotional development in ECD learners with disabilities have been conducted. Research done by Baradaran Bazaz et al. (2018) emphasised the role of culturally relevant play activities in enhancing socio-emotional development for learners with disabilities. It concluded that culturally based inclusive games could improve peer relationships, boost emotional regulation, and increase self-esteem for learners with disabilities by fostering group participation and social inclusion. In the same vein, research done by Ashar et al. (2024) which looked at how inclusive cultural games supported the development of socio-emotional skills among learners with disabilities, especially in diverse, multicultural classrooms. They revealed that inclusive cultural games were an effective way of teaching learners about empathy, perspective-taking, and social norms while promoting social cohesion and reducing stigma. It is against this background that this research sought to explore the use of Inclusive Cultural Games as a Medium for Socio-Emotional Development in ECD Learners with Disabilities.

## **Statement of the Problem**

Despite inclusive cultural games being hailed for promoting socio-emotional development in ECD learners with disabilities, research has indicated that culturally rooted, inclusive games

were currently less recognised and increasingly being replaced by modern technological games (Nasrulloh et al., 2024; Saura & Zimmermann, 2021). The fact that inclusive cultural games are critical in promoting socio emotional skills during early years, lack of such games hindered ECD learners with disabilities to engage with peers and develop necessary skills. Therefore, this study sought to explore how inclusive cultural game could be used in daily class activities to help ECD learners with disabilities develop socio-emotional skills.

### **Research Objectives**

This study sought to:

- i. Assess the influence of inclusive cultural games in promoting socio-emotional development in ECD learners with disabilities.
- ii. Establish challenges faced by teachers in integrating inclusive cultural games to promote socio-emotional in ECD learners with disabilities.
- iii. Suggest strategies enhancing effective inclusion of cultural games in promoting socio-emotional ECD learners with disabilities.

### **Research Questions**

This research was guided by the following research questions:

- i. How do inclusive cultural games influence the development of socio-emotional skills in ECD learners with disabilities.
- ii. What are the challenges faced by teachers in integrating inclusive cultural games to promote socio-emotional in ECD learners with disabilities.
- iii. What strategies can be used to enhance the effectiveness of inclusive cultural games in promoting socio-emotional ECD learners with disabilities.

### **Conceptual Framework**

This research study was anchored on sociocultural theory and socio-emotional learning theory. These theories assisted in exploring the intersection of inclusive cultural games in promoting socio-emotional skills in ECD learners with disabilities. By weaving together these complementary theoretical perspectives, the proposed study explored the multifaceted ways in which inclusive cultural games could be used meaningfully by ECD teachers in inclusive environments to help ECD learners with disabilities develop socio-emotional skills within the selected district.

Firstly, the socio-cultural theory proposed by Lev Vygotsky emphasises the crucial role that cultural and social contexts play in shaping the learning and development of ECD learners through the following aspects Zone of Proximal Development, scaffolding, social interaction, and use of cultural tools (Sukabumi & Syekk, 2023). This theoretical lens underscored the importance of integrating culturally relevant content, pedagogical approaches, and learning environments. Of interest to this research is the aspects of social interactions and use of cultural tools to support the socio-emotional growth and identity formation of young ECD learners with disabilities (Sitti et al., 2024).

Inclusive cultural games inherently involved social interaction, offering learners with disabilities opportunities to communicate, collaborate, and learn from their peers. These interactions could promote the development of socio-emotional skills such as empathy, cooperation, respect, following rules, initiative taking, emotional intelligence and conflict

resolution (Mania et al., 2024). Through these games, ECD learners observe and model social and emotional behaviours, leading to enhanced socio-emotional growth. Cultural tools embedded in inclusive cultural games such as language, symbols, songs and play material that are essential for socio-emotional development. They mediate and shape how ECD learners interact with their environment and each other. These inclusive cultural games function as cultural tools that convey social norms, values, and practices. They provide a familiar and culturally relevant context for ECD learners with disabilities to develop and practice socio-emotional skills (Sulistyaningtyas & Fauziah, 2019). By engaging in these games, they did not only learn the rules and strategies but also internalised socially accepted roles and behaviours.

To complement Vygotsky theory, was the Socio-emotional learning theory (SEL) by Jones and Bouffard which had a positive influence on a wide range of outcomes, including promoting emotional regulation in young learners, empathy and perspective-taking, building positive relationships and social skills, enhancing self-awareness and confidence, cultural relevance and identity formation, fostering resilience and coping skills (Cipriano & Mccarthy, 2023). Jones and Bouffard's SEL model emphasises the importance of integrating SEL skills into daily educational practices (Watson, 2013). Applying this model to this research, the focus was on using inclusive cultural games as suggested by Vygotsky to promote the development of socio-emotional skills in ECD learners with disabilities. These games would help ECD learners with disabilities identify different feelings, manage their emotions, and practice calming techniques to cope with negative emotions (Zieher et al., 2024). Cultural games integrated with the principles of SEL are key to an inclusive socio-emotional personality in an ECD learners with disabilities.

## **Review of Related Literature**

### **Influence of Inclusive Cultural Games on the Development of Socio-Emotional Skills in ECD Learners With Disabilities**

Socio-emotional development plays a pivotal role in both academic and well-being of every child. It is against this background that the domain needs to be developed in young learners including those learners with disabilities as early as ECD level. Cipriano and Mccarthy (2023) assert that recent studies have reported that social-emotional competence is a strong predictor of school readiness, academic achievements, and the psychological well-being of a child. In these studies, conducted in Asia, learners who are high in social-emotional competence were reported to have the ability to form positive relationships with others and regulate and express emotions in a culturally appropriate way. This calls for culturally, responsive ways to enhance such development of socio-emotional skills and one way to foster such skills is using cultural games.

Furthermore, traditional cultural games have profound influence in learners' socio emotional development as the games in ECD settings were noted to involve teamwork and some developed values in learners (Tarashika & Jairo, 2023). As learners will be playing in groups, chances are that even learners with disabilities will be engaged and their socio-emotional will be developed all because of the use of cultural games.



## **Challenges Faced by Teachers in Integrating Inclusive Cultural Games to Promote Socio-Emotional in ECD Learners With Disabilities**

While cultural games offer valuable opportunities for promoting socio-emotional development in Early Childhood Development (ECD) learners, their implementation for learners with disabilities presents unique challenges. ECD teachers face a variety of challenges when attempting to integrate inclusive cultural games into Early Childhood Development (ECD) curricula to promote socio-emotional growth among learners with disabilities.

One significant hurdle is the lack of training and resources necessary for adapting traditional cultural games to suit the diverse needs of learners with disabilities (Duncan, 2024). Cultural games often rely on physical movement, sensory engagement, or verbal communication, all of which may be inaccessible to learners with mobility impairments, sensory processing issues, or communication challenges (Mawere & Mawere, 2018). Teachers may struggle to find creative ways to modify these games to ensure they remain inclusive, engaging, and educational for all learners (Kong & Ereky-Stevens, 2023). Additionally, many teachers lack the specialised knowledge required to understand the specific developmental needs of learners with disabilities, which makes it difficult for them to assess and address those needs effectively during play. Research conducted by (Mpu & Adu, 2021) in South Africa revealed that the main factors contributing to teachers' struggle to use cultural games in an inclusive ECD classroom were inadequate training and a lack of knowledge and skills.

Another challenge is the tension between maintaining the cultural integrity of traditional games and ensuring that they are inclusive and accessible for learners with disabilities (Grant & Jones-Goods, 2016). Cultural games often have specific rules, roles, and ways of engagement that reflect the traditions and values of a community, and adapting these elements without diluting their significance can be complex. Research done by (Dewi, 2024) in Indonesia discovered that many ECD teachers do not have the required knowledge or skills to modify the cultural games to meet the diverse needs of learners. Teachers must strike a balance between respecting the cultural aspects of the game and modifying them to create a safe and welcoming environment for learners with diverse needs. However, research done by (Saminder Singh et al., 2023) in Malaysia found out that failure to strike a balance makes it difficult for the teacher to provide balanced support for each child. Moreover, there is often a lack of materials or tools that can help facilitate these adaptations, making it difficult to implement culturally relevant and inclusive activities on a consistent basis (Philpott et al., 2019). Teachers may also face resistance from parents or communities who perceive adaptations as a departure from tradition, adding a layer of complexity to their efforts.

Consequently, while cultural games hold significant potential for promoting socio-emotional development, the challenges teachers face in making them inclusive can hinder their effectiveness in fostering social interaction, empathy, and emotional regulation for learners with disabilities.

## **Strategies That Enhance the Effectiveness of Inclusive Cultural Games in Promoting Socio-Emotional ECD Learners With Disabilities**

Research studies approve several inclusive strategies that can be used to mitigate challenges in promoting socio emotional development that are as follows, modification of cultural

games, provision of culturally relevant games, parental involvement, and teacher training (Tlili et al., 2022).

Culturally relevant games are key in promoting socio-emotional development of learners with disabilities. Jubhari et al. (2022) allude that learners with disabilities face several limitations that result in isolation and loneliness. Therefore, cultural relevant games often reflect learners' cultural backgrounds that are embedded in societal values and practices that allow learners with disabilities to develop social and emotional skills connected to practices and traditions (Sulistyaningtyas & Fauziah, 2019). Exposure to such cultural games promotes vital social-emotional such as self-awareness, collaboration, empathy, and communication among peers (Sitti et al., 2024). For instance, findings of an American study Lai et al. (2023) show that incorporating cultural cooperative games in educational settings enhanced peer relationships, interaction, and reduced feelings of isolation among learners with disabilities. Situationally, culturally relevant games provide opportunities for learners with disabilities to practice several skills that include turn-taking, emotional regulation, and problem-solving in a way that resonates with their experiences, hence a relevant means to socio-emotional development. Apart from being culturally relevant, games need to be modified to address learners' socio-emotional needs.

Research indicates that modification of cultural games is vital in promoting socio-emotional development in ECD learners (Tlili et al., 2022). Such games are fun, engaging and culturally relevant to support the development of skills in learners with disabilities. A study done in South Africa by Giese et al. (2023) revealed that the introduction of data tools in early childhood development is an effective intervention strategy that promotes socio emotional skills in learners from diverse backgrounds including those with disabilities. Thus, teachers may develop several cultural game activities using computer applications. Therefore, through the modification of games, teachers create a platform that allows learners to develop socio-emotional skills. Teacher training brings change of teachers' negative attitude towards the integration of inclusive cultural games.

Teachers' knowledge on how cultural games promote socio-emotional skills of learners with disabilities has a significant role. Lyu et al. (2024) noticed that professionally trained teachers may create an inclusive and supportive learning environment by selecting games and activities that are culturally relevant and developmentally appropriate. For example, adapting the games to the individual learners' needs. This may involve simplifying rules, using adaptive equipment, or providing additional support. With the teacher overseeing the ECD classroom he or she can amend the rules of some cultural games that can develop socio-emotional skills in learners. Findings of a study by Gladh et al. (2022) indicate that special needs learners taught by trained teachers were guided to socialise with peers whilst those taught by untrained teachers lacked guidance and were attracted to toys instead of interacting with peers. These results were confirmed by (Sulistyaningtyas & Fauziah, 2019) who found out that most Indonesian ECD teachers rarely used cultural games due to lack of knowledge, training, and negative attitude towards the use of cultural games. Thus, through training teachers may develop empathy and respect learners' cultures. Accordingly, teachers need training so that they can develop a positive attitude and implement interventions that promote socio-emotional development of learners with special needs through cultural games.

Another intervention strategy that can be used by teachers is parental involvement. A study by Roy and Giraldo-garcía (2018) revealed that parents offer a supportive environment both at home and in ECD settings. Furthermore, it shows that parental involvement enhances

social skills and reduces behavioural problems in learners with special needs. Thus, parents may reinforce, create consistent routines for learners to practice socio-emotional skills through cultural games played at home. Further emphasis is that parental involvement is key in supporting learners with disabilities to develop feelings of belonging and security that are usually a challenge to them (Liu et al., 2022). Situationally, collaborating with parents would make teachers learn socio-emotional skills valued by the society and be in the position to support learners with disabilities through culturally responsive games. Again, teachers may instil in parents an awareness of the importance of cultural games in managing their learners' emotions.

### **Methodology**

This study was largely located within the interpretivist qualitative research approach. Interpretivists believe in understanding social phenomena and its complexities in its unique context (Lewis, 2024). This allows the researchers to have a bigger picture and deeper understanding of the topic under study (Kumatongo & Muzata, 2021). Furthermore, in this research a case study design was adopted because it allowed researchers to explore and analyse three schools in one district in-depth (Swift, 2022).

### **Population and Sample**

Population of this research was composed of qualified early childhood teachers from three primary schools in Matabeleland region Bulawayo Province Mzilikazi district. On average each school had 4 early childhood teachers giving us a population of approximately 12 teachers. Due to minimal time resources, a sample of 6 purposively selected teachers was used (Thomas, 2022). Purposive sampling was ideal for this research because it allowed researchers to select participants who had in-depth knowledge on the topic under study (Isaac, 2023). Teachers with most experience and attached to classes with learners that had disabilities were targeted. The aim was to collect data on strategies they used to integrate cultural games in the teaching and learning process including challenges they encountered. Furthermore, Mzilikazi district was chosen as it had many big schools that accommodated learners with disabilities in mainstream classes. This selection allowed researchers to explore how inclusive cultural games were used to support the development of socio-emotional skills among ECD learners with disabilities.

### **Research Instruments**

To gather information from the participants, this research used semi-structured interviews and observations. ECD teachers were interviewed and observed on how they integrated inclusive cultural games in daily activities to promote the development of socio-emotional skills in children with disabilities (Fix et al., 2022).

### **Data Collection and Analysis**

Before conducting research, all necessary groundwork concerning the initial processes was done. Permission to conduct research was sought from the Provincial Education Director. Furthermore, before conducting interviews with ECD teachers, researchers made their intentions known to the participants, convenient date and time were set. This procedure was very critical as it allowed the researchers to build a relationship with their participants (Cohen et al., 2018). Interviews were face-to-face and they took around 10 to 15 minutes long per

interviewee. Interviews were done between 2pm and 3pm when learners had dismissed, we choose this time to avoid disrupting classes. Data collected was presented and analysed in themes.

### **Data Presentation, Interpretation and Discussion of Results**

#### **Influence of Inclusive Cultural Games on the Development of Socio-Emotional Skills in ECD Learners With Disabilities**

The researchers through interviews and observation noted that cultural games had a great influence on the development of children's socio-emotional skills. This was evidenced from the participants responses. *ECD A Teacher 1* had this to say:

Some cultural games are played as a team and enable children to be collaborative in nature even if they are not used to the game, what they only request to know are the game rules. Hence the children will start to play and collaborate for the benefit of the team. During play children tried to play by the rules for the benefit of individual recognition and group as well.

A Grade 1 teacher said, "Some learners with speech difficulties express themselves better through rhythm-based games. This non-verbal communication improves their peer relationships and emotional regulation."

From observations done in ECD B class, researchers observed that, when learners engaged in game called "*Ngubani iqhude elikhulu*" (who is the strong cock?). We observed that child with a physical disability was seated in a circle with peers. The game was adapted so that rest of the learners could participate using claps and vocal responses rather than physical movement. Peers spontaneously took turns helping the child clap in rhythm and encouraged their participation.

The data from interviews and observations in ECD classrooms highlight the positive impact of inclusive cultural games had on learners with disabilities, emphasising three interconnected themes. Participation in culturally familiar games enhanced social interaction and peer relationships and this significantly supports emotional development and self-esteem, boosting learners' confidence, promoting emotional expression, and reducing anxiety by instilling a sense of belonging and worth. Observations confirm that peers assisted ECD learners with disabilities without prompting, creating a collaborative and respectful environment, while learners with disabilities demonstrate visible signs of joy, comfort, and active engagement.

#### **Challenges Faced by Teachers in Integrating Inclusive Cultural Games to Promote Socio-Emotional in ECD Learners With Disabilities**

Data collected from interviews and observation revealed several challenges that ECD teachers encountered in trying to use inclusive cultural games. Firstly, Grade 3 teacher indicated that; "Lack of resources is a big issue. We don't have enough materials or support staff to assist learners with special needs during these games. For example, visual aids or tactile materials they would need during the game."

*ECD B Teacher 1* shared the following sentiments, “There’s limited training on inclusive practices in our teacher development programs. I often feel unsure how to modify a game appropriately for all learners.”

Grade 2 teacher had this to say, “some parents view inclusive cultural games as non-essential and do not support such activities.”

Grade 1 Teacher said,

I rarely engage my children in cultural games because they are time consuming, I have syllabi to cover therefore I cannot waste time by engaging in games. Furthermore, the timetable is congested with several activities that do not allow us to do so. Lastly, with high ratio of learners I even fail to cater for the few learners with disabilities that I have in my class.

From observations, researchers noted that most teachers struggled to support learners with disabilities because time constraints and curriculum. Teachers often have pressure to cover academic content, leaving limited time for games especially inclusive adaptations. Also, teachers have very high teachers-learner ratio and congested timetables.

### ***Emerging Themes***

The themes emerging from both interviews and classroom observations reveal a complex set of challenges that hinder the effective inclusion of cultural games for promoting socio-emotional development in learners with disabilities. A key issue is the lack of training and adaptive knowledge, as many teachers are willing but unequipped to modify traditional games or handle diverse learner needs effectively. This is compounded by inadequate resources and support, including limited access to teaching aides, assistive materials, and the strain of overcrowded classrooms, making individualized attention during play activities difficult. Additionally, managing inclusion in large, mixed-ability groups presents logistical and engagement challenges, often resulting in unintentional exclusion. A lack of peer sensitisation and parental involvement further alienates learners with disabilities, affecting their social confidence and emotional well-being.

### **Strategies That Enhance Effective Inclusion of Inclusive Cultural Games in Promoting Socio-Emotional ECD Learners With Disabilities**

Data collected from interviews and observations on strategies used by teachers indicate different views from teachers. Some teachers were of the view that use of cultural games benefit learners with disabilities to develop socio emotional skills. ECD B Teacher 1 responded by saying:

I use several strategies that include assigning roles that match with the child's disability. For example, a child with mobility difficulties, when others engage in vigorous cultural song activities like jumping and dancing the child claps to the rhythm. I also improvise play material for learners with disabilities.

Another ECD A Teacher 2 said; “I always encourage learners to work in groups although I will not be targeting learners with disabilities.” Teamwork and cooperation are key in developing socio emotional skills in learners with disabilities. Although teachers engaged

learners in group activities, observations indicated that emphasis was not on accommodating learners with disabilities.

An outstanding response from a Grade 1 Teacher was noted, “Even though I do not use these games, I suggest that teacher ask parents to designing home-based versions of cultural games by so doing it will help them participate in their children’s education.”

This study findings further revealed that grade 1,2 and 3 teachers rarely engaged learners in cultural game activities. The above views on strategies used by teachers were validated by observations carried out with interviewed respondents. From observations it was noted that teachers rarely used inclusive games in daily activities.

### ***Emerging Themes***

Foster peer support and inclusive grouping. This strategy promotes peer buddy system to support learners with disabilities. Parental involvement is another theme that is emerging. Lastly, provide appropriate activities for learners with disabilities so that they do not get frustrated or bored during play time.

### **Proposed Framework to Enhance the Integration of Cultural Inclusive Games**

The study recommended a framework to integrate cultural games into teaching, especially for learners with disabilities. Teachers should be empowered to adapt games that support active participation and socio-emotional development. Instructional strategies and assessments must be inclusive and culturally relevant. Learning objectives should reflect diverse needs and promote cooperation, communication, and emotional growth. Teachers should be encouraged to work with parents and communities, attending cultural events to better understand relevant norms and values. Technology could be used to document cultural games for educational purposes. Involving parents as resource persons strengthens teacher-parent relationships, supporting positive behaviour and ensuring cultural continuity for learners with disabilities.

### **Discussion**

Number of studies acknowledge the use of inclusive cultural games in promoting socio-emotional skills of learners with disabilities (Sitti et al., 2024; Stančin et al., 2020). The development of children's emotions is embedded in their cultural context. Mcelelwa and Musarandega (2024) argue that disregarding cultural upbringing frustrates learners and hinders discourse in class, which intern interferes with the socio emotional development of learners with special needs. An American study by (Lai et al., 2023) showed that incorporating cultural cooperative games in educational settings enhanced peer relationships, interaction and reduced feelings of isolation among learners with disabilities. It becomes a challenge to effectively promote socio emotional development of learners with disabilities without the inclusion of cultural inclusive games. Early childhood teachers therefore need to appreciate cultural games played in Mzilikazi district, Bulawayo.

Mzilikazi early childhood teachers need to be equipped with knowledge and skills on how to integrate cultural inclusive games. Although several games contribute to socio-emotional development of children with disabilities, these should be culturally inclusive. Studies confirm that teachers who lack knowledge skills, rarely engage learners in culturally inclusive games (Saura & Zimmermann, 2021; Sulistyaningtyas & Fauziah, 2019). Holistic

development of socio emotional is often compromised when teachers fail to select proper games. This could be due to lack of key socio emotional skills such as, self-awareness, collaboration, empathy, and communication among others. However, if teachers are equipped with necessary skills, they will be able to include culturally relevant games within the school curriculum leading to the development of socio-emotional skills in learners with disabilities.

### **Conclusions and Recommendations**

The development of socio-emotional skills of learners with disabilities depends on many activities and among them are cultural inclusive games. Studies reveal that learners develop skills such as empathy, cooperation and self confidence among other skills. Despite, the crucial role played by the integration of inclusive cultural games, teachers struggle to engage ECD learners with disabilities in cultural games due to lack of knowledge and skills to modify the games, teaching and learning resources, negative attitude of parents and teachers towards cultural games and lack of parental involvement. Therefore, for support and intervention strategies, the study proposed the following recommendations:

- The Ministry of Primary and Secondary Education should prioritise the integration of inclusive cultural games in mainstream classes through policy formulation.
- The Ministry of Primary and Secondary Education should provide assistive devices or materials for learners with disabilities to fully participate in inclusive cultural games.
- Teachers' colleges must empower early childhood teachers with skills and knowledge on how to modify or adapt and integrate cultural games in the teaching and learning process.
- Policies that would make teachers and the community play a partnership role in promoting the integration of inclusive cultural games in schools need to be designed
- Provide in-service or staff development program for qualified teachers to empower them with knowledge and practical skills to modify games and other activities that enhance the development of socio-emotional skills in ECD learners with disabilities.

### **Acknowledgements**

We extend our heartfelt gratitude to the three heads of schools in Mzilikazi District in Bulawayo Province, Zimbabwe, for graciously granting us permission to collect data from their schools. Our sincere appreciation also goes to the six early childhood teachers whose valuable participation and insights greatly enriched our research. We are especially thankful to the Education Director for Bulawayo Province for authorising and supporting the conduct of this study, thereby making this research possible.

### **Declaration of Using AI-Assisted Technologies in the Writing Process**

We, the authors declare that we used AI tools to proofread and correct grammar in this document. These tools were employed to enhance the clarity, coherence, and grammatical accuracy. All ideas, analysis, and conclusions presented are entirely our own. No part of the content was generated or re-written by AI beyond surface-level language corrections.

## References

- Baradaran Bazaz, S., Yaghobi Hasankala, Q., Shojaee, A. A., & Unesi, Z. (2018). The Effects of Traditional Games on Preschool Children's Social Development and Emotional Intelligence: A Two - Group, Pretest - Posttest, Randomized, Controlled Trial. *Modern Care Journal*, 15(1), 2–6. <https://doi.org/10.5812/modernc.66605>
- Cavioni, V., Grazzani, I., & Ornaghi, V. (2017). Social and emotional learning for children with learning disability: Implications for inclusion. *International Journal of Emotional Education*, 9(2), 100–109.
- Cipriano, C., & McCarthy, M. F. (2023). Social and Emotional Learning : Research , Practice, and Policy Towards an inclusive social and emotional learning ☆. *Social and Emotional Learning: Research, Practice, and Policy*, 2(March), 100008. <https://doi.org/10.1016/j.sel.2023.100008>
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research Methods in Education* (8th Ed). Taylor & Francis Group. <http://taylorandfrancis.com>
- Dewi, A. E. R. (2024). Effectiveness of Implementing Inclusive Education: Challenges and Opportunities in Culturally Diverse Classrooms. *Journal of Pedagogy*, 1(3), 1–7. <https://doi.org/10.62872/k2k0zs91>
- Duncan, M. M. T. (2024). *How Play-Based Learning Impacts Students With Specific Learning and Social-emotional Needs*. <https://spark.bethel.edu/etd/1089>
- Fix, G. M., Kim, B., Ruben, M. A., & McCullough, M. B. (2022). Direct observation methods: A practical guide for health researchers. *PEC Innovation*, 1(March), 100036. <https://doi.org/10.1016/j.pecinn.2022.100036>
- Garaigordobil, M., Berruero, L., & Celume, M. (2022). Developing Children ' s Creativity and Social-Emotional Competencies through Play : Summary of Twenty Years of Findings of the Evidence-Based Interventions “ Game Program .” *Journal of Intelligence*, 10(4), 77. <https://doi.org/10.3390/jintelligence10040077>
- Giese, S., Dawes, A., Biersteker, L., Girdwood, E., & Henry, J. (2023). Using Data Tools and Systems to Drive Change in Early Childhood Education for Disadvantaged Children in South Africa. *Children*, 10(9). <https://doi.org/10.3390/children10091470>
- Gladh, M., Siljehag, E., Westling Allodi, M., & Odom, S. L. (2022). Supporting children's social play with peer-based intervention and instruction in four inclusive Swedish preschools. *Frontiers in Education*, 7(August), 1–18. <https://doi.org/10.3389/educ.2022.943601>
- Grant, M., & Jones-Goods, K. M. (2016). Identifying and Correcting Barriers to Successful Inclusive Practices: A Literature Review. *Journal of the American Academy of Special Education Professionals*, 64–71. <https://www.aasep.org>



- Isaac, E. (2023). Convenience and Purposive Sampling Techniques : Are they the Same ? *International Journal of Innovative Social and Science Education Research*, 11(1), 1–7.
- Jubhari, R. R., Bandaso, T. D., Hidayah, N., Zabila, Z., Gizly, M. A., & Amal, A. J. (2022). Disability Play Therapy: Implementation of Traditional Japanese Game to Improve Creativity and Education in Public Special Needs Inclusive School (SLB) 1 Makassar. *Proceedings of the Interdisciplinary Conference of Psychology, Health, and Social Science (ICPHS 2021)*, 639(Icphs 2021), 31–36. <https://doi.org/10.2991/assehr.k.220203.006>
- Kong, K., & Ereky-Stevens, K. (2023). *BUILDING AN INCLUSIVE AND EQUITABLE EARLY CHILDHOOD EDUCATION FOR REFUGEE CHILDREN: FRAMEWORK FOR ACTION Final Report Authors IRAM SIRAJ*. 1–67. <https://share.google/SDPUKGAZjPeMzT50L>
- Kumatongo, B., & Muzata, K. K. (2021). Research Paradigms and Designs With Their Application in Education. *Journal of Lexicography and Terminology*, 5(1), 16–32. <https://journals.unza.zm/index.php/jlt>
- Lai, B., Young, R., Craig, M., Chaviano, K., Swanson-Kimani, E., Wozow, C., Davis, D., & Rimmer, J. H. (2023). Improving Social Isolation and Loneliness Among Adolescents With Physical Disabilities Through Group-Based Virtual Reality Gaming: Feasibility Pre-Post Trial Study. *JMIR Formative Research*, 7(1). <https://doi.org/10.2196/47630>
- Lewis, S. (2024). *Interpretivism Paradigm & Research Philosophy*. Simply Sociology. <https://stepofweb.com/interpretivism-paradigm/>
- Liu, H., Qiu, Y., & Luo, L. (2022). Exploring family educational involvement and social skills in Chinese preschoolers: The moderating role of parent-child relationship. *Frontiers in Psychology*, 13(August), 1–14. <https://doi.org/10.3389/fpsyg.2022.911421>
- Lyu, Y. U. E., An, P., Zhang, H., Katsuragawa, K., & Zhao, J. (2024). *Designing AI-Enabled Games to Support Social-Emotional Learning for Children with Autism Spectrum Disorders*. 1–5. <https://doi.org/10.48550/arXiv.2404.15576>
- Mania, S., Malik, M., & St, I. (2024). Early Childhood Social-Emotional Development Through Traditional Games in Learning at Mutiara Integrated Islamic Kindergarten Makassar. *Journal of Research and Multidisciplinary*, 7(2), 876–885. <https://doi.org/10.5281/jrm.v7i2.96>
- Mawere, P., & Mawere, D. (2018). Challenges Encountered In The Implementation Of Inclusive Early Childhood Development ( ECD ) In Private ECD ‘ A ’ And ‘ B ’ Settings In Gweru . A Case Study Of Private Preschools In Gweru , Zimbabwe. *International Journal of Innovative Research and Advanced Studies*, 5(5).
- Mcelelwa, S., & Musarandega, H. (2024). *Integrating Education and Culture: Towards A Community Immersion Framework for Enhancing Educational Utility in Mogoditshane Village, Botswana. December 2023*.

- MoPSE. (2023). Zimbabwe National Early Learning Policy (NELP). *Zimbabwe-National-Early-Learning-Policy1\_compressed.pdf*.
- Mpu, Y., & Adu, E. O. (2021). The challenges of inclusive education and its implementation in schools: The South African Perspective. *Perspectives in Education*, 39(2), 225–238. <https://doi.org/10.18820/2519593X/pie.v39.i2.16>
- Nasrulloh, A., Hermawan, H. A., Ihsan, F., & Yogyakarta, U. N. (2024). Beneficios para la salud de los juegos tradicionales: una revisión sistemática (Health benefits of traditional games - a systematic review). *Retos*, 59, 843–856. <https://doi.org/10.47197/retos.v59.107467>
- Philpott, D. F., Young, G., Maich, K., Penney, S. C., & Butler, E. (2019). *The preemptive nature of quality early child education on special educational needs in children. February*. [https://research.library.mun.ca/13571/?utm\\_source=sootoday.com&utm\\_campaign=sootoday.com&utm\\_medium=referral](https://research.library.mun.ca/13571/?utm_source=sootoday.com&utm_campaign=sootoday.com&utm_medium=referral)
- Roy, M., & Giraldo-garcía, R. (2018). The Role of Parental Involvement and Social / Emotional Skills in Academic Achievement: Global Perspectives. *School Community Journal*, 28(2), 29–46.
- Saminder Singh, G. K., Ahmad, I. Y. B., Baharudin, S. N. A., & Ngadni, I. (2023). Challenges Faced by Teachers in Inclusive Classrooms in Early Childhood Education (ECE) Setting. *International Journal of Academic Research in Progressive Education and Development*, 12(2). <https://doi.org/10.6007/ijarped/v12-i2/17267>
- Saura, S. C., & Zimmermann, A. C. (2021). Traditional Sports and Games : Intercultural Dialog , Sustainability , and Empowerment. *Frontiers in Psychology*, 11(January), 1–11. <https://doi.org/10.3389/fpsyg.2020.590301>
- Sitti., M., Ibrahim, M. M., Syamsudduha, S., Sadaruddin, & Dewi, A. C. (2024). The Impact of Traditional Games on Social-Emotional Development: A Comprehensive Review of Existing Research. *Journal of Learning and Development Studies*, 4(2), 39–51. <https://doi.org/10.32996/jlds.2024.4.2.5>
- Smith, K. (2020). *Indigenous Games in the Classroom*. <https://indiancountrytoday.com/archive/learning-to-play-snow-snake-is-a-sacred-rite-of-passage-bRMOL7WHIkeRkLtm3KtXOQ%0A24>
- Stančin, K., Hoić-božić, N., & Mihić, S. S. (2020). Using Digital Game-Based Learning for Students with Intellectual Disabilities – A Systematic Literature Review. *Informatics in Education*, 19(2), 323–341. <https://doi.org/10.15388/infedu.2020.15>
- Sukabumi, S. P., & Syekk, Y. (2023). Social Learning Theory: Cognitive and Behavioral Approaches Social Learning Theory : Cognitive and Behavioral Approaches. *Jurnal Ilmiah Pendidikan Holistik*, 1(3), 297–324. <https://doi.org/10.55927/jiph.v1i3.2317>
- Sulistyaningtyas, R. E., & Fauziah, P. Y. (2019). *The Implementation of Traditional Games for Early Childhood Education. July*. <https://doi.org/10.2991/iccie-18.2019.75>

- Suteja, S., Saifuddin, S., Farihin, F., Aris, A., & Winarso, W. (2022). A Traditional Game-Based Parenting Model as a Cultural-Inheritance Medium in Early Childhood Education. *International Journal of Learning, Teaching and Educational Research*, 21(3), 143–165. <https://doi.org/10.26803/ijlter.21.3.9>
- Swift, A. (2022). Being Creative with Resources in Qualitative Research. *The SAGE Handbook of Qualitative Research Design*, April, 290–306. <https://doi.org/10.4135/9781529770278.n19>
- Tarashika, M., & Jairo, G. (2023). Rethinking the Role of Shona Cultural Games and Activities in the Teaching and Learning of Mathematics at ECD Level in a Selected District in Manicaland Province, Zimbabwe. *International Journal of Research and Innovation in Social Science (IJRISS)*, 7(01), 1214–1224. <https://dx.doi.org/10.47772/IJRISS.2023.7011094>
- Thomas, F. B. (2022). The Role of Purposive Sampling Technique as a Tool for Informal Choices in a Social Sciences in Research Methods. *Just Agriculture Multidisciplinary E-Newsletter*, 2, Article 047.
- Tlili, A., Denden, M., Duan, A., Padilla-zea, N., & Huang, R. (2022). Game-Based Learning for Learners With Disabilities — What Is Next? A Systematic Literature Review From the Activity Theory Perspective. *Frontiers in Psychology*, 12(February), 814691, 1–16. <https://doi.org/10.3389/fpsyg.2021.814691>
- UNESCO. (2017). *Education for Sustainable Development Goals (SDGs): Learning Objectives* (European Conference on Educational Research). <https://doi.org/10.54675/CGBA9153>
- UNESCO. (2021). *Inclusive early childhood care and education: From commitment to action*. United Nation Educational, Scientific and Cultural Organisation. <https://unesdoc.unesco.org/Ark:/48223/Pf0000384496>
- Watson, S. (2013). *UNDERSTANDING PROFESSIONAL DEVELOPMENT FROM THE PERSPECTIVE OF SOCIAL LEARNING THEORY*. 8(2013), 3287–3296.
- Zieher, A. K., Bailey, C. S., Cipriano, C., McNaboe, T., Smith, K., & Strambler, M. J. (2024). Social and Emotional Learning : Research , Practice , and Policy Considering the “How” of SEL : A framework for the pedagogies of social and emotional learning. *Social and Emotional Learning: Research, Practice, and Policy*, 3(March 2023), 100030. <https://doi.org/10.1016/j.sel.2024.100030>

**Contact email:** 2026964078@ufs4life.ac.za



## Experiencing REFLACT: A Workshop Practicing What It Proposes From Theory to Embodied Teaching-Learning Experiences in Complex Contexts

Astrid Dobmeier, Fresenius University of Applied Sciences, Germany  
Veronika Sweet, Technical Institute Deggendorf, Germany

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

In the face of rapid global transformations, educational settings increasingly demand approaches that transcend traditional, linear models of teaching. In response, Dr. Astrid Dobmeier and Dr. Veronika Sweet were invited to design and facilitate a workshop introducing *REFLACT* [sic!]<sup>1</sup>—an interdisciplinary framework for meaningful teaching-learning experiences in complex contexts. Rooted in systemic thinking and informed by systems theory, second-order cybernetics, organizational psychology, and learning organization theory, REFLACT fosters learning environments where action and reflection are dynamically intertwined. At its core, REFLACT views learning as a co-created, relational process. Rather than framing educators as knowledge transmitters, the framework facilitates context-sensitive dialogue and collective sense-making. Using a structured choreography—the *Reflect Hoop*—the workshop guides participants through iterative stages: *Act* (Creating Contact), *Reflect* (Check In), *Act* again (Dialogue beyond linear teacher-learner roles), and finally, *ReflAct* (Making deductions, transferring insights, and Checking Out). This article invites readers not only to understand the theoretical underpinnings of REFLACT, but to experience the spirit and flow of the workshop itself. Drawing on moments of interaction, resonance, and co-creation, we trace how the REFLACT Hoop unfolds in practice—opening spaces for mutual trust, embodied reflection, and transformative insight. Our ongoing research suggests that the more trust exists in educational relationships, the more participants can thrive—even in contexts of uncertainty and change. REFLACT offers both a structure and an invitation to engage in learning that is alive, shared, and generative. Universities and colleges have the potential to evolve into ReflActing organisations.

**Keywords:** REFLACT [sic!], interdisciplinary framework, meaningful teaching-learning experiences, complex contexts, co-created learning, relational process, context-sensitive dialogue, systemic teaching, systemic thinking, systems theory

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

With complexity shaping today's world more than ever, education must evolve beyond conventional, one-directional teaching models. In this spirit, at the Paris Conference on Education 2025, Dr. Astrid Dobmeier and Dr. Veronika Sweet developed and facilitated a workshop centered on REFLACT [sic!]<sup>1</sup>—a dynamic framework that blends disciplines to foster meaningful learning experiences in shifting, unpredictable contexts.

The purpose of this article is to invite readers to experience that workshop. Its purpose, thereby, was twofold: to present the conceptual foundation of the REFLACT framework and to trace how it comes to life in a real-world workshop setting. By doing so, we aim to explore how relational, systemic approaches can foster trust, participation, and transformation in learning environments—especially under conditions of complexity and change.

REFLACT is grounded in systemic thinking and informed by systems theory, second-order cybernetics, organisational psychology, and learning organisation theory. It reimagines learning as a co-created, dialogical process, shaped not by the transmission of knowledge, but by mutual engagement, reflection, and adaptive action.

This article offers both theoretical insight and experiential access. It follows the workshop choreography of the *Reflact Hoop—Act* (Creating Contact), *Reflect* (Check In), *Act* again (Dialogue beyond linear teacher-learner roles), and *ReflAct* (Making deductions, transferring insights, and Checking Out). Along the way, we invite readers into the dynamic learning space that REFLACT creates—where trust grows, new perspectives emerge, and knowledge is co-constructed through structured yet flexible interaction.

## Experiencing REFLACT – A Workshop Practicing What It Proposes

We wanted participants to truly experience the REFLACT framework. So, we designed a 50-minute session that put its key ideas into practice. All participants collaboratively rearranged the room in preparation for the subsequent learning experience. True to the spirit of *radical education*, we chose a flexible dramaturgy: sometimes relying on slides for visual guidance, mostly working solely with spoken word. This openness reflects our belief that meaningful learning emerges in relation—not from rigid scripts, but from shared energy in the room.

## Setting the Stage: From Contact to Dialogue Within Our Context

Sitting in a circle, all on the same level and in eye-contact, we began with music to signal a shift away from passive reception and into participatory presence. This set the tone: REFLACT invites energy, emotion, and engagement. Context is key in REFLACT. Contextual elements such as room temperature, time of day, mood, or breaks for nourishment are not peripheral but integral to our capacity for dialogue and interpersonal connection. 12:15pm on the fourth day of the conference, with temperatures significantly above 30 degrees Celsius without airconditioning make a difference that needs addressing and integration. These seemingly mundane conditions shape the relational atmosphere and directly influence everybody's readiness to engage, listen, and co-create meaning in educational settings.

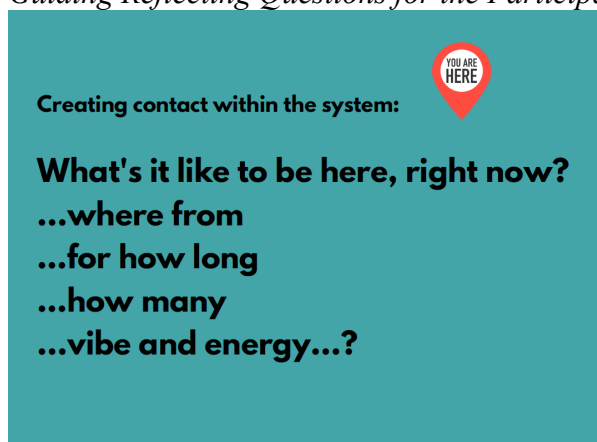
**Figure 1**  
*Context, Setting and Spatial Design*



Excerpt of ex-post documentation

After welcoming participants, we introduced ourselves not only professionally, but personally: What excites us about this work? What are we curious to discover today? In turn, we invited participants to reflect on *who they are today*: physically, mentally, contextually. This embodied check-in is not a warm-up. It is the first *Act* of the REFLACT Hoop—*Creating Contact*.

**Figure 2**  
*Guiding Reflecting Questions for the Participants*



Shared via Canva Video Presentation during the Workshop

## From Self-Reflection to Shared Meaning

We then moved to *Reflect*: What makes learning meaningful—for you? Participants took time to recall valuable learning experiences in their lives, asking themselves what made these moments stand out. Was it trust? Freedom? Challenge? Encouragement? They then entered into dialogue with peers—activating what we call *collective resonance*. This shift from self-reflection to shared conversation creates a bridge from individual experience to systemic understanding.

**Figure 3***Guiding the Check-In for the Participants*

Shared via Canva Video Presentation during the Workshop

**REFLECT as Framework and Mindset**

As we continued through the Hoop, we introduced the underlying concepts of REFLACT. Learning, we argue, is not something delivered, but co-created. In our experience, students thrive when learning environments acknowledge their complexity—academic, emotional, cultural, and interpersonal. Our research shows that when mutual trust is present, motivation, engagement, and even exam performance increase. The framework is based on systems theory, second-order cybernetics, organisational psychology, and the concept of learning organisations. It is designed to foster spaces where dialogue replaces instruction, and where action and reflection inform each other in cycles of change.

**Irritation is Highly Welcome**

In REFLACT, irritation is intentionally invited as a catalyst for reflection and learning. Rather than delivering predefined content or impulses, our role as facilitators lies in the art of posing precise, resonant questions. This creates a space in which all participants are encouraged to contribute their own experiences and share insights that hold collective value. In this way, knowledge emerges relationally — through dialogue, not instruction. Our preparation builds on two questions we ask ourselves before every workshop, derived from our theoretical background:

1. How can both students and faculty benefit from prior experience in complex, disciplinary-diverse settings?
2. How can a framework like REFLACT contribute to meaningful transformation in higher education across cultures and contexts?

Participants explored these questions in small group dialogues, or in some cases, carried them into a walk outside—an invitation for self-organised learning continuity beyond the session.

**Continuous Orientation by REFLACT Hoops**

We provide continuous orientation throughout the workshop process — a clear sense of where we are, what has come before, and what lies ahead.

This structure is supported by the REFLACT Hoops, a guiding framework that enables participants to situate themselves within the flow of the session. These hoops function as



dynamic orientation markers, fostering coherence, transparency, and a shared learning journey.

**Figure 4**  
*Guiding the Check-In for the Participants*



Shared via Canva Video Presentation during the Workshop

### Check-Out: Transfer and Closing the Loop

We closed the session by inviting participants to reflect once more—this time on what they are taking with them. What small insight might shape their own practice? What might they try out, share, question, or unlearn?

What was particularly striking: Participants explicitly noted how much more refreshed, alert, and engaged they felt. Despite the high room temperatures, many remained in their small groups well after the official closing — sitting together, talking, and laughing.

### Conclusion

As complexity and uncertainty increasingly define our global and educational landscapes, the need for teaching-learning formats that embrace—not avoid—this complexity becomes urgent. The REFLACT framework offers a response rooted in systemic thinking, dialogue, and relational engagement. Rather than presenting knowledge as content to be transferred, REFLACT positions learning as an emergent, co-constructed process shaped by context, connection, and continuous reflection.

This article traced the conceptual foundation and lived application of REFLACT during our workshop at the Paris Conference on Education 2025. By following the REFLACT Hoop, we demonstrated how learning environments can be transformed into dialogical spaces that foster trust, participation, and change. Central to this approach is the deliberate invitation of irritation as a productive force: participants are not passive recipients of pre-set content, but co-authors of meaning-making processes. Their contributions are shaped not only by expertise, but by presence, emotion, and lived experience.

The implications of REFLACT are both didactic and systemic. When students and faculty are guided by shared orientation, dialogical openness, and contextual awareness, learning becomes more than skill acquisition—it becomes a transformative experience. Educators are

invited to rethink their roles, not as content deliverers, but as facilitators of space, structure, and questions that allow meaning to emerge.

The REFLACT framework is relational and situational by design, which means it may resist rigid standardisation or easy scalability. It also demands a high level of self-awareness and flexibility from facilitators—skills that may require further professional development and institutional support. Additionally, while qualitative feedback from participants was overwhelmingly positive, further empirical research is planned to examine the long-term impact of REFLACT on learning outcomes, behavior change, and systemic transformation in higher education.

### **We Offer the Following Recommendations:**

For educators: Experiment with dialogical formats that integrate embodied, emotional, and contextual awareness. Practice a systemic attitude and stance. Start with questions rather than content, and notice what emerges without judging or comparing.

For institutions: Create spaces where innovative didactics like REFLACT can be explored, adapted, and evaluated—without immediate pressure for quantifiable outcomes. Given the appropriate orientation and commitment to reflection and action, universities and colleges can develop into what may be termed ReflActing organisations.

For researchers: Further study is recommended to assess how systemic frameworks like REFLACT perform across disciplines, cultures, and educational levels. Mixed-method and longitudinal studies could yield valuable insights.

Ultimately, REFLACT does not claim to be a universal solution, but rather a mindset for engaging meaningfully with complexity. It is a framework in motion—responsive, curious, and grounded in the belief that learning is a shared, living process. Our experience in Paris confirmed this: even under challenging conditions, participants stayed, listened, reflected, and laughed together. In a world often marked by fragmentation and speed, such moments of genuine connection are perhaps the most powerful form of education we can offer.

## References

- De Shazer, S. (2004). Das Spiel mit Unterschieden. [Playing with differences.] Carl-Auer.
- Dewey, J., Montessori, M., Strzemiński, W., Piaget, J., Vygotsky, L., von Foerster, H., & Morin, E. (1997). Constructivism (learning theory). *Journal of Social Sciences, Literature and Languages*, 9, 9–16.
- Hüther, G. (2020). Wege aus der Angst: Über die Kunst, die Unvorhersehbarkeit des Lebens anzunehmen. [Ways out of fear: On the art of accepting the unpredictability of life.] Vandenhoeck & Ruprecht.
- Königswieser, R., & Exner, A. (2019). Systemische Intervention: Architekturen und Designs für Berater und Veränderungsmanager. [Systemic Intervention: Architectures and Designs for Consultants and Change Managers.] Schäffer-Poeschel.
- Radatz, S. (2007). Coaching-Grundlagen für Führungskräfte: Mit Coaching neue Weichen in der Führung stellen (Vol. Systemisches Management). [Coaching basics for managers: Setting a new course in leadership with coaching (Vol. Systemic Management).] Systemisches Management.
- Reich, K. (1996). Systemisch-konstruktivistische Didaktik: Eine allgemeine Zielbestimmung. [Systemic-constructivist didactics: A general definition of objectives.] In R. Voß (Ed.), *Die Schule neu erfinden*. [Reinventing the school.] Luchterhand.
- Reusser, K. (2016). Jenseits der Beliebigkeit. “Konstruktivistische Didaktik” auf dem Prüfstand der empirischen Unterrichtsforschung. [Beyond arbitrariness. ‘Constructivist didactics’ on the test bench of empirical teaching research.] *Journal für LehrerInnenbildung*, 16(2), 40–48.
- Satir, V. (2010). Kommunikation, Selbstwert, Kongruenz: Konzepte und Perspektiven familientherapeutischer Praxis (8th ed.). [Communication, self-esteem, congruence: concepts and perspectives of family therapy practice.] Junfermann.
- Segal, L. (2001). The dream of reality: Heinz von Foerster’s constructivism. Springer Science & Business Media.
- Senge, P. M. (2014). The fifth discipline fieldbook: Strategies and tools for building a learning organization. Crown Currency.
- Simon, F. B. (2023). Einführung in Systemtheorie und Konstruktivismus. [Introduction to systems theory and constructivism] Carl-Auer.
- Tomm, K. (1994). Die Fragen des Beobachters: Schritte zu einer Kybernetik zweiter Ordnung in der systemischen Therapie. [The observer's questions: steps towards a second-order cybernetics in systemic therapy.] Carl-Auer.

Von Glasersfeld, E. (1995). Aspekte einer konstruktivistischen Didaktik. [Aspects of constructivist didactics.] In Regional Institute for School and Secondary Education (Ed.), *Lehren und Lernen als konstruktive Tätigkeit*. [Teaching and learning as a constructive activity.] Soest.

**Contact emails:** [astrid@dobmeier.solutions](mailto:astrid@dobmeier.solutions)  
[mail@sweetandpartners.com](mailto:mail@sweetandpartners.com)

## **The Educational Environment for Generation Z Students' Sustainable Learning in Higher Education: Challenges in the Italian Context**

Barbara Barabaschi, Università Cattolica del Sacro Cuore, Italy  
Roberta Virtuani, Università Cattolica del Sacro Cuore, Italy

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This paper examines how higher education can meet the evolving expectations of Generation Z students by designing a sustainable educational environment. Drawing from management and education studies, we propose a three-pillar model focused on innovative teaching methods, collaboration with the business world, and inclusive physical and relational spaces. The study adopts a qualitative approach, analyzing data from student satisfaction surveys and interviews with academic coordinators across seven Master of Science programs in management at a leading Italian university. Findings highlight strong alignment between student expectations and institutional practices. Students appreciate interactive learning, career-oriented opportunities, and accessible support services. Coordinators emphasize experiential methods, partnerships with companies, and student-centered infrastructures as essential to long-term learning and development. The paper contributes a holistic and actionable model grounded in the Sustainable Learning in Education (SLE) framework, offering practical insights for higher education institutions seeking to foster meaningful, future-oriented learning experiences for Generation Z.

*Keywords:* Generation Z students, sustainable learning, educational environment, higher education

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The growing complexity of contemporary global challenges requires higher education institutions to reconsider the aims and methods of teaching and learning. In particular, the emergence of Generation Z—students born and raised in a hyper-connected, information-rich environment—has brought forth new expectations regarding the role of education. These students are not merely seeking knowledge acquisition; rather, they express a strong desire for learning experiences that are meaningful, future-oriented, and socially impactful (Schwieger & Ladwig, 2018; Seemiller & Grace, 2016).

In response to these evolving demands, it becomes necessary to rethink not only teaching practices but the broader concept of the educational environment itself. Drawing on insights from the literature, this paper proposes an integrated framework that reconceptualizes the educational environment as a dynamic system composed of three interdependent dimensions: innovative pedagogical approaches, active collaboration with external stakeholders—particularly from the business world—and the design of inclusive physical and relational spaces that foster both academic and personal development. While these dimensions have been addressed individually in previous studies (Barnett, 2020; Thomas & Brown, 2011), our contribution lies in articulating their interconnection as a unified model that, with a systemic perspective, is capable of aligning educational strategies with the values and learning needs of Generation Z students.

However, the implementation of these elements should not occur in isolation. They must be informed by a unifying and forward-looking principle: the sustainability of learning.

In this context, Sustainable Learning in Education (SLE) offers a valuable conceptual framework. Drawing on the theoretical contributions of Ben-Eliyahu (2021), SLE differs from both traditional learning paradigms and content-specific sustainability education. It is grounded in the idea that *learning itself*—rather than solely environmental or economic resources—can and must be renewed, reused, and sustained over time. SLE emphasizes strategies and dispositions that enable learners to adapt, inquire, self-regulate, and collaborate in navigating complex and changing environments.

As an emerging educational philosophy, SLE aims to cultivate long-term personal and societal development. It fosters transferable skills and promotes learner autonomy, equipping individuals to maintain and evolve their learning throughout diverse life transitions and across domains. Embedding SLE principles within higher education design not only aligns with the aspirations of Generation Z students but also contributes to a broader vision of sustainable and resilient societies (Ben-Eliyahu, 2021; Sterling & Orr, 2001).

Against this backdrop, the present paper explores three interconnected dimensions that are essential for rethinking higher education in light of contemporary challenges. First, it examines the distinctive characteristics, expectations, and learning preferences of Generation Z students, whose educational needs differ markedly from those of previous cohorts. Second, it investigates how the educational environment—in its methodological, spatial, and relational components—can be reimaged to respond effectively to these needs. Third, it introduces Sustainable Learning in Education (SLE) as the underlying pedagogical philosophy capable of supporting long-term, adaptive, and meaningful learning processes.

The original contribution of this study lies in the development of an integrated conceptual model for a sustainable educational environment, specifically tailored to management education. The model is structured around three interdependent pillars: innovative teaching methods, active collaboration with the business world, and the design of physical and social spaces conducive to collaborative and reflective learning. This integrated approach aims to foster not only academic achievement but also the long-term personal and professional growth of students. These pillars are conceived as mutually reinforcing components of a dynamic system that must be activated and balanced to achieve meaningful and lasting learning outcomes. The following section provides a review of the literature that informs each of these three dimensions and positions the proposed model within the broader discourse on educational innovation.

### **Literature Review**

Recent literature emphasizes the need for a pedagogical shift in response to the evolving characteristics of Generation Z students. Born between 1995 and 2012, Gen Z learners are digital natives who exhibit strong familiarity with technology but often lack the ability to use it strategically for career development (Shatto & Erwin, 2016). They show a clear preference for hands-on experiences, collaborative work, and multimedia-rich environments over traditional lecture-based instruction and memorization tasks. With shorter attention spans and extensive use of digital content—often up to nine hours daily on mobile devices—Gen Z students benefit most from visually engaging, interactive, and concise learning formats (Hallowell & Rater, 2011; Hicks, 2011; Shatto & Erwin, 2016). Socially, they are diverse, globally aware, and environmentally conscious, with a strong desire for relevance, peer interaction, and personalization in their education (Bagdi et al., 2023; Jaleniauskiene & Juceviciene, 2015; Mosca et al., 2019; Pew Research Center, 2014).

This perspective is further supported by Constructivist Learning Theory (Kamalov et al., 2023; Vygotsky, 1978), which views learning as an active, contextualized process in which knowledge is co-constructed through social interaction and experiential engagement. Generation Z thrives in environments that promote problem-solving and real-world application, where they can act as co-producers of educational value. This aligns with the concept of prosumption in educational services (Arcidiacono, 2018; Royo, 2017; Toffler, 1980), wherein students actively contribute to the co-creation of the learning process through feedback, collaboration, and involvement in shaping content and delivery.

Self-Determination Theory (Ryan & Deci, 1985, 2000; Wang et al., 2023) provides further insight into Gen Z's learning needs by highlighting the importance of fulfilling three basic psychological needs: autonomy, competence, and relatedness. Gen Z students value the opportunity to personalize their learning paths, expect clear guidance and meaningful feedback to feel competent, and seek collaborative and mentoring relationships that support emotional connection and engagement. Learning environments designed to meet these needs are more likely to foster sustained motivation, persistence, and effective learning outcomes.

Finally, from the lens of Digital Natives and Media Ecology (Bennett et al., 2008; Mertala et al., 2024), it is evident that Gen Z's cognitive habits have been deeply shaped by continuous exposure to digital technologies. Educational strategies should therefore embrace mobile tools, gamified learning, AI tutors, and multimedia content that reflect the dynamic and interactive nature of their everyday digital experiences. The integration of flexibility,

interactivity, and personalization into learning design is essential to align educational delivery with the habits and expectations of this generation.

Understanding Generation Z's preferences and psychological needs provides the foundation for rethinking the role of the educational environment. As students seek personalization, engagement, and relevance in their learning, the environment in which they learn becomes more than a physical space—it transforms into a dynamic context that can either support or hinder motivation, collaboration, and critical thinking. Thus, the educational environment must be deliberately designed to reflect the learning preferences and values of Gen Z, promoting autonomy, digital fluency, and meaningful peer interaction.

### **The Role of the Educational Environment**

A growing body of literature emphasizes the central role of the learning environment in shaping students' learning experiences, academic outcomes, and personal development. Moos (1979) first conceptualized learning environments as multidimensional spaces comprising personal development orientation, relational dynamics, and systemic structure. Fraser (1998) extended this view by highlighting that students' perceptions of the environment critically affect their motivation and academic performance. In higher education, Genn (2001) introduced the idea of educational climate as a dynamic factor influencing learning engagement and emotional well-being.

More recent perspectives have expanded the concept to encompass sustainability, inclusion, and digital integration—particularly relevant for Generation Z students who demand interactive, purpose-driven, and technologically rich learning environments (Doll et al., 2020). These environments are not merely passive settings but dynamic ecosystems that promote well-being, foster curiosity, and encourage collaboration. The shift toward resilient and student-centered learning spaces also aligns with contemporary educational priorities such as emotional intelligence, adaptability, and life-long learning readiness. Consequently, the educational environment is increasingly viewed as a strategic component of sustainable education, one that must evolve alongside pedagogical innovation and societal transformation.

Recent research broadens this understanding by highlighting how physical spaces and social infrastructure directly contribute to student success. Studies by Oblinger (2006) and Jamieson et al. (2000) underscore the importance of learning environments designed for collaboration, flexibility, and accessibility. Thoughtfully designed spaces—such as open study areas, technologically equipped classrooms, and informal gathering zones—are shown to promote autonomy, peer interaction, and creative thinking (Brown, 2005; Temple, 2008). In parallel, student services such as peer mentoring, career counseling, and well-being programs are increasingly recognized as essential components of the educational ecosystem (Thomas, 2012). These findings reinforce the idea that the educational environment must evolve in a holistic way to support Generation Z students, who value autonomy, inclusiveness, and real-world applicability.

As a result, the educational environment should be understood as a multilayered ecosystem—one that, especially thought in the field of management studies, integrates innovative teaching methods, business cooperation, and spatial-social infrastructure to foster sustainable and meaningful learning.



The original contribution of this paper lies in the integrated model we propose, conceptualized as a dynamic wheel composed of three interdependent components. For the system to function effectively, all parts—pedagogical innovation, real-world engagement, and supportive environments—must be balanced and actively interacting. This holistic and circular structure reflects the complexity of contemporary learning and highlights the necessity of synergy among these dimensions to support Generation Z students in a sustainable and transformative academic experience.

In our paper, we define the educational environment as:

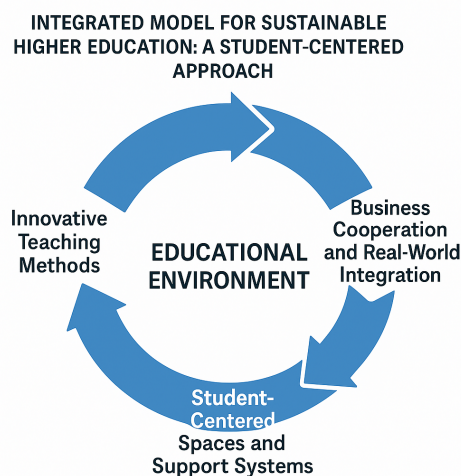
An integrated system of physical spaces, social dynamics, and pedagogical approaches that collectively shape the conditions for student learning, well-being, and development. A sustainable educational environment fosters inclusion, creativity, and adaptability—particularly aligned with the values and expectations of Generation Z students.

This conceptualization sets the stage for the central question that guides our investigation: *How can higher education institutions enhance engagement, learning, and employability among Generation Z students?* To address this question, the paper develops a theoretically grounded and experience-based framework specifically tailored to management education. By integrating insights from the literature with institutional practices, it proposes a holistic and actionable model aimed at fostering sustainable learning and long-term student development.

### **The Three Pillars of a Sustainable Educational Environment**

Building on this theoretical foundation, we propose a three-pillar framework for a sustainable educational environment tailored to Generation Z students. This model synthesizes current research and institutional experience to identify the core components that foster meaningful learning and long-term student development. Each pillar reflects a key dimension of the educational experience: (1) the methods by which learning is facilitated, (2) the relevance and integration of real-world contexts—particularly within management studies, and (3) the physical, emotional, and social infrastructure that supports students' academic and personal growth. Together, these pillars form an interconnected ecosystem that addresses the evolving expectations of today's learners and the strategic role of higher education in cultivating adaptive, responsible, and empowered graduates.

Our integrated model of sustainable education for Generation Z students in higher education is structured around three interdependent pillars. Together, they constitute a coherent educational environment that fosters motivation, adaptability, and long-term growth. This integrated perspective is visually represented in Figure 1, titled *The integrated model for sustainable learning in higher education*, which illustrates how the pillars interact to support student motivation, adaptability, and long-term growth.

**Figure 1***The Integrated Model for Sustainable Learning in Higher Education*

Note: Authors elaboration

Each pillar is described in detail below, illustrating how it contributes to creating a sustainable and student-centered learning experience.

### ***Pillar 1: Innovative Teaching Methods***

This pillar emphasizes the centrality of active, student-centered learning practices. Drawing from the work of Fraser (1998) and Genn (2001), we recognize that pedagogical strategies must evolve beyond traditional lectures to include flipped classrooms, problem-based learning, role-play, and simulation techniques. These methods enhance engagement, promote critical thinking, and empower students to take ownership of their learning. For Generation Z students, who expect interactivity, feedback, and purpose-driven education, innovative teaching fosters not only knowledge acquisition but also self-awareness and soft skill development (Schroth, 2019).

### ***Pillar 2: Business Cooperation and Real-World Integration (Context: Management Education)***

In the context of management studies, the integration of real-world dynamics into the academic journey is indispensable. This pillar includes collaborations with companies, mentorship programs, internships, and case-based learning. It prepares students to face complex economic and social systems, bridging the gap between academic theories and managerial practice (Doll et al., 2020). By exposing students early to business challenges and decision-making processes, we develop their strategic thinking, adaptability, and professional identity. This approach aligns with calls for employability-focused education that builds both technical knowledge and a proactive, impact-oriented mindset.

### ***Pillar 3: Student-Centered Spaces and Support Systems***

The third pillar focuses on the physical and relational components of the educational environment. Learning is shaped not only by teaching methods but also by where and how it takes place. As noted by Oblinger (2006) and Temple (2008), flexible, collaborative learning spaces and informal areas encourage creativity, communication, and a sense of community.

In parallel, support services such as peer mentoring, counseling, and career guidance contribute to student well-being, resilience, and belonging (Thomas, 2012). This integrated ecosystem—of space and support—underpins the emotional and cognitive readiness of students, reinforcing the sustainability of their educational journey.

This third pillar would include:

- Learning commons
- Collaborative spaces and classrooms
- Study lounges and informal areas
- Digital infrastructure
- Student support services (counseling, peer mentoring, career guidance)

Together, these three pillars—innovative teaching methods, business cooperation, and spatial-social infrastructure—form an integrated and interdependent model of the educational environment (see Figure 1). Their effectiveness relies not only on the strength of each component but also on their interaction: for example, innovative teaching practices benefit from flexible and collaborative physical spaces; real-world learning is enhanced when supported by mentoring or digital tools; and student services are most impactful when aligned with pedagogical strategies and external partnerships. By acknowledging these synergies, the model seeks to reflect the complexity of the learning ecosystem experienced by Generation Z students.

To explore how this model reflects the actual needs and expectations of students and educators, the following section outlines the methodological approach adopted in the study.

## Methodology

This study adopts a qualitative research design that integrates multiple methodological components to investigate the needs, expectations, and experiences of Generation Z students in relation to higher education learning services. Grounded in both managerial and sociological perspectives, the analysis seeks to provide a comprehensive understanding of student engagement, learning preferences, and institutional responses in a context shaped by digital transformation and socio-cultural change.

The research focuses on a case study involving the seven Master of Science programs offered by a leading Italian higher education institution in the field of management. Data were collected from two distinct sources: (1) a student satisfaction questionnaire and (2) seven semi-structured interviews with academic coordinators overseeing the advanced degree programs.

The questionnaire was designed to collect empirical evidence on students' perceptions of the quality and effectiveness of educational services. The responses highlighted both strengths and critical areas for improvement in addressing the expectations of digitally native learners. Complementing this, the semi-structured interviews provided insights into the institutional and pedagogical perspectives of program coordinators. These interviews explored how academic leaders interpret and adapt to the evolving needs of Generation Z students, particularly with regard to curriculum design, service innovation, and the implementation of student-centered learning strategies.

## **Students' Perspective: A Three-Pillar Analysis of the Educational Environment**

To assess the student perspective, we analysed data from the annual satisfaction survey administered across the seven Master of Science programs. This instrument captures a broad range of feedback on students' academic and institutional experiences, and it plays a crucial role in the university's strategy for continuous improvement and student engagement. The following analysis reinterprets the survey findings through the lens of our integrated three-pillar model of the educational environment: (1) Teaching and Learning Innovation, (2) Business Cooperation and Professional Development, and (3) Supportive Infrastructures and Inclusive Spaces.

### ***Pillar 1: Teaching and Learning Innovation***

Students reported high levels of satisfaction with the academic dimension of their education, particularly with the relevance and clarity of course content, the teaching skills of faculty, and the functionality of learning platforms.

"I appreciate how the professors use real-life examples and interactive methods. The online platforms are intuitive and make it easier to follow the courses, especially when you have a busy schedule" (Student, MSc Program #3).

This reflects the effectiveness of the institution's pedagogical strategies and its investment in digital learning tools. From a sociological perspective, this aligns with the principle of *cognitive justice*, promoting equitable access to meaningful and personalized learning experiences. Moreover, the integration of soft skills and life skills laboratories contributes to innovative learning pathways that support holistic development.

### ***Pillar 2: Business Cooperation and Professional Development***

A core area of student feedback concerns the opportunities provided for career readiness and employability. Students value the structured connection with the job market through company presentations, networking events, and mentorship programs such as MyMentor. These initiatives enhance students' capacity to develop relational capital and to navigate complex, hybrid professional environments. The university's commitment to bridging academic content with real-world demands resonates with students' aspirations to build purposeful and adaptable career trajectories.

"The workshops and networking events helped me feel more confident about my future. Talking with professionals during company presentations gave me a clearer idea of what I want to do after graduation" (Student, MSc Program #6).

### ***Pillar 3: Supportive Infrastructures and Inclusive Spaces***

The survey results also highlight the significance of institutional services and learning environments in shaping students' experiences. Administrative offices such as Stage & Placement, International Relations, Educatt, and the Student Office are recognized as essential support structures. Their accessibility and efficiency influence students' sense of trust and inclusion within the academic community. Additionally, students appreciate innovative shared spaces and sustainability-driven projects such as the Renewable Energy Community. These elements contribute to a socially and environmentally responsible

learning environment and reinforce students' sense of belonging and agency. Programs like PRISMA - Promoting Well-being in the Academic Community - further enrich the educational experience by promoting self-awareness, intergenerational dialogue, and social engagement. All these activities help to cultivate well-rounded individuals who are conscious of their role within broader social systems.

Viewed through the three-pillar framework, student feedback reveals a dynamic and evolving educational environment that goes beyond traditional academic metrics. It encompasses innovative teaching, strong ties with the professional world, and a responsive ecosystem of services and values. This holistic approach not only supports students' academic success but also contributes to their personal growth, identity formation, and social empowerment—key components in fostering a sustainable and inclusive model of higher education.

### **Coordinators' Perspective: Insights From an Italian Higher Education Institution in Management Studies**

To complement the analysis of Generation Z students' learning expectations, we explored the perspective of program coordinators within a Master of Science in Management at a leading Italian university. Their views—collected through interviews conducted during institutional Open Day presentations—offer a grounded understanding of how higher education design is evolving to enhance student engagement, learning, and employability. The coordinators' insights are analyzed through the lens of the three-pillar model that underpins our conceptual framework.

#### ***Pillar 1: Innovative Teaching Methods***

All coordinators emphasized a decisive move away from traditional, lecture-based formats toward experiential, student-centered approaches. Core methods mentioned include case studies, entrepreneurial lectures, business games, hackathons, and company visits. These active formats are designed to foster problem-solving, critical thinking, and collaboration:

“We have adopted a model that fosters student engagement through interaction and active participation in solving real-world problems, in collaboration with leading companies, using formats such as business games and hackathons” (Coordinator 4).

Teaching methods are often supported by digital technologies, promoting real-time collaboration and access to international content. Assessment practices integrate qualitative tools—such as portfolios and rubrics—with quantitative methods like self- and peer-assessment, allowing for deeper personalization and reflection.

Moreover, soft skills development is structurally embedded into disciplinary curricula, in line with Generation Z's demand for relevance and applicability. This approach aims not only to enhance learning but also to build the mindset and competencies needed for the future of work.

#### ***Pillar 2: Business Cooperation and Real-World Integration***

A central theme across all interviews was the strong connection with the business world. The academic offer is co-designed with company input, ensuring alignment between educational

content and labor market needs. Coordinators described robust collaborations with key Italian and international companies through:

- Internships and placement services, both in Italy and abroad
- Company involvement in assessment and project work
- Multicultural classes and international programs that encourage mobility and global competence

“To foster open-mindedness and an international outlook, we developed a global network involving leading companies, which students visit and where they may complete internships” (Coordinator 6).

This pillar directly addresses employability by enabling students to operate in realistic professional contexts, practice complex problem-solving, and develop cross-cultural competencies.

### ***Pillar 3: Student-Centered Spaces and Support Systems***

Coordinators also highlighted the importance of physical and relational infrastructures in shaping students’ overall learning experience. Modern campus spaces are designed to be welcoming, flexible, and conducive to collaboration. Specific examples include:

- Learning commons, collaborative classrooms, and informal lounges
- Digital infrastructures supporting hybrid and technology-enhanced learning
- Customized services, such as personalized placement tutoring and career days

Support systems extend beyond academic advising to include diversity and inclusion programs, student committees (e.g., Equal Opportunity Committees), and well-being initiatives. One notable example is the permanent Diversity & Inclusion service offering initiatives like “*Put yourself in my shoes*” and “*International Day*”, which reflect the institution’s commitment to empathy, equity, and community engagement.

The coordinators’ perspectives confirm the relevance and applicability of the three-pillar model in fostering sustainable education for Generation Z students. Their shared commitment to pedagogical innovation, real-world engagement, and supportive infrastructures reflects a strategic approach to higher education that aligns with the values, aspirations, and learning preferences of today’s learners.

Our goal is not only to prepare students for their first job, but to shape professionals who know how to learn, adapt, and grow. This is why we design every part of the program—from teaching methods to company partnerships and support services—as an integrated experience that reflects the world they are about to enter. (Coordinator 2)

These findings suggest that a systemic, student-centered educational environment—such as the one illustrated in this case study—can effectively respond to the core challenge posed in this research: enhancing engagement, learning, and employability among Generation Z students.

## Findings

### Aligning Student and Coordinator Perspectives Within the Three-Pillar Model

The integration of data from both students and coordinators confirms the relevance and applicability of the three-pillar model for understanding and enhancing the educational environment in higher education management programs. The qualitative evidence highlights a strong convergence in the recognition of certain priorities, while also revealing nuanced differences in emphasis and perspective.

#### Pillar 1: Innovative Teaching Methods

Both students and coordinators underscore the importance of active, student-centered pedagogical approaches. Students express appreciation for interactive methods and practical applications, which align with their preferences for relevance, clarity, and flexibility. Coordinators, on the other hand, emphasize the strategic shift toward experiential formats—such as business games, flipped classrooms, and project-based learning—as tools to foster deeper engagement and critical thinking. Notably, both perspectives highlight the growing role of soft skills development as integral to the academic experience.

#### Pillar 2: Business Cooperation and Professional Development

There is strong alignment between students' desire for professional preparedness and coordinators' focus on integrating real-world experiences into the curriculum. Students value opportunities for networking and exposure to business environments, while coordinators detail structured collaborations with companies, international mobility programs, and co-designed assessments with industry stakeholders. This synergy reflects a shared commitment to bridging academic learning with employability outcomes.

#### Pillar 3: Supportive Infrastructures and Inclusive Spaces

Students' feedback emphasizes the central role of administrative services, well-being initiatives, and inclusive spaces in shaping their sense of belonging and academic motivation. Coordinators similarly point to the institutional effort to create accessible, flexible, and socially responsive learning environments. However, coordinators also frame these services as strategic tools for fostering diversity, inclusion, and personalized support—suggesting a more systemic and institutional rationale that complements students' lived experiences.

### Cross-Cutting Insight: A Shared Vision for Sustainable Learning

Across all three pillars, both groups articulate a vision of higher education that is not only academically rigorous but also sustainable in emotional, social, and developmental terms. Students seek an educational journey that supports personal growth and social impact, while coordinators design learning environments aimed at producing adaptive, reflective, and socially responsible graduates. These converging aspirations reinforce the conceptual and practical value of the proposed model and its grounding in the Sustainable Learning in Education (SLE) framework.

## **Conclusion and Managerial Implications**

This study presents a comprehensive, experience-based model for designing sustainable educational environments that align with the expectations of Generation Z students. By integrating pedagogical innovation, business cooperation, and inclusive support infrastructures, the proposed three-pillar framework offers a strategic vision for enhancing student engagement, learning effectiveness, and long-term personal and professional development.

The analysis of both student and coordinator perspectives confirms the relevance and applicability of the model in higher education management programs. The convergence between learners' aspirations and institutional practices underscores the value of adopting a systemic and student-centered approach to academic design.

From a managerial standpoint, the findings offer actionable insights for academic leaders, program coordinators, and policy makers. First, institutions should invest in flexible, interactive, and digitally supported teaching strategies that foster student autonomy and relevance. Second, they should strengthen partnerships with the business sector to enhance employability and real-world learning. Finally, student well-being and belonging must be supported through inclusive services and adaptive learning spaces.

Taken together, these elements not only respond to the specific needs of Generation Z but also advance a broader shift toward sustainable and resilient models of higher education. Future research may expand this framework to other disciplines and explore its long-term impact on graduate outcomes.

## **Limitations and Future Research**

While this study proposes an integrated model of the educational environment aimed at supporting sustainable learning for Generation Z students, some limitations must be acknowledged. The analysis is based on a single case study within the Italian higher education system and specifically within management studies, which may limit the broader applicability of the findings. Moreover, the perspectives gathered through student surveys and coordinator interviews reflect a specific institutional and cultural context, which could differ across other academic disciplines or countries.

Future research could explore how the proposed framework applies across different educational systems, disciplinary areas, and student populations. Comparative studies involving multiple institutions—nationally and internationally—could provide a richer understanding of how the three pillars interact under varying conditions. Additionally, longitudinal research might capture how students' engagement with the educational environment evolves over time, particularly in response to changes in technology, pedagogy, and workplace expectations. Further investigation could also examine the impact of this model on specific learning outcomes, such as student motivation, well-being, or readiness for professional challenges, helping to refine the framework and enhance its relevance in diverse educational settings.



### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

The author declares that ChatGPT, an AI-assisted writing software, was used in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The authors further declare that, apart from ChatGPT, no other AI or AI-assisted technologies have been used to generate content in writing the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

## References

- Arcidiacono D., Loconto A., Maestripieri L., Podda A. (eds.) (2018), La società dei prosumer. Innovazione, partecipazione e consumo digitale [Pro-sumers on the move: overcoming the line between labour and consumption]. *Sociologia del Lavoro*, 152(4), 7–222.
- Bagdi, H., Bulsara, H. P., Sankar, D., & Sharma, L. (2023). The transition from traditional to digital: factors that propel Generation Z's adoption of online learning. *International Journal of Educational Management*, 37(3), 695–717. <https://doi.org/10.1108/IJEM-01-2023-0003>
- Barnett, R. (2020). Towards the creative university: Five forms of creativity and beyond. *Higher Education Quarterly*, 74(1), 5–18.
- Ben-Eliyahu, A. (2021). Sustainable learning in education. *Sustainability*, 13(8), 4250.
- Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39(5), 775–786. <https://doi.org/10.1111/j.1467-8535.2007.00793.x>
- Brown, M. (2005). *Learning Spaces: More than Meets the Eye*. EDUCAUSE Quarterly.
- Doll, B., Brehm, K., & Zucker, S. (2020). *Resilient Classrooms: Creating Healthy Environments for Learning*. Guilford Publications.
- Fraser, B. J. (1998). Classroom Environment Instruments: Development, Validity and Applications. *Learning Environments Research*, 1(1), 7–33. <https://doi.org/10.1023/A:1009932514731>
- Genn, J. M. (2001). Curriculum, environment, climate, quality and change in medical education – a unifying perspective. *Medical Teacher*, 23(5), 445–454. <https://doi.org/10.1080/01421590120075661>
- Hallowell, E. M., & Ratery, J. J. (2011). *Driven to distraction at work: How to focus and be more productive*. Harvard Business Review Press.
- Hicks, A. (2011). *Teaching digital natives: Partnering for real learning*. Corwin Press.
- Jaleniauskiene, E., & Juceviciene, P. (2015). Reconsidering University Educational Environment for the Learners of Generation Z, *Social Sciences*, 88(2), 38–53. <https://doi.org/10.5755/j01.ss.88.2.12737>
- Jamieson, P., Fisher, K., Gilding, T., Taylor, P. G., & Trevitt, A. C. F. (2000). Place and space in the design of new learning environments. *Higher Education Research & Development*, 19(2), 221–236. <https://doi.org/10.1080/072943600445664>
- Kamalov, F., Santandreu Calonge, D., & Gurrib, I. (2023). Reinvigorating constructivist learning in higher education: A generational perspective. *Education and Information Technologies*, 15(16), 1–27. <https://doi.org/10.1007/s10639-023-11853-0>

- Mertala, P., López-Pernas S., Vartiainen H., Saqr M., Tedre M. (2024). Digital natives in the scientific literature: A topic modeling approach, *Computers in Human Behavior*, 152, 108076. <https://doi.org/10.1016/j.chb.2023.108076>
- Moos, R. H. (1979). *Evaluating Educational Environments: Procedures, Measures, Findings and Policy Implications*. Jossey-Bass.
- Mosca, J. B., Curtis, K. P., & Savoth, P. G. (2019). *New Approaches to Learning for Generation Z*. *Journal of Business Diversity*, 19(3), 66–67. <https://doi.org/10.33423/jbd.v19i3.2214>
- Oblinger, D. G. (2006). *Learning Spaces*. Lousville, CO:EDUCAUSE.
- Pew Research Center. (2014). *Millennials in adulthood: Detached from institutions, networked with friends*. <https://www.pewresearch.org/>
- Royo, J. P. (2017). Higher education students as prosumers: Challenges and opportunities in the digital age. *Journal of Educational Technology Development and Exchange*, 10(1), 1–10. <https://doi.org/10.18785/jetde.1001.01>
- Ryan, R. M., & Deci, E. L. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Schroth, H. (2019). Are you ready for Gen Z in the workplace? *California Management Review*, 61(3), 5–18. <https://doi.org/10.1177/0008125619841006>
- Schwieger, D., & Ladwig, C. (2018). Reaching and retaining the next generation: Adapting to the expectations of Gen Z in the classroom. *Information Systems Education Journal*, 16(3), 45–54.
- Seemiller, C., & Grace, M. (2016). *Generation Z goes to college*. John Wiley & Sons.
- Shatto, B., & Erwin, K. (2016). Moving on from millennials: Preparing for Generation Z. *The Journal of Continuing Education in Nursing*, 47(6), 253–254. <https://doi.org/10.3928/00220124-20160518-05>
- Sterling, S., & Orr, D. (2001). *Sustainable education: Re-visioning learning and change* (Vol. 6). Totnes: Green Books for the Schumacher Society.
- Temple, P. (2008). Learning Spaces in Higher Education: An Under-Researched Topic. *London Review of Education*, 6(3), 229–241. <https://doi.org/10.1080/14748460802489363>
- Thomas, D., & Brown, J. S. (2011). *A new culture of learning: Cultivating the imagination for a world of constant change* (Vol. 219). CreateSpace.

- Thomas, L. (2012). *Building Student Engagement and Belonging in Higher Education*. Paul Hamlyn Foundation.
- Toffler, A. (1980). *The third wave*. William Morrow and Company.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Wang, K. J., Shen, B., & Zhang, T. (2023). Self-determination theory and student motivation in online learning: A systematic review. *Journal of Computer Assisted Learning*, 39(1), 30–45. <https://doi.org/10.1111/jcal.12704>

**Contact email:** [barbara.barabaschi@unicatt.it](mailto:barbara.barabaschi@unicatt.it)

## Distance Education as a Tool for Transformation in Adult Life

Maria de Fátima Goulão, Universidade Aberta, Portugal

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

Distance education (DE) has become an important alternative for adult education, allowing individuals to balance studies with other responsibilities such as work and family. However, returning to education, particularly after a long interval, entails a series of challenges and opportunities that vary according to each student's context. Returning to studies, especially at an advanced age and in the distance education modality, represents an increasing challenge for many. This article aims to explore adult students' perceptions of the opportunities and challenges arising when resuming their educational journey, based on testimonies collected in online forums. The methodology used was qualitative content analysis. A total of 199 statements collected from online forums of students sharing their experiences in resuming studies in a degree programme X were analysed. The responses were categorised into two major themes: "Opportunities" and "Challenges," based on their perceptions of the positive and negative aspects of this educational journey. We found that while distance education offers flexibility and accessibility, balancing personal life, work, and studies remains a significant challenge. Maturity and resilience emerge as key factors for overcoming obstacles, while personal and professional growth are seen as the main rewards.

*Keywords:* distance education, adult learners, return to study

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Online education has grown significantly in recent decades, promoting inclusion and accessibility for various age groups. Online learning has been a fundamental tool for adult education, allowing them to resume their studies with greater flexibility. For adults who have interrupted their studies, this modality offers the possibility of returning without compromising professional and family responsibilities (Garrison, 2017). This work seeks to understand the factors that drive and challenge the return to study, through an empirical analysis of adult students' experiences in online education.

## Literature Review

Online education has established itself as a tool for social and educational transformation, especially in adult life. According to Bates (2015), contemporary society seeks continuous retraining, driven by technological transformations and the need to acquire new skills to face current socio-economic challenges. In this context, online education stands out for providing flexibility, autonomy, and inclusion, allowing individuals to reconcile studies with work and family responsibilities (Garrison, 2017). In addition, online education enables student-centred learning, respecting individual rhythms and contexts, which makes it particularly attractive for adults returning to the academic environment after a long break.

The concept of lifelong learning has become increasingly central to adult education, challenging the traditional model that presupposes a single, definitive training programme for the whole of one's career. Knowles (1980) already pointed to andragogy as a method centred on the adult learner, emphasising autonomy and self-management as essential characteristics of this training process. The development of autonomy in learning is especially relevant in the context of online education, as it requires adult learners to have self-management, discipline, and self-regulation skills. The emergence of educational technologies reinforces the need to develop digital skills and competences for independent learning, as emphasised by Siemens (2005) and Anderson (2008). In this sense, Siemens' connectivist approach suggests that learning takes place in networks, where the learner connects information from different sources, something that is enhanced by online platforms.

In addition to the opportunities, returning to the academic environment presents significant challenges for adult students. Studies such as those by Merriam and Bierema (2013) identify barriers such as time management, adapting to new technological tools and reconciling multiple social roles (work, family, and study). The transition to the online format can generate insecurities, especially for those who have little familiarity with digital resources. However, maturity and resilience are factors that contribute to a successful academic career, corroborating the perspective of Tough (1979), who recognises self-direction as a vital characteristic for adult education. According to Mezirow (2000), transformative learning, which occurs when the individual critically reflects on their experiences, also plays a crucial role in the context of online education, enabling significant changes in personal and professional perspective.

Returning to formal online education is not just a simple technological adaptation but involves building socio-emotional skills such as resilience and time management. These skills are crucial to maintaining academic engagement and success in the educational process and are essential components in the development of autonomy and the personal and professional transformation of individuals. In addition, institutional support, including pedagogical

guidance and technical support, plays a fundamental role in the permanence and success of adult students in online courses.

Thus, by understanding the factors that facilitate and hinder returning to study in online education, it is possible to improve pedagogical strategies and support resources, guaranteeing a more inclusive and efficient training path for adult students. The development of educational policies that value continuous training and curricular flexibility can promote a more welcoming and accessible learning environment, encouraging a return to study as a continuous and natural process in adult life.

## **Methodology**

### **Objective**

The aim of our study was to find out how a group of students view their return to study, its opportunities, and challenges.

### **Sample**

Our study sample consisted of 199 statements collected on an online forum by students sharing their experiences of returning to study on an X degree programme. The students were of both sexes, were attending online education for the first time and had an average age of 40. They are all working students.

### **Procedure and Instrument**

At the start of the school year, a forum was set up within the Y course on returning to study. They were asked to tell us about their motivations, expectations, and fears about the experience of returning to study. There was no fixed response period. At the end of the semester, we collected all the reports found in this forum, totaling 199, which make up our corpus of analysis.

### **Analysing the Data**

Thematic analysis is a methodology used to interpret written, spoken, or visual messages within a specific context. In this case, the analysis focuses on the reflections of forum participants on returning to study in an online education environment. The data was extracted from the document provided and reflects the perceptions, challenges and motivations of individuals who have chosen to return to study in an online format. Thematic analysis was carried out using AI. It was an automated analysis focusing on online education versus Opportunities and Challenges.

## **Results**

The results obtained from the thematic analysis point to five broad categories, as shown in Figure 1.

**Figure 1**  
*Thematic Analysis Categories*

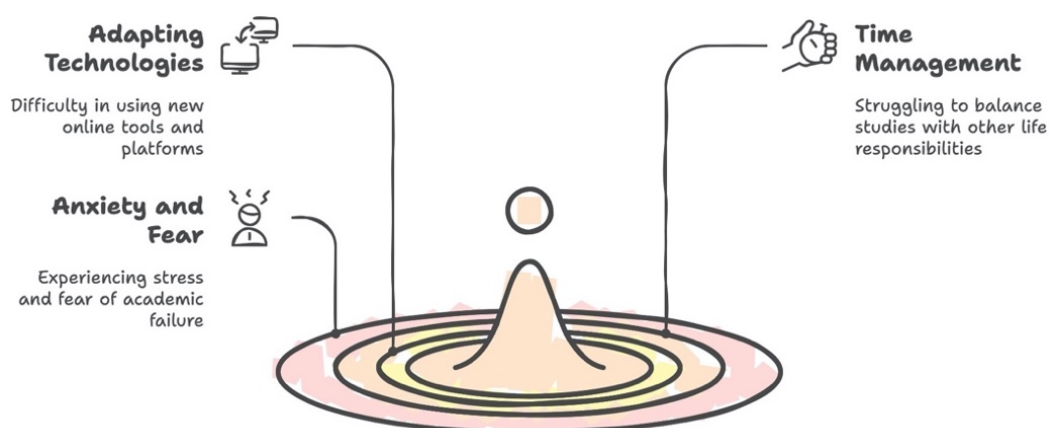


The thematic analysis of the statements reveals that returning to online education is a challenging yet highly rewarding journey. The need to adapt to technologies, manage time, and overcome fear are present obstacles, but motivation, organisation, and resilience make this path possible and fulfilling. The accounts show that, regardless of age or stage of life, the desire to learn and evolve remains a strong driving force for those who decide to return to study.

How are each of these categories operationalised? Let's look at the figures below.

The “Challenges of returning to study” category is based on 3 dimensions: adapting to new technologies, time management and reconciling roles and, finally, anxiety and fear of failure - Figure 2.

**Figure 2**  
*Challenges of Returning to Study Category*





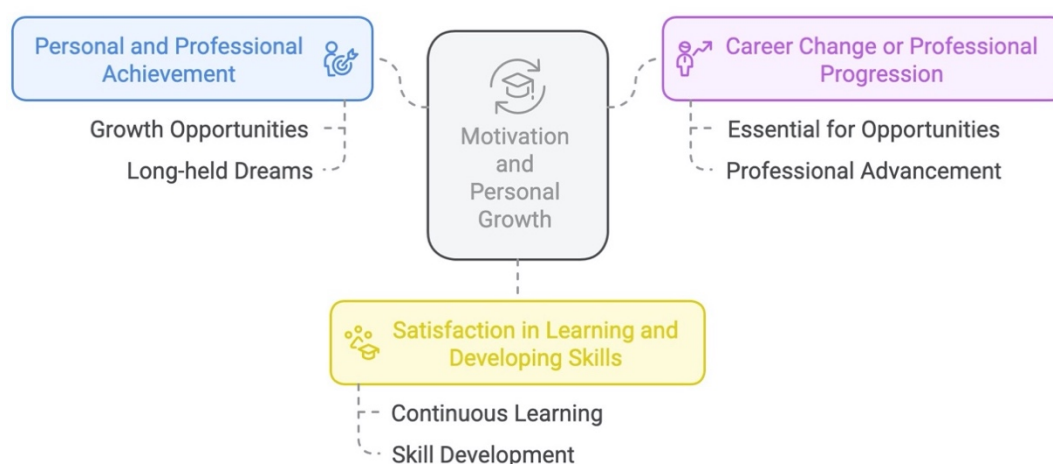
**Examples:**

- “The start, even though the outline says slow, was intense, two weeks that required assiduous attendance.” **S9F**
- “I’m 49 years old and it’s never too late for anything.” **S7F**
- “I’m still trying to figure out the best way to manage my schedule, considering that I work from 9am to 5pm and have a son aged almost 4, who requires a lot of attention.” **S13F**

In category 2 we have elements that can be grouped into the following dimensions: Personal and professional fulfilment, Career change or professional progression and Satisfaction in learning and developing skills, as shown in Figure 3.

**Figure 3**

*Motivation and Personal Growth Category*

**Examples:**

- “This challenge demands method, priorities, determination, and a lot of resilience from me.” **S18F**
- “Maturity is certainly an asset, but there is also greater tiredness as a result of the fronts we have as parents, professionals and other activities in our personal lives.” **S11F**
- “I took on this challenge to fulfil a childhood dream: to get a degree in X ! At 63, I’m finally ready for this new stage in my life.” **S18F**

Category 3 deals with issues related to Organisation and Planning. As with the previous categories, it is also supported by 3 dimensions relating to efficient time management, the use of digital tools and support materials, as well as the creation of an appropriate study method - Figure 4.

**Figure 4**  
*Organisation and Planning Category*

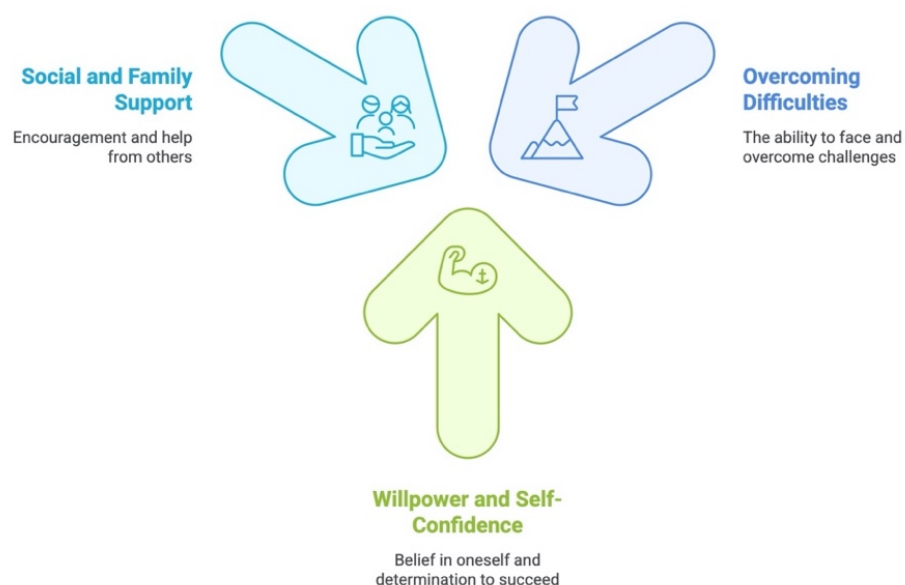


**Examples:**

- "It's important to start slowly, because only then will I be able to understand and apply the study techniques best suited to my daily rhythm." **S4F**
- "I'll have to start more slowly until I gain a working rhythm, without accumulating tasks/challenges, writing everything down in a diary or calendar to better manage my time." **S27F**
- "I'm learning day by day to be more organised and have a more efficient study method." **S88F**

Category 4 brings together factors of a more personal and social nature, such as overcoming difficulties and obstacles, willpower and self-confidence and the importance of social and family support - Figure 5.

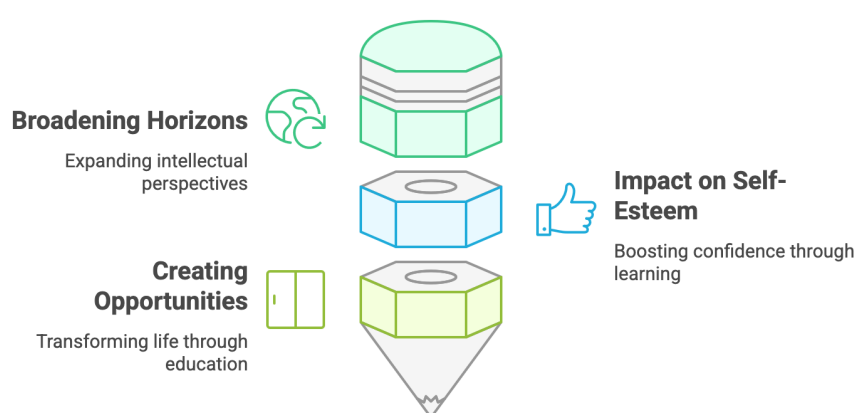
**Figure 5**  
*Resilience and Persistence Category*



**Examples:**

- “The secret is to start slowly, go back, if necessary, understand the study techniques, be calm, persistent and achieve the end goal.” **S183F**
- “Failing is part of it, but never giving up. It's important to be resilient and, if necessary, take a step back to climb up with the right strength.” **S14F**
- “With persistence, calm and dedication, I'll be able to complete my degree and the fact that I'm more mature may be a strong point in my favour.” **S27F**

Finally, we find category 5 - Benefits of Study. This category includes elements related to broadening horizons, the impact on self-esteem and personal satisfaction and the creation of new personal and professional opportunities - Figure 6.

**Figure 6***Study Benefits Category***Examples:**

- “Learning and knowledge enrich our lives, our culture... I'm loving this new experience and hope to complete all the course units successfully and proudly.” **S34F**
- “I feel grateful and excited. It all seems a bit daunting at first, but I know it will be worth it.” **S120F**
- “Returning to study is a significant step towards professional and personal growth.” **S174F**

**Legend:**

S = Student

X = Number of students

F = Gender (F= female | M = male)

**Discussion**

The empirical analysis of the accounts of adult students who have returned to study in online education reveals both the challenges and the opportunities encountered along the way. From the analysis of the 199 testimonies found, five main categories emerged: Challenges of Returning to Study, Motivation and Personal Growth, Organisation and Planning, Resilience and Persistence, and Benefits of Study.

The challenges faced by adult students corroborate the theoretical discussions presented in the literature review. Time management and adapting to new technologies, pointed out by

Merriam and Bierema (2013) as common barriers, were also identified as significant difficulties by the participants. The need to balance family, professional and academic responsibilities proved to be a constant pressure factor. As Tough (1979) had already suggested, self-management and resilience are fundamental characteristics for facing such obstacles, and this was evident in the reports, where many highlighted the importance of self-management and organisational skills.

I think it's important to organise our time, define our objectives well and not procrastinate' (S8F); '(...) we must be resilient and take risks. Method is the key to being able to take this boat to a good harbour' S28M.' 'The technology issues will be a huge challenge, as it will require effort and knowledge appropriate to the needs required here.' (S48M)

On the other hand, intrinsic motivation, mentioned by Mezirow (2000) as essential for transformative learning, was a prominent factor in the testimonies, especially regarding personal fulfilment and the desire for continuous development ("I know that it will require some demanding planning, and that I will have to be rigorous in its realisation, but I am very excited and motivated." [S29F]; "(...) the thirst to learn has been motivating me to achieve and I don't intend to stop here." [S31F]). By providing flexibility, online education has proved to be an inclusive modality adapted to contemporary challenges, as discussed by Bates (2015). This flexibility was valued by the participants, who pointed to the possibility of adapting their studies to their routine as a positive differential.

The Organisation and Planning category proved to be central to maintaining academic engagement ("Going back to school, having a routine is going to be the biggest challenge for me, reconciling work and family life, managing all this in just one day is going to be complicated." [S48M]). As Siemens (2005) emphasised in his connectivist theory, the ability to connect information and use digital resources is essential for success in online education. The reports highlighted that students who develop study routines and use digital tools effectively have a greater chance of success ("I decided to do it online, to avoid missing work and reduce costs, but it will require me to do a lot of time management, to learn to work better with technology, to develop study techniques." [S52F]; "At U.Y. I saw the opportunity to return to studying because it's a method that allows us to manage ourselves, to map out the path of activities at our own pace and to reconcile professional and family life." [S74M]; "For me it's a blessing to be able to do my degree in the comfort of my own home, I'm grateful to the new technologies for making it possible, otherwise it would be unthinkable for me to go to university every day." [S94F]).

In addition, resilience, and persistence, combined with social and family support, were identified as crucial elements for continuing studies. Maturity, pointed out by Garrison (2017) as a factor that contributes to autonomy and critical thinking, was frequently mentioned as an advantage of adult students compared to younger students ("I would like to ask my colleagues for their support and say that they can count on me to do whatever is necessary and possible. With help and support we will go far." [S127F]; "I think that persistence and calmness are important for this journey. It will be an arduous challenge, but thanks to maturity and dedication it will be a very achievable goal." [S148F]).

Finally, the benefits perceived by participants, such as professional and personal growth, broaden the understanding of the impacts of online education on adult life. Lifelong learning, discussed by Knowles (1980), is valued as a continuous and necessary process, especially in

times of rapid social and technological transformation. (“The decision to return to study was a decision that, despite being very well thought out, was really necessary, not only because it would allow me to progress professionally, but also for my development as a person.” [S97F]; “When I enrolled on this degree, it was with the aim of acquiring academic knowledge and skills to progress in my career” [S129F].)

In conclusion, the empirical analysis reinforces the theoretical references that indicate online education as a viable and positive path for adult continuing education. Although there are significant challenges, adaptability, resilience, and institutional support are key to success. Therefore, educational policies that promote support and training environments for digital competences are fundamental to widening access and ensuring that these students remain.

### **Conclusion**

The growing demand for continuing education reflects a structural change in the way lifelong learning is perceived. Training done in each period and for life increasingly no longer makes sense. There is a need to retrain or acquire new skills that can respond to the challenges that society poses to individuals. In this context, traditional teaching models are being challenged by more flexible approaches adapted to the needs of different audiences. Allied to this need to adapt and respond to the challenges of society, the labour market and social inclusion, there have also been major technological changes that have helped to promote online learning through digital platforms. Knowledge societies demand continuous re-skilling. It is therefore technology that is leading economic changes, the way we communicate and relate to others, and the way we learn (Bates, 2015).

The empirical analysis carried out in this study shows that online education is consolidating itself as an essential modality for the continuous training of adults, providing flexibility, inclusion, and personal and professional development. The results show that although the challenges are significant, such as time management and adapting to technologies, the benefits outweigh the difficulties. Adaptability, resilience, and institutional support are determining factors for educational success in this modality.

In conclusion, to promote a more inclusive and accessible learning environment, it is essential that educational policies encourage the development of digital competences and offer adequate support to adult students. In this way, it will be possible to increase access to continuing education, promoting not only professional growth, but also the strengthening of autonomy and personal resilience.

It is therefore imperative that educational institutions continue to invest in innovative pedagogical strategies that respond to the needs of adults returning to education, guaranteeing a learning experience that effectively contributes to the personal and professional transformation of individuals.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

As mentioned above, the thematic analysis of the 199 student statements was initially carried out using AI (ChatGPT).

## References

- Anderson, T. (2008). *The Theory and Practice of Online Learning*. Athabasca University Press.
- Bates, T. (2015). *Teaching in a Digital Age: Guidelines for Designing Teaching and Learning*. BCcampus.
- Garrison, D. R. (2017). *E-Learning in the 21st Century: A Framework for Research and Practice*. Routledge.
- Knowles, M. (1980). *The Modern Practice of Adult Education: From Pedagogy to Andragogy*. Adult Education Company.
- Merriam, S. B., & Bierema, L. L. (2013). *Adult Learning: Linking Theory and Practice*. Jossey-Bass.
- Mezirow, J. (2000). *Learning as Transformation: Critical Perspectives on a Theory in Progress*. Jossey-Bass.
- Siemens, G. (2005). Connectivism: A Learning Theory for the Digital Age. *International Journal of Instructional Technology and Distance Learning*.
- Tough, A. (1979). *The Adult's Learning Projects: A Fresh Approach to Theory and Practice in Adult Learning*. Ontario Institute for Studies in Education.

**Contact email:** fatimapgoulao@gmail.com

## Enhancing Performance in Academic Tasks: Challenges and Opportunities in University Students' Use of ChatGPT

Esther Argelagós, Universitat de Girona, Spain  
Blanca Campos, Universitat de Girona, Spain  
Èlia Casanovas, Universitat de Girona, Spain  
Aina Caritg, Universitat de Girona, Spain

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

The use of ChatGPT has brought about a revolution in education and the completion of academic tasks, especially for high school and university environments. In this pilot study, we recruited twenty-eight university students to qualitatively and quantitatively analyse the performance of an academic task using the internet, including the possibility of using ChatGPT. The tasks performed by each student were recorded while their screen activity and eye movements were being captured. The results show that only the third part of the students used ChatGPT for their searches in completing the academic task. They also reveal that the main difficulties encountered by the university students analysed were as follows: formulating search terms in a search engine or prompts in ChatGPT, selecting sources based on reliability elements beyond the title of a result, comparing sources consulted, integrating and comparing information from diverse sources, and citing references properly. Based on these results, we conclude that university students' use of the Internet, specifically ChatGPT, would require greater attention from their educators. For example, training courses should be carried out, and more emphasis could be placed on the subjects that they regularly take in their university programs, to help students overcome those difficulties and to enhance the potential of the internet and, specifically ChatGPT, to learn, taking profit of the affordances of these tools when are used adequately.

*Keywords:* ChatGPT, higher education, academic tasks, learning, eye movements

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The rapid emergence of generative artificial intelligence (AI) is transforming educational paradigms, particularly in how students engage with learning tasks and academic knowledge production. Tools such as ChatGPT (OpenAI, 2022), which enable users to generate coherent text, summarise information, and simulate interactive dialogue via simple textual prompts, have introduced a paradigm shift. In this new context, information access and processing no longer depend solely on active search strategies but increasingly on the ability to formulate effective queries and critically interpret algorithmically generated responses. Consequently, the approach university students take when completing academic tasks is evolving, presenting new challenges in terms of information literacy and critical thinking (Frerejean et al., 2019; Garcia & Badia, 2017; Romero-Rodríguez et al., 2023).

A substantial body of research highlights persistent deficiencies among higher education students in areas such as formulating effective search queries, evaluating the reliability of sources, integrating information from diverse references, and citing sources correctly (Argelagós et al., 2022; Brand-Gruwel et al., 2009; Lanning & Mallek, 2017; Leichner et al., 2014). These deficits are particularly concerning given the centrality of digital information management, not only to academic achievement, but also to autonomy and lifelong learning (ACRL, 2016). Merely having access to digital tools does not equate to being able to use them effectively (Pifarré & Argelagós, 2020). Without targeted guidance and instruction, students often struggle to engage critically with the abundance of content available to them online.

The concept of Information Problem Solving (IPS), as proposed by Brand-Gruwel et al. (2009), refers to the complex set of cognitive and metacognitive skills required to identify, locate, evaluate, and use information effectively to resolve an academic task or inquiry. The IPS model outlines five core stages: defining the research question, planning the search strategy, locating relevant information, processing and evaluating retrieved content, and organising and presenting the information in a coherent, academically appropriate form. Although this model has been validated in multiple contexts (Argelagós & Pifarré, 2012; Boetje et al., 2024; Frerejean et al., 2019; Garcia et al., 2021), the recent advent of generative AI tools like ChatGPT requires the reconsideration of established models and practices, particularly regarding how students interact with digital information and construct meaning from it.



**Figure 1**

*Information Problem-Solving (IPS) Skills (Left Column) and Subskills (Right Column) for Reviewing Scientific Literature, Inspired by Brand-Gruwel et al. (2009) and Adapted From Argelagós et al. (2022)*



Unlike traditional search engines that provide users with lists of indexed web pages, ChatGPT generates coherent and plausible-sounding narratives that respond directly to user prompts. While this represents a significant advancement in AI-driven information access, it can become pedagogically problematic if students lack the skills to assess the credibility, relevance, and accuracy of the content produced. As Mitchell et al. (2021) note, the use of AI in academic settings can foster an illusion of mastery—students may feel confident in their outputs without recognizing the epistemological or factual flaws they may contain. Furthermore, the lack of source transparency, the presence of algorithmic biases, and users' limited understanding of the model's inner workings further heighten the risk of uncritical reliance (Hyland, 2016; Promma et al., 2025).

This dynamic highlights the urgent need for a redefinition of digital literacy in higher education. As argued by Castelló (2014) and Garcia et al. (2021), digital literacy must transcend technical navigation skills and instead incorporate metacognitive awareness, ethical sensitivity, and epistemological understanding. Effective use of tools like ChatGPT depends not only on technical fluency but on a nuanced understanding of how to formulate prompts, detect quality indicators in information outputs, verify factual accuracy, synthesise content from multiple sources, and integrate those insights into academically rigorous texts (Promma et al., 2025; Swales & Feak, 2004). Consequently, a significant portion of recent academic literature emphasises the development of critical thinking, information evaluation, and integrative academic writing as core competencies in higher education (Argelagós et al., 2022; Romero-Rodríguez et al., 2023; Wopereis et al., 2015).

Despite the growing relevance of generative AI in education, empirical research on its actual use in authentic academic settings remains limited. Although students are increasingly

adopting tools like ChatGPT to assist with academic tasks, there is a lack of systematic research analysing how these interactions take place and what cognitive strategies are employed—or overlooked—in the process. Preliminary evidence suggests that students often use ChatGPT in superficial ways, focusing on obtaining ready-made content or paraphrased explanations, without engaging in deeper validation, comparison, or integration of information (Kacperski et al., 2025; Romero-Rodríguez et al., 2023). This indicates a disconnect between tool availability and students' ability to use it for higher-order academic purposes.

In response to this situation, educators and institutions must adapt their pedagogical strategies. As Francom (2016) and Van Merriënboer et al. (2025) argue, teaching complex skills like IPS requires instruction based on whole-task approaches—realistic, integrated, and transferable learning experiences. Instruction must not only teach students how to use AI tools, but also how to interrogate their outputs, triangulate them with other sources, identify gaps or inaccuracies, and construct academically sound arguments (Kacperski et al., 2025). Such approaches align with the tenets of the 4C/ID instructional design model, which emphasises authentic learning tasks, progressive scaffolding, and emphasis on transfer to real-world academic contexts (Frerejean et al., 2019; Van Merriënboer et al., 2025).

In this regard, the present study seeks to contribute to ongoing academic discourse by exploring how university students engage with the digital information, including generative AI tools, when completing a real academic task. Specifically, it examines whether students use the tool, how they do so, and what challenges arise during the information-seeking and knowledge-construction processes. Unlike prior studies focused exclusively on outcomes, this research emphasises the processes involved in digital information interaction, including decision-making, source evaluation, integration, and citation.

## **This Study**

This study seeks to conduct both a qualitative and quantitative analysis of how a cohort of university students utilises the internet—particularly with reference to the potential use of ChatGPT—to complete an academic task. By observing participants' digital behaviour directly, the research aims to uncover patterns of use, recurrent challenges, and the core competencies required for effective online information retrieval and academic writing (Argelagós et al., 2022; Argelagós et al., 2023; Brand-Gruwel et al., 2009). Particular emphasis is placed on how students formulate search queries, assess the credibility of sources, and synthesise and reference the information obtained.

In this study, both screen recording and eye-tracking technologies were employed to capture in detail each participant's decision-making process, offering insights into the cognitive steps underlying academic task resolution in a digital context.

## **Method**

### **Participants**

The study involved twenty-eight undergraduate students enrolled in various social sciences and education-related degree programs. Students participated voluntarily, and all signed informed consent forms before participation. Although they self-reported having intermediate

to advanced digital competence, none of them had received formal training in the academic use of generative AI tools such as ChatGPT.

## Procedure

Each participant was asked to complete an individual academic task, which required searching for information on a specific topic and composing a short-written report or argumentative response. Students were free to use any digital tools available on the internet, including ChatGPT. During the activity, both their screen activity and eye movements were recorded using screen-capture software and an eye-tracking device. This setup enabled precise observation of which digital elements attracted the participants' attention and for how long.

The task had a maximum duration of 20 minutes. Upon completion, participants were asked to watch the video recording of their task performance. As they watched, they were instructed to verbally describe the specific actions they had taken, the reasons behind each action, and what they had been thinking at each moment. This retrospective verbalisation session also lasted 20 minutes. Finally, students were briefly asked about their general feelings during the task and whether they had encountered any particular difficulties. While these final comments did not take the form of structured interviews, they provided additional contextual insights into the students' subjective experiences.

## Data Collection

Data collection for this study was implemented through a multi-modal strategy that combined behavioural tracking technologies with post-task reflections. This integrative methodology enabled the capture of both observable user interactions and students' interpretations of their task performance. The triangulation of three distinct data sources —screen recordings, eye-tracking metrics, and participant feedback— provided a comprehensive and layered understanding of students' engagement with the academic task.

*Screen recording.* Each participant's on-screen activity was continuously recorded using screen-capture software installed on the computer. These recordings documented the full digital trace of participant behaviour, including interactions with web browsers, search engines, academic databases, and generative AI tools such as ChatGPT. The data included the sequence of visited websites, and detailed interaction patterns such as keyword entries, scrolling behaviour, tab-switching, and instances of text copying. This visual-log data offered a temporally precise reconstruction of each student's decision-making trajectory, revealing how information was accessed, evaluated, and operationalised during task execution.

*Eye-tracking data.* To further explore participants' visual attention and cognitive engagement with digital stimuli, a screen-based eye-tracking system was employed throughout the task. The device captured fixation durations, saccades, and gaze paths. These data were crucial for discerning whether students engaged in close reading or surface scanning, whether their source selection was guided by titles, metadata, or visual prominence, and how they processed search engine results or AI-generated responses. The eye-tracking data thus complemented the screen recordings by adding a perceptual dimension to behavioural analysis.

*Post-task video-based reflection.* Immediately after completing the academic task, participants engaged in a retrospective reflection session guided by their screen recordings. As they watched their task performance video, they were asked to describe, step by step, the specific actions they had taken, the purpose behind each action, and the thoughts or decision-making processes associated with each moment. This method allowed for a richer reconstruction of cognitive and strategic processes that were not directly observable through screen and eye-tracking data alone. In addition to this structured reflection, participants were briefly asked about their emotional responses and any difficulties they had faced during the task. These post-task accounts added a valuable subjective layer to the behavioural and perceptual data.

## **Data Analysis**

The analysis was conducted using the video recordings of participants' screen activity, which were systematically coded according to a coding scheme constructed following the basis of previous studies on information problem-solving (Argelagós & Pifarré, 2012; Argelagós et al., 2022; Brand-Gruwel et al., 2009; Garcia et al., 2021) and adapted to the generative IA tools. Considering the five IPS skills, an analysis was conducted to determine the degree of accuracy or quality attributed to the different subskills of each skill (see Figure 1). This methodology facilitated the transformation of qualitative observations into structured quantitative data, thereby allowing for a more rigorous and replicable examination of students' task engagement.

The coding protocol enabled researchers to trace both temporal dynamics and behavioural patterns within each participant's task performance, with a particular focus on decision-making processes, search strategies, source selection, and information integration. Descriptive analysis was employed to identify recurring behaviours, assess the frequency and manner of ChatGPT usage, and document the nature of the difficulties encountered during the task. By adopting this mixed-methods approach—integrating qualitative coding with quantitative representation—the study offers a nuanced and empirically grounded account of how university students navigate academic tasks in digitally mediated learning contexts.

This study has the approval of the Ethics Committee of the Universitat de Girona (CEBRU00048-23).

## **Results**

The results of the study indicate that only one-third of the participating students used ChatGPT to carry out the necessary research and to complete the proposed academic task. These results suggest a relatively limited integration of AI-assisted support into their academic workflows, despite the potential benefits that such tools may offer in terms of efficiency, idea generation, and access to information. The study allowed complete freedom to decide the sources to be used. The results show a greater tendency to consult sources such as Google, Google Scholar or other more specific websites. The tendency to use AI is lower than the tendency to search using other sources. Nevertheless, a portion of students did make use of ChatGPT to complete the task.

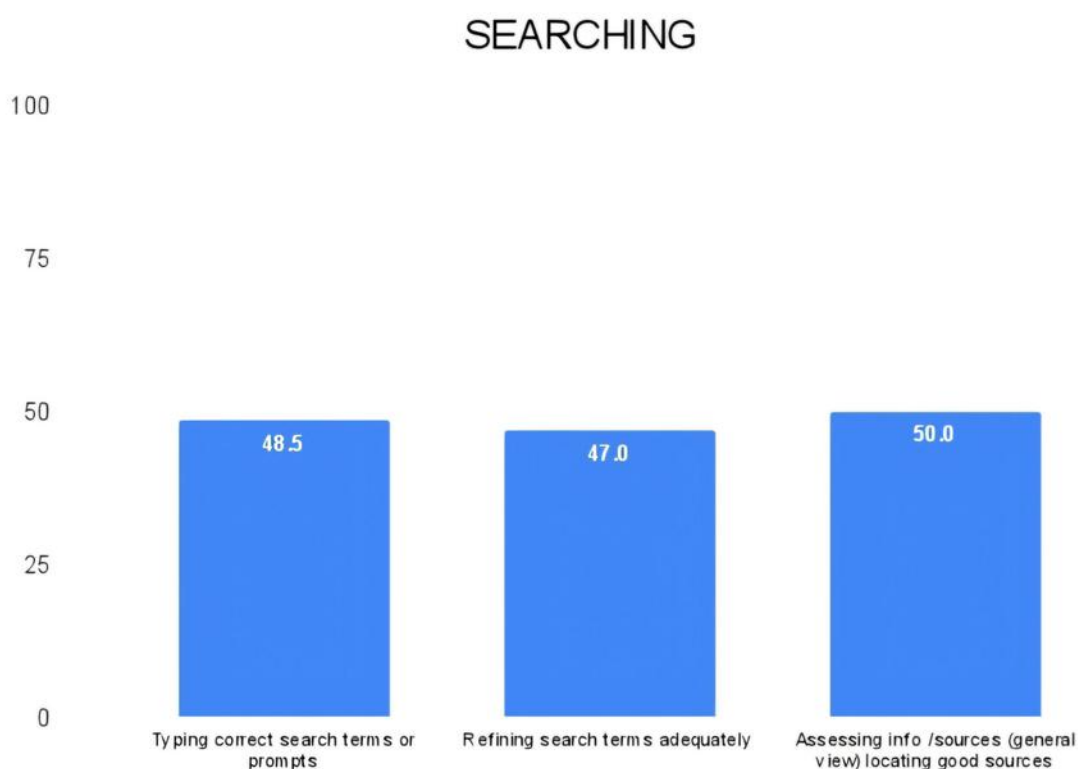
Results also revealed the main difficulties encountered by the university students analysed. The most revealing results are to be found in the skills “Searching”, “Selecting”, and “Presenting”.

Figure 2 shows the subskills of the “Searching” skill. They are “Typing correct search terms or prompts”, “Refining search terms adequately” and “Assessing info / sources (general view) locating good sources”. The scores in this category were all very low, with the highest score being fifty out of one hundred in the “Assessing info / sources (general view) locating good sources” subskill.

As can be seen in the punctuation of the remaining subskills (“Typing correct search terms or prompts” and “Refining search terms adequately”), they exhibited difficulties in formulating search terms in a search engine or prompts in ChatGPT. The scores are forty-eight and a half out of a hundred and forty-seven out of a hundred respectively.

**Figure 2**

*Average Adequacy of Searching Subskills*



The next skill analysed was “Selecting”, which has four subskills (see Figure 3): “Adequate partial reading” (seven point five out of one hundred), “Adequate slow reading” (sixty-one point four out of a hundred), “Selecting correct info / sources” (forty-five) and “Comparing info / sources” (only four out of a hundred).

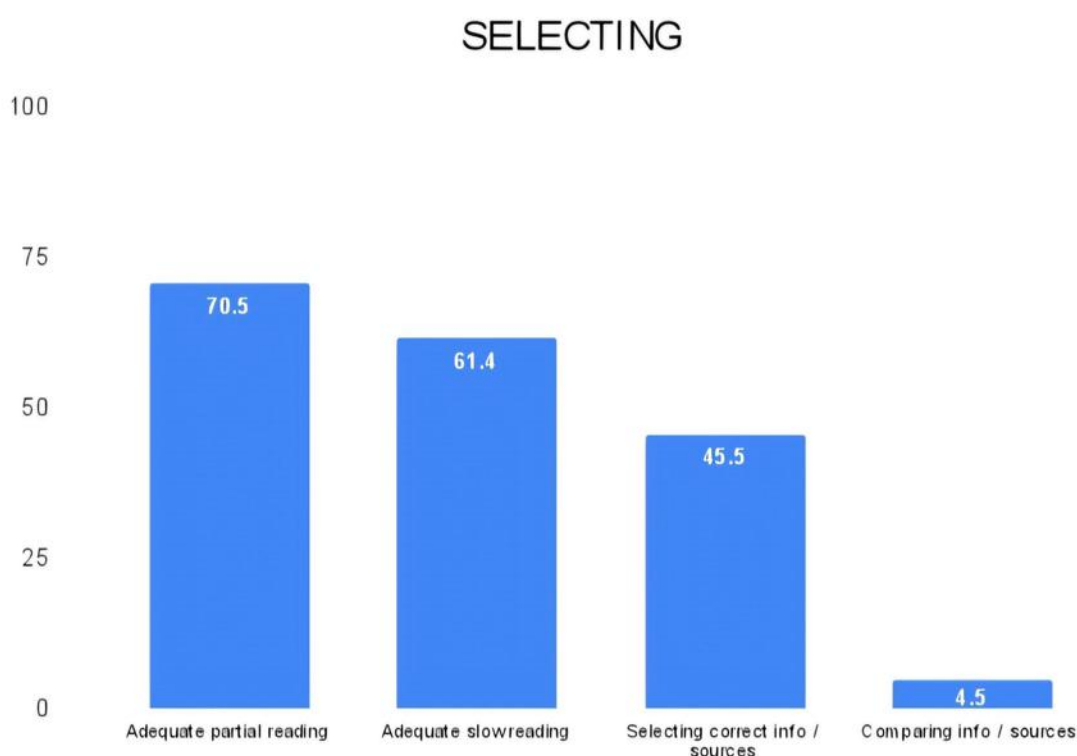
The scores indicate a partially correct and slow reading process to some extent; however, difficulties remain in the other subskills. One difficulty identified was related to the selection of sources based on reliability criteria beyond the title of the result, as seen in Figure 3. Students generally failed to consider key indicators of source reliability, such as the author, publication site, or institutional affiliation, thereby demonstrating limited capacity for critical evaluation and validation of digital information. The participants, on many occasions, only looked at the title of the source to decide whether to access it or not. This often led them to consult sources lacking consistent credibility.

In addition, problems were observed in comparing the sources consulted, with a score of 4.5 out of 100. Students showed limited ability to analyse and contrast different pieces of information obtained from various sources on the same topic—an essential process for validating the accuracy and objectivity of retrieved information.

This lack of critical comparison likely hindered the construction of more solid and well-founded arguments, as well as the ability to identify potential biases or limitations in the sources used. As a result, it made the process of creating deeper and more rigorous knowledge more difficult.

**Figure 3**

*Average Adequacy of Selecting Subskills*



The last skill that has been analysed is “Presenting”, which has the following subskills: “Correct answer”, “Personal answer, paraphrased, not literally copied”, “Complete answer”, “Correct grammar and spelling”, “Correct in-text citations”, and “Correct references”.

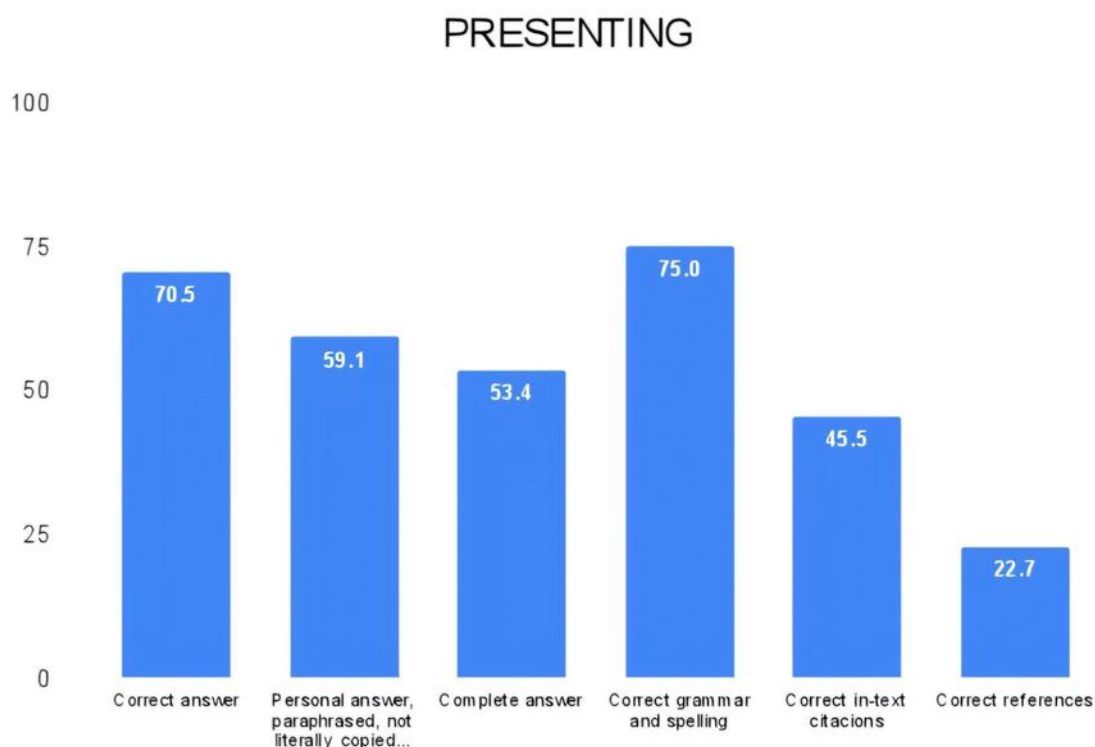
The challenge of integrating and comparing information from diverse sources was also noted in presenting the information (see Figure 4), that refers to the process of organising, synthesising, and critically contrasting information to construct a more comprehensive and substantiated understanding of a given subject. Many students showed difficulties in making this synthesis, as they often limited themselves to superficially summarising the ideas, without delving into the implications or the connections between the different sources.

Finally, a recurrent issue was observed in the proper citation of references. Students demonstrated a lack of familiarity with the APA citation standard, often including references that were incorrectly formatted according to the model’s guidelines. Furthermore, many students did not use the available tools for managing bibliographic references effectively —

such as reference management software— which could have helped them adhere more easily to the established standards.

**Figure 4**

*Average Adequacy of Presenting Subskills*



In conclusion, the results of the study show that, although students have access to advanced tools such as ChatGPT and other digital resources, many still use other basic internet sources to conduct various searches. Nevertheless, those who do use AI continue to exhibit significant gaps in key aspects of academic research in the digital age.

### Discussion and Conclusion

Previous empirical research has evidenced a notable lack in the cognitive framing and process-oriented analysis of student–AI interactions, particularly with generative tools, such as ChatGPT. The present study, through implementing a multimodal and multi-layered methodological design, facilitates a more granular exploration of the perceptual dimension within behavioural analytics. The obtained data substantiate prior findings concerning the limitations of digital competencies among university students.

Notably, the participants demonstrated a marked predisposition to rely on conventional information retrieval systems, such as Google and Google Scholar, over ChatGPT, despite the potential advantages this AI tool can offer in terms of efficiency and information access (Zhang & Yang, 2025).

A critical insight emerging from this investigation pertains to the cognitive and procedural deficiencies manifested during academic task execution. Participants exhibited substantial challenges in articulating precise search queries and inappropriate use of subject-specific

vocabulary —phenomena previously documented by Leichner et al. (2014), Lanning and Mallek (2017), and Argelagós and Pifarré (2017). Moreover, findings indicate an underdeveloped criticality in the appraisal, cross-referencing, and synthesis of retrieved information. Eye-tracking and screen-recording data revealed a superficial engagement with credibility markers such as authorship attribution and institutional affiliation, thereby impeding epistemically rigorous knowledge construction and argumentation, core skills within the IPS framework (Brand-Gruwel et al., 2009) and central to instructional models like the Four-Component Instructional Design (4C/ID) (Frerejean et al., 2019; Van Merriënboer et al., 2025). These outcomes also align with the concerns raised by Van Dis et al. (2023), who caution against the potential of AI tools to engender epistemic overconfidence, whereby students overestimate the validity of generated outputs absent critical verification.

Furthermore, the widespread misapplication of APA citation standards and limited recourse to bibliographic management tools underscore a broader unfamiliarity with scholarly conventions. This deficiency, as highlighted by Swales and Feak (2004) and Suntoro et al. (2023), reflects inadequacies in academic literacy, particularly in the domains of documentary practices and scholarly communication.

Finally, it is essential to underscore that the responsible use of generative AI in academia should not be seen as a threat to academic integrity. On the contrary, it represents an opportunity to rethink the role of educators, the design of academic tasks, and the modalities of assessing learning. Rather than imposing prohibitions or restrictions, educational institutions must strive to cultivate critical, reflective, and competent AI users (ACRL, 2016; Cassany, 2015; Sparks et al., 2024). This involves embedding AI literacy within curricula and promoting a culture of transparency, accountability, and scholarly rigour in how such tools are employed. Only by doing so can the full pedagogical potential of AI be harnessed to foster meaningful learning and the development of thoughtful, autonomous learners.

### **Acknowledgments**

The authors would like to thank the students who participated in this study for their time and collaboration. We also gratefully acknowledge the support of the PsychoLab at the University of Girona for providing the technical infrastructure necessary for data collection, as well as the Vice-Rectorate for Research at the Universitat de Girona for funding support (APLECT\_UdG).



## References

- ACRL, Association of College and Research Libraries. (2016). *Framework for Information Literacy for Higher Education*. American Library Association.  
<http://www.ala.org/acrl/standards/ilframework>
- Argelagós, E., Garcia, C., Privado, J., & Wopereis, I. (2022). Fostering information problem solving skills through online task-centred instruction in higher education. *Computers & Education*, Article 104433. <https://doi.org/10.1016/j.compedu.2022.104433>
- Argelagós, E., Garcia, C., Privado, J., & Wopereis, I. G. J. H. (2023). Improving Master's students' information literacy through online instruction. In *The International Academic Forum (IAFOR) Conference on Educational Research & Innovation 2023: Official Conference Proceedings* (pp. 211-221). <https://doi.org/10.22492/issn.2435-1202.2023.15>
- Argelagós, E., & Pifarré, M. (2012). Improving information problem solving skills in secondary education through embedded instruction. *Computers in Human Behavior*, 28(2), 515–526. <https://doi.org/10.1016/j.chb.2011.10.024>
- Argelagós, E., & Pifarré, M. (2017). Unravelling secondary students' challenges in digital literacy: A gender perspective. *Journal of Education and Training Studies*, 5(1), 42. <https://doi.org/10.11114/jets.v5i1.1517>
- Boetje, J., van Ginkel, S. O., Smakman, M. H., Barendsen, E., & Versendaal, J. (2024). Information problem solving during a digital authentic task: A thematic analysis of students' strategies. *Computers in Human Behavior Reports*, 15, Article 100470. <https://doi.org/10.1016/j.chbr.2024.100470>
- Brand-Gruwel, S., Wopereis, I., & Walraven, A. (2009). A descriptive model of information problem solving while using internet. *Computers & Education*, 53(4), 1207–1217. <https://doi.org/10.1016/j.compedu.2009.06.004>
- Cassany, D. (2015). *Construir la escritura [Building writing skills]*. Paidós.
- Castelló, M. (2014). Los retos actuales de la alfabetización académica: estado de la cuestión y últimas investigaciones [Current challenges in academic literacy: state of the art and latest research]. *Enunciación*, 19(2), 346–365. <https://doi.org/10.14483/10.14483/udistrital.jour.enunc.2014.2.a13>
- Francom, G. M. (2016). Principles for task-centered instruction. In R. A. Reiser, & J. V. Dempsey (Eds.), *Instructional-Design Theories and Models, Volume IV* (pp. 81–108). New York: Routledge.
- Frerejean, J., Van Merriënboer, J. J. G., Kirschner, P. A., Roex, A., Aertgeerts, B., & Marcellis, M. (2019). Designing instruction for complex learning: 4C/ID in higher education. *European Journal of Education*, 54(4), 513–524. <https://doi.org/10.1111/ejed.12363>

- Garcia, C., Argelagós, E., & Privado, J. (2021). Assessment of higher education students' information problem-solving skills in educational sciences. *Information Development*, 37(3), 359–375. <https://doi.org/10.1177/02666666920976189>
- Garcia, C., & Badia, A. (2017). Information problem-solving skills in small virtual groups and learning outcomes. *Journal of Computer Assisted Learning*, 33(4), 382–392. <https://doi.org/10.1111/jcal.12187>
- Hyland, K. (2016). Methods and methodologies in second language writing research. *System*, 59, 116–125. <https://doi.org/10.1016/j.system.2016.05.002>
- Kacperski, C., Ulloa, R., Bonnay, D., Kulshrestha, J., Selb, P., & Spitz, A. (2025). Characteristics of ChatGPT users from Germany: Implications for the digital divide from web tracking data. *PLOS ONE*, 20(1), Article e0309047. <https://doi.org/10.1371/journal.pone.0309047>
- Lanning, S., & Mallek, J. (2017). Factors influencing information literacy competency of college students. *The Journal of Academic Librarianship*, 43(5), 443–450. <https://doi.org/10.1016/j.acalib.2017.07.005>
- Leichner, N., Peter, J., Mayer, A. K., & Krampen, G. (2014). Assessing information literacy among German psychology students. *Reference Services Review*, 41(4), 660–674. <https://doi.org/10.1108/RSR-11-2012-0076>
- Mitchell, K. M., McMillan, D. E., Lobchuk, M. M., Nickel, N. C., Rabbani, R., & Li, J. (2021). Development and validation of the situated academic writing self-efficacy scale (SAWSES). *Assessing Writing*, 48, Article 100524. <https://doi.org/10.1016/j.asw.2021.100524>
- OpenAI. (2022). *Introducing ChatGPT*. <https://openai.com/blog/chatgpt>
- Pifarré, M., & Argelagós, E. (2020). Embedded information problem-solving instruction to foster learning from digital sources: Longitudinal effects on task performance. *Sustainability*, 12(19), Article 7919. <https://doi.org/10.3390/su12197919>
- Promma, W., Imjai, N., Usman, B., & Aujirapongpan, S. (2025). The influence of AI literacy on complex problem-solving skills through systematic thinking skills and intuition thinking skills: An empirical study in Thai gen Z accounting students. *Computers and Education: Artificial Intelligence*, 8, Article 100382. <https://doi.org/10.1016/j.caeai.2025.100382>
- Romero-Rodríguez, J.-M., Ramírez-Montoya, M.-S., Buenestado-Fernández, M., & Lara-Lara, F. (2023). Use of ChatGPT at university as a tool for complex thinking: Students' perceived usefulness. *Journal of New Approaches in Educational Research*, 12(2), 323–339. <https://doi.org/10.7821/naer.2023.7.1458>
- Sparks, J. R., Ober, T. M., Tenison, C., Arsian, B., Roll, I., Deane, P., Zapata Rivera, P., Gooch, R. M., & O'Reilly, T. (2024). *Opportunities and challenges for assessing digital and AI literacies*. ETS Research Institute. <https://www.ets.org/pdfs/rd/ets-digital-literacy-ai-full-report.pdf>

- Suntoro, S., Zulaeha, I., Mardikantoro, H. B., & Yuniawan, T. (2023). Undergraduate Students Citation Writing Difficulties. In *Proceedings of International Conference on Science, Education, and Technology* (Vol. 9), pp. 724-728.
- Swales, J. M., & Feak, C. B. (2004). *Academic Writing for Graduate Students: Essential Tasks and Skills* (Vol. 1). Ann Arbor: University of Michigan Press.
- Van Dis, E. A., Bollen, J., Zuidema, W., Van Rooij, R., & Bockting, C. L. (2023). ChatGPT: five priorities for research. *Nature*, 614(7947), 224-226. <https://doi.org/10.1038/d41586-023-00288-7>
- Van Merriënboer, J. J. G., Kirschner, P. A., & Frèrejean, J. (2025). *Ten steps for complex learning: A systematic approach to four-component instructional design*. (4th ed.). Routledge. <https://doi.org/10.4324/9781003322481>
- Wopereis, I., Frerejean, J., & Brand-Gruwel, S. (2015). Information problem solving instruction in higher education: A case study on instructional design. *Communications in Computer and Information Science*, 552, 293–302. [https://doi.org/10.1007/978-3-319-28197-1\\_30](https://doi.org/10.1007/978-3-319-28197-1_30)
- Zhang, M., & Yang, X. (2025). Google or ChatGPT: Who is the better helper for university students. *Education and Information Technologies*, 30, 5177–5198. <https://doi.org/10.1007/s10639-024-13002-5>

**Contact email:** [esther.argelagos@udg.edu](mailto:esther.argelagos@udg.edu)



## Internet and ChatGPT as Learning Tools in University Environments

Esther Argelagós, Universitat de Girona, Spain  
Noël Rusalleda, Universitat de Girona, Spain  
Nerea Almendros, Universitat de Girona, Spain  
Jordi Hernansáez, Universitat de Girona, Spain  
Nizar Belkhyr, Universitat de Girona, Spain

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

Informational literacy is a transversal skill that all graduates need to acquire, as it plays a crucial role in managing online information for learning and knowledge development. This pilot study examines how seven university students interact with online information and Artificial Intelligence (AI) tools, such as ChatGPT, while completing an academic task. Students' interactions were recorded using an eye-tracking device to capture their visual attention patterns. After that, each student watched the video obtained (which contained all the actions made and the eye movements performed during the resolution of the task) while verbalising their thoughts and decision-making processes of each action. A definitive video file (which contained actions, eye movements and verbalizations) was obtained for each participant. Each definitive video file was analysed considering the time spent and the frequency of performing each skill: defining the academic task to be solved, planning search strategies, searching for information, processing it, and presenting and organising information. Findings indicate that students devote a considerable amount of time to reading and formulating responses, but spend significantly less time analysing the task, planning, and searching for information. In particular, they rarely showed prior knowledge activation before searching, which may affect the depth of their responses. In addition, the limited comparison between multiple sources could reduce the complexity of their final answers. These results highlight the need to strengthen information literacy training, enabling students to maximise the potential of online resources and AI tools for academic tasks.

*Keywords:* informational literacy, artificial intelligence (AI), ChatGPT, higher education

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

In today's digital society, university students are expected not only to access vast quantities of online information but also to critically evaluate, organise, and use that information effectively. This capacity, referred to as information literacy (IL), is now considered a fundamental transversal skill in higher education, essential for academic success and lifelong learning (ACRL, 2016). The importance of IL goes beyond locating information; it involves strategic thinking, ethical judgement, and reflective use of sources to construct meaningful academic knowledge (James & Filgo, 2023).

However, numerous studies reveal that students often struggle to perform essential IL tasks such as planning search strategies, comparing sources, and integrating information meaningfully in academic tasks (Brand-Gruwel et al., 2009; Garcia & Badia, 2017).

The growing adoption of digital tools and Artificial Intelligence (AI) applications, such as ChatGPT, adds further complexity to the way academic information is processed. Although these technologies create opportunities for personalized learning, quick access to knowledge, and greater engagement — including tasks like summarizing, writing, and idea generation (Chiu et al., 2023) — they also present significant challenges related to source evaluation, critical thinking, misinformation, and the ethical use of information (Kasneji et al., 2023; Sublime & Renna, 2024).

As AI becomes a more common component of academic practice, it becomes essential to understand how students integrate AI tools into their information-seeking behaviour and whether these tools enhance or hinder the development of deep learning strategies. Prior research has emphasized that digital environments can either scaffold or inhibit IL development depending on instructional design and student awareness (Frerejean et al., 2019).

To conceptualize how students engage with information, we rely on the Information Problem Solving (IPS) model developed by Brand-Gruwel et al. (2009), which outlines five cognitive sub-skills: (1) defining the task, (2) planning the search process, (3) searching and locating information, (4) processing and evaluating sources, and (5) presenting the results. This model has been widely applied in educational settings, especially in the context of online learning (Argelagós et al., 2022; Garcia et al., 2021). Moreover, the 4C/ID instructional model offers a robust pedagogical framework to design learning tasks that facilitate the acquisition of complex IL skills through realistic, whole-task practice (Van Merriënboer & Kirschner, 2018; Van Merriënboer et al., 2025).

Despite these advancements, few studies have used observational methods such as eye-tracking and verbal protocols to explore how students actually use online resources and AI tools during academic tasks. These techniques can provide nuanced insights into students' cognitive processes, including their attention distribution, decision-making strategies, and implicit knowledge (Argelagós et al., 2022). Eye-tracking data, in particular, has shown promise in capturing real-time interactions with digital content and visual attention patterns (Holmqvist et al., 2011).

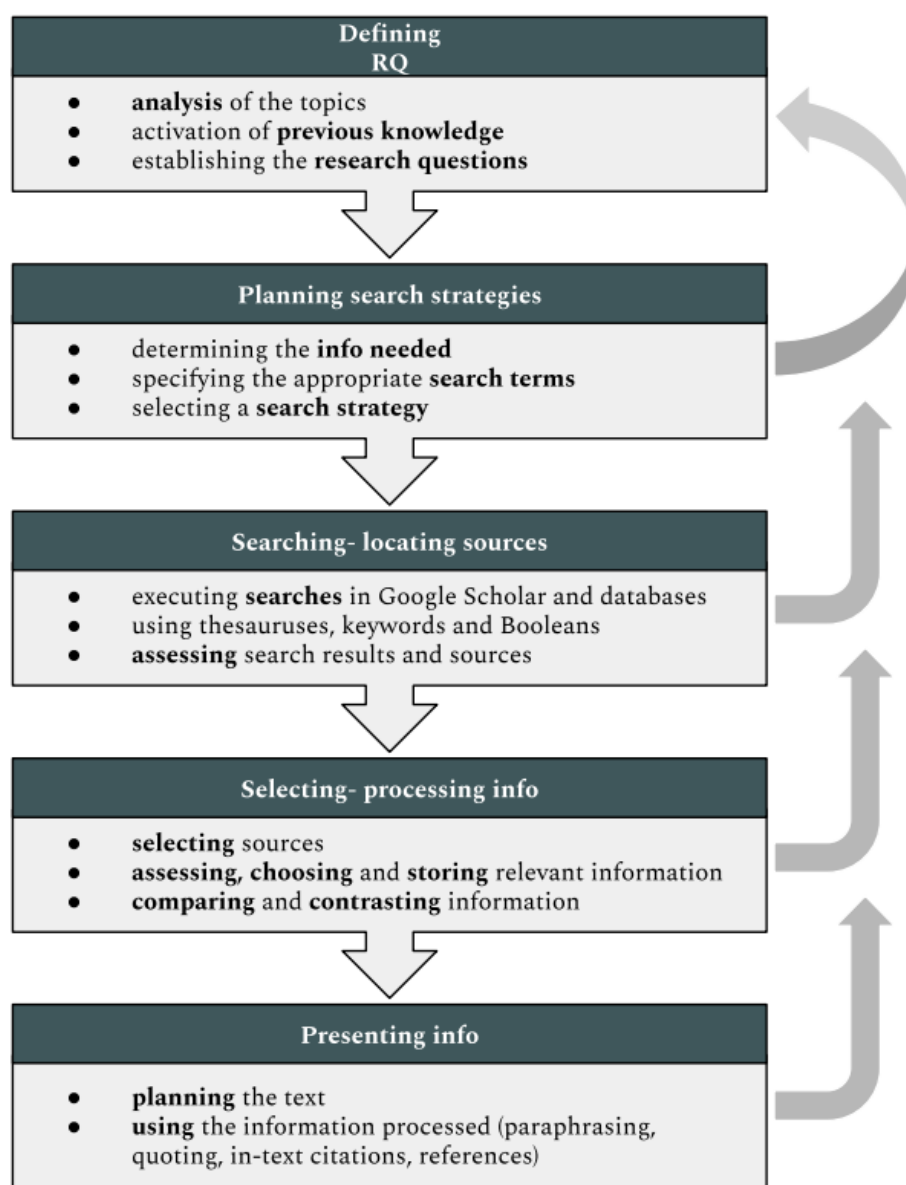
This pilot study responds to that gap by combining eye-tracking technology with retrospective verbal protocols to investigate how university students manage academic information tasks using online tools and ChatGPT. Our analysis focuses on students' actual

behaviour during task completion, rather than self-reported usage or beliefs. By doing so, we aim to uncover both strengths and gaps in students' IL performance and identify patterns that may inform future pedagogical interventions.

This study examines how university students interact with online resources and AI tools (particularly ChatGPT) while completing an academic task. The study focuses on how students navigate the five sub-skills of information literacy as defined by the IPS model: defining the task, planning the search, locating information, processing sources, and presenting results (Brand-Gruwel et al., 2009; Garcia et al., 2021), as can be seen in Figure 1. By using eye-tracking technology and cued retrospective verbal reports, we seek to obtain direct insight into students' visual attention, strategic behaviour, and cognitive processes during task performance.

**Figure 1**

*Information Problem Solving (IPS) Skills and Subskills to Review Scientific Literature (Inspired by Brand-Gruwel et al., 2009; Adapted From Garcia et al. [2021] and Argelagós et al. [2022])*



Specifically, we aim to identify which IPS subskills are most and least developed when students use ChatGPT and other online tools, and whether these tools support or hinder the development of deep learning and critical engagement. We hypothesise that while students benefit from the efficiency and fluency offered by ChatGPT, they may neglect early-stage IPS subskills such as task definition and planning, as well as critical source evaluation and comparison. These findings will inform future instructional practices for the integration of AI in higher education.

## **Method**

### **Participants**

A total of seven undergraduate students from different degree programs at the University of Girona took part voluntarily in this pilot study. Although all of them had previous experience using online research tools, they had not received formal training in information literacy frameworks. The participants were between 19 and 23 years old. Their involvement was both anonymous and voluntary, and informed consent was obtained in accordance with the university's ethical standards and has the approval of the Ethics Committee of the Universitat de Girona (CEBRU00048-23).

### **Procedure**

Each participant was asked to complete a short academic task that required searching for information online, organising it, and writing a brief argumentative response. They were allowed to use any digital tools, including ChatGPT. A maximum time limit of 20 minutes was given to complete the task.

While participants worked, an eye-tracking device recorded their gaze behaviour, including eye movements across the screen. Their screen activity was simultaneously recorded.

Once the task was completed, each participant viewed a playback of their session, which included both screen recording and gaze visualization. During this viewing, participants provided a cued retrospective verbal report, commenting on their thoughts, decisions, and reasons behind each action taken. These verbalizations were audio-recorded.

### **Data Collection**

Three layers of data were collected per participant:

- Screen recordings, capturing the sequence of digital actions, websites visited, and tool use.
- Eye-tracking recordings, which showed attention patterns and refixations across the screen.
- Audio recordings of retrospective verbal reports, which provided insights into reasoning, intentions, and confidence levels during the task.

From these, an integrated “definitive video” was created for each participant, combining all three layers for comprehensive analysis.

Each definitive video was coded in a qualitatively way using the five skills from the IPS model (Brand-Gruwel et al., 2009; Garcia et al., 2021): (1) defining the task, (2) planning the



search, (3) searching for information, (4) processing and evaluating information, and (5) organising and presenting the final product (see Figure 1).

### Data Analysis

A mixed-methods analysis was conducted. Each protocol was qualitatively analysed to determine which skill and subskill corresponded to each action. Quantitatively, the total time and frequency of behaviours associated with each IPS skill and subskill were manually calculated and compared across participants. The resulting data were visualised using graphs that illustrated the distribution of time across the five skills, as well as the relative contribution of ChatGPT usage within each skill.

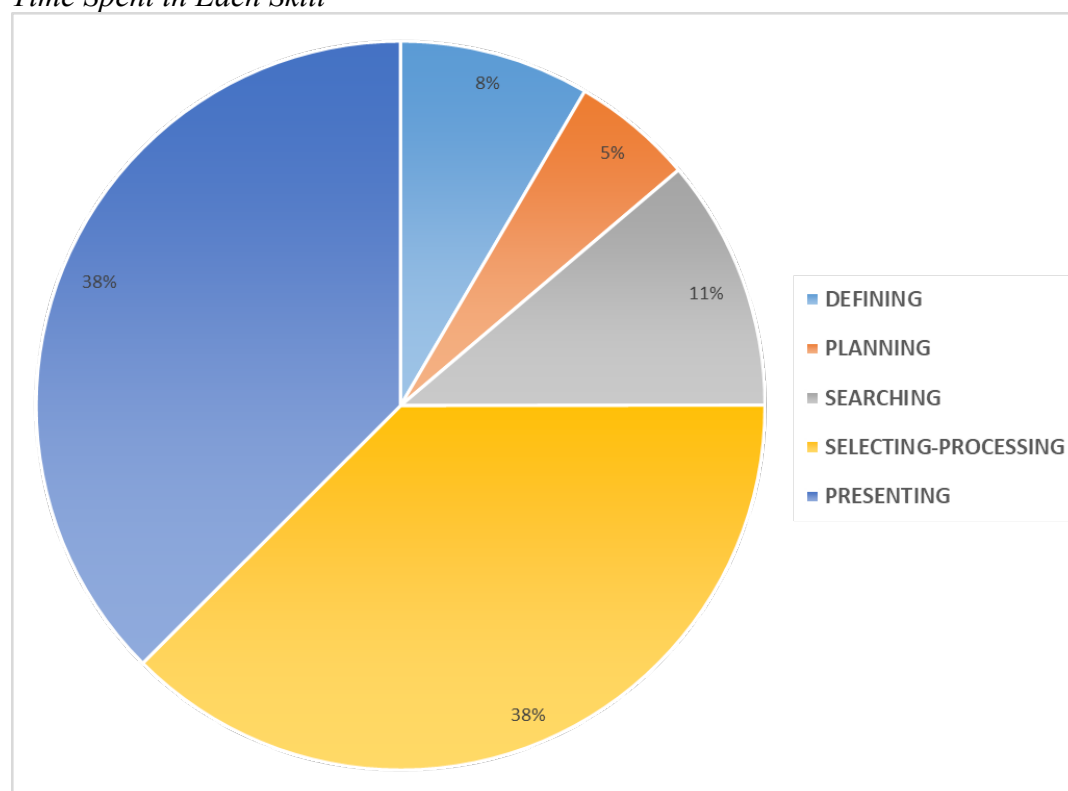
The integration of procedural (screen activity), behavioural (eye-tracking), and reflective (verbal report) data provided a detailed picture of how students engage with digital and AI-based tools during academic tasks.

### Results

The analysis of the data gathered from the seven participants (five of whom used ChatGPT during the task) revealed notable differences in the amount of time and number of actions dedicated to each of the five skills outlined in the IPS model: Defining, Planning, Searching, Processing, and Presenting (see Figure 2).

**Figure 2**

*Time Spent in Each Skill*



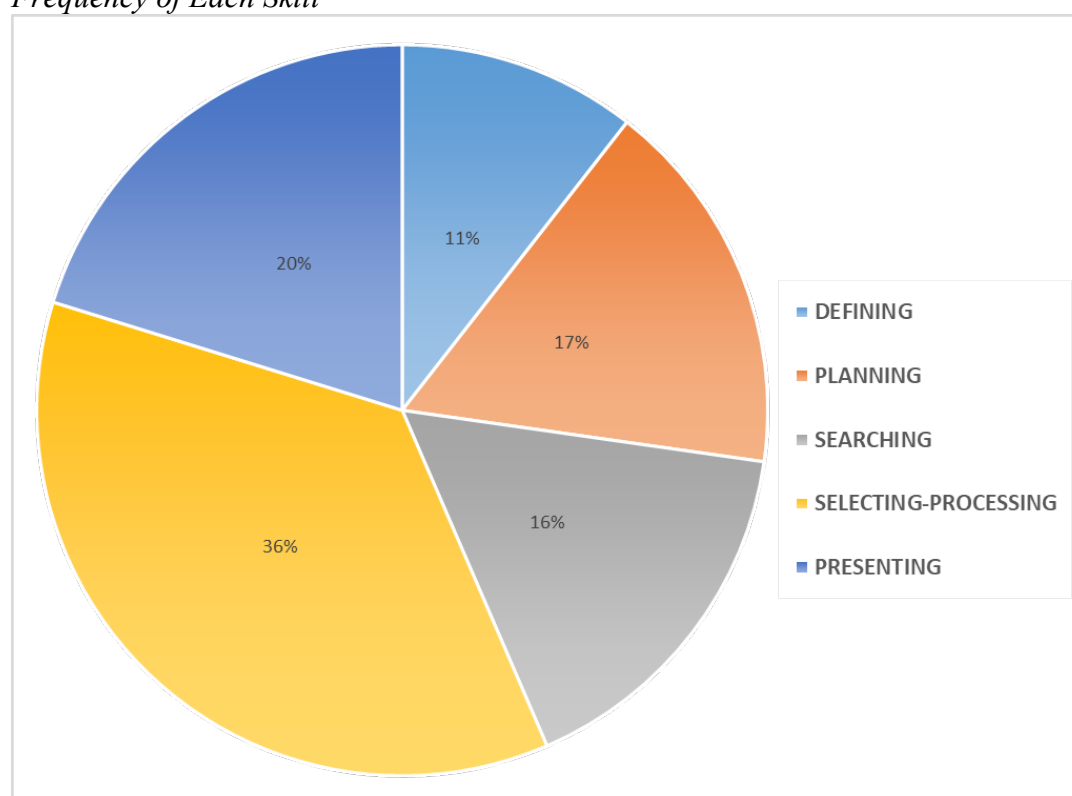
Regarding time allocation, students showed a marked preference for engaging in the later stages of the IPS cycle. On average, Processing was the most time-consuming phase, with participants dedicating approximately an average of 467 seconds, followed by Presenting,

with 466 seconds. In contrast, the earlier stages —Defining and Planning— received significantly less attention, with means of 105 seconds and 67 seconds, respectively. This distribution suggests that students concentrated their efforts on interpreting and reproducing content rather than on understanding the task or organising their approach beforehand.

The Searching phase occupied an intermediate position, with students spending on average 139 seconds locating information sources. However, behavioural indicators suggest that in many cases, this search process was relatively shallow, especially among those who relied heavily on ChatGPT.

In terms of frequency (see Figure 3), students engaged more often in Processing-related actions (e.g., reading, selecting, copying, summarizing) and Presenting behaviours (e.g., writing, editing). For instance, participants reported between 15 and 30 processing actions and up to 19 presentation-related actions per task. Conversely, the number of Defining and Planning actions was low, with some students only performing one or two behaviours linked to these skills. The low frequency and duration of these early-stage activities suggest a limited investment in structuring the task before interacting with content.

**Figure 3**  
*Frequency of Each Skill*



Beyond temporal and behavioural data, an analysis of the quality of students' final responses offers further insight. On average, participants demonstrated a relatively high rate of correct answers ( $M = 70.45$ ) and grammatical accuracy ( $M = 75.00$ ), indicating basic understanding and language competence. However, deeper indicators of critical thinking and academic rigour showed modest results. For example, the average score for paraphrased answers (an indicator of cognitive processing and original synthesis) was 59.09, while the completeness of responses averaged 53.41.

Importantly, the use of in-text citations ( $M = 45.45$ ) and references ( $M = 22.73$ ) was particularly limited, suggesting that students did not habitually document sources or follow academic conventions. Moreover, the average frequency of comparing multiple sources was just 4.55, highlighting a superficial use of available information and a tendency to rely on single-source input, often from ChatGPT.

While no formal statistical comparison was conducted due to the small sample size, a descriptive contrast between the five students who used ChatGPT and the two who did not, shows that ChatGPT users tended to spend less time on Searching and Planning, but slightly more on Processing, relying on the tool to quickly generate content which was then edited. However, they also tended to include fewer citations and references, and were less likely to paraphrase critically, pointing to a potential trade-off between speed and depth.

### **Discussion and Conclusion**

The results of this study align with existing literature that identifies significant challenges in students' ability to activate and execute early-stage IL or IPS skills when working with online tools and AI. Despite the recognised importance of IL as a transversal competency in higher education (ACRL, 2016; James & Filgo, 2023), our findings confirm that students tend to prioritize content manipulation and output over initial planning and critical evaluation processes (Sublime & Renna, 2024).

Students' limited engagement with the Defining and Planning phases of the IPS model suggests a procedural gap in their academic strategies. As shown in previous studies, this early-stage disengagement can significantly hinder the quality and relevance of the learning process, particularly when students lack structured guidance or frameworks to guide their inquiry (Argelagós & Pifarré, 2016; Frerejean et al., 2019). Instead of allocating sufficient time to identify objectives or articulate search criteria, most participants jumped directly into content retrieval and adaptation, especially when assisted by generative tools such as ChatGPT.

The preference for the Processing and Presenting phases, both in time spent and frequency, is consistent with the hypothesis that students may use ChatGPT not as a support tool for cognitive development, but as a shortcut for content creation. This raises questions about the depth of learning facilitated by AI applications, and whether students are developing reflective academic habits or merely accelerating task completion. These concerns have been echoed in recent research highlighting how ChatGPT can foster superficial learning if not critically embedded into pedagogical contexts (Sublime & Renna, 2024). These observations suggest a possible trade-off between efficiency and depth, and highlight the need to guide students in how and when to integrate AI tools responsibly.

Moreover, the low average frequency of source comparison ( $M = 4.55$ ) and minimal use of in-text citations and references reflect a lack of engagement with academic conventions (Suntoro et al., 2023) and suggest that students are not being trained to validate or contextualise the information they retrieve (Kacperski et al., 2025). This is especially relevant in AI-supported environments, where the reliability of generated content may vary and cannot be assumed (Promma et al., 2025).

In conclusion, this study offers a nuanced look at how university students engage with information when given open access to digital resources and AI tools. While generative

technologies like ChatGPT can enhance productivity and access to information, they must be framed within a structured pedagogical model that emphasises critical inquiry, strategic planning, and academic rigour. Educators should consider incorporating targeted instruction on early-phase IL skills (Argelagós et al., 2022), source validation, and ethical use of AI into curriculum design (Sparks et al., 2024), especially as these tools become increasingly integrated into everyday academic practice (Boetje et al., 2024; Suntoro et al., 2023).

These results highlight the need to strengthen information literacy training, enabling students to maximise the potential of online resources and AI tools for academic tasks. Future research with larger and more diverse samples could build on these findings by testing interventions designed to scaffold IL development in AI-supported environments. Additionally, integrating measures of learning outcomes or long-term retention could help clarify whether AI tools merely facilitate task completion or genuinely contribute to meaningful knowledge construction.

### **Acknowledgements**

The authors wish to express their sincere gratitude to the students who took part in this study for their time and valuable collaboration. We also extend our thanks to the PsychoLab at the University of Girona for supplying the technical resources required for data collection, and to the Vice-Rectorate for Research at the University of Girona for their financial support (APLECT\_UdG).

## References

- ACRL, Association of Colleges and Research Libraries (2016). *Framework for Information Literacy for Higher Education*. <http://www.ala.org/acrl/standards/ilframework>
- Argelagós, E., Garcia, C., Privado, J., & Wopereis, I. (2022). Fostering information problem solving skills through online task-centred instruction in higher education. *Computers & Education*, Article 104433. <https://doi.org/10.1016/j.compedu.2022.104433>
- Argelagós, E., & Pifarré, M. (2016). Key Information-Problem Solving Skills to Learn in Secondary Education: A Qualitative, Multi-Case Study. *Journal of Education and Learning*, 5(4), 1-14. <http://dx.doi.org/10.5539/jel.v5n4p1>
- Boetje, J., van Ginkel, S. O., Smakman, M. H., Barendsen, E., & Versendaal, J. (2024). Information problem solving during a digital authentic task: A thematic analysis of students' strategies. *Computers in Human Behavior Reports*, 15, Article 100470. <https://doi.org/10.1016/j.chbr.2024.100470>
- Brand-Gruwel, S., Wopereis, I., & Walraven, A. (2009). A descriptive model of information problem solving while using internet. *Computers & Education*, 53(4), 1207–1217. <https://doi.org/10.1016/j.compedu.2009.06.004>
- Chiu, T. K. F., Lin, T. J., & Lonka, K. (2023). Enhancing learning and engagement through generative AI in higher education. *Computers & Education: Artificial Intelligence*, 4, 100126. <https://doi.org/10.1016/j.caeai.2023.100126>
- Frerejean, J., Velthorst, G. J., van Strien, J. L., Kirschner, P. A., & Brand-Gruwel, S. (2019). Embedded instruction to learn information problem solving: Effects of a whole task approach. *Computers in Human Behavior*, 90, 117-130. <https://doi.org/10.1016/j.chb.2018.08.043>
- Garcia, C., Argelagós, E., & Privado, J. (2021). Assessment of higher education students' information problem-solving skills in educational sciences. *Information Development*, 37(3), 359–375. <https://doi.org/10.1177/02666666920976189>
- Garcia, C., & Badia, A. (2017). Students' information problem-solving process in academic writing tasks. *Journal of Computer Assisted Learning*, 33(4), 382–392. <https://doi.org/10.1111/jcal.12187>
- Holmqvist, K., Nyström, M., Andersson, R., Dewhurst, R., Jarodzka, H., & van de Weijer, J. (2011). *Eye tracking: A comprehensive guide to methods and measures*. Oxford University Press.
- James, A. B., & Filgo, E. H. (2023). Where does ChatGPT fit into the Framework for Information Literacy? *College & Research Libraries News*, 84(3), 123–126. <https://doi.org/10.5860/crln.84.9.334>

- Kacperski, C., Ulloa, R., Bonnay, D., Kulshrestha, J., Selb, P., & Spitz, A. (2025). Characteristics of ChatGPT users from Germany: Implications for the digital divide from web tracking data. *PLOS ONE*, 20(1), Article e0309047. <https://doi.org/10.1371/journal.pone.0309047>
- Kasneci, E., Sessler, K., Küchenhoff, H., & Bannert, M. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Nature Human Behaviour*, 7, 5–9. <https://doi.org/10.1038/s41562-023-01525-0>
- Promma, W., Imjai, N., Usman, B., & Aujirapongpan, S. (2025). The influence of AI literacy on complex problem-solving skills through systematic thinking skills and intuition thinking skills: An empirical study in Thai gen Z accounting students. *Computers and Education: Artificial Intelligence*, 8, Article 100382. <https://doi.org/10.1016/j.caeai.2025.100382>
- Sparks, J. R., Ober, T. M., Tenison, C., Arsian, B., Roll, I., Deane, P., Zapata Rivera, P., Gooch, R. M., & O'Reilly, T. (2024). *Opportunities and challenges for assessing digital and AI literacies*. ETS Research Institute. <https://www.ets.org/pdfs/rd/ets-digital-literacy-ai-full-report.pdf>
- Sublime, J., & Renna, I. (2024). Is ChatGPT massively used by students nowadays? A survey on the use of large language models such as ChatGPT in educational settings. *arXiv preprint*. <https://doi.org/10.48550/arXiv.2412.17486>
- Suntoro, S., Zulaeha, I., Mardikantoro, H. B., & Yuniawan, T. (2023). Undergraduate Students Citation Writing Difficulties. In *Proceedings of International Conference on Science, Education, and Technology* (Vol. 9), pp. 724-728.
- Van Merriënboer, J. J. G., & Kirschner, P. A. (2018). *Ten steps to complex learning: A systematic approach to four-component instructional design*. Routledge.
- Van Merriënboer, J. J. G., Kirschner, P. A., & Frèrejean, J. (2025). *Ten steps for complex learning: A systematic approach to four-component instructional design*. (4th ed.). Routledge. <https://doi.org/10.4324/9781003322481>

**Contact email:** [esther.argelagos@udg.edu](mailto:esther.argelagos@udg.edu)

## **Enhancing Primary Education Through Interactive Teaching and Learning Aids in Rural Uttarakhand, India**

Khushboo Bharti, University of Petroleum and Energy Studies, India

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Primary education in India has long been neglected due to multiple factors. Although significant progress has been made recently to increase access to education, the quality of schooling remains a critical concern especially in poorly funded schools in rural areas of the country. Key issues include the shortage of trained and qualified teachers, an outdated curriculum focused on rote learning, inadequate infrastructure and resources, and socio-economic challenges faced by many students. These factors also prevent teachers from accessing necessary teaching aids and materials, leading to an incomplete educational experience. This research paper addresses these concerns by presenting a case study of an innovative interactive Teaching Aid: The ancient game of Snakes and Ladders, adapted to teach Geography and mathematics to students from underprivileged backgrounds in a government-aided school in a village in Uttarakhand, India. Designed in a large floor game format, the game is intended to be a low-cost teaching aid that facilitates an interactive platform for students to learn while playing. This paper thus contributes by addressing the research gap in school education in India by providing a case study on educational innovation using Interaction Design. It demonstrates that traditional games can be adapted to create effective and engaging teaching aids, addressing some of the key challenges in primary education, particularly for underprivileged students in rural areas, by fostering an interactive and practical learning environment.

*Keywords:* SDG4, education equity, play, ancient games, local knowledge

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

SDG 4 encompasses a broad range of targets aimed at ensuring access to quality education for all individuals, regardless of gender, age, or socio-economic status. These targets include universal primary and secondary education, early childhood development and pre-primary education, equal access to affordable technical, vocational, and higher education, skills for employment and decent jobs, elimination of gender disparities in education, inclusive education for persons with disabilities, literacy and numeracy, and education for sustainable development and global citizenship.

While India has made significant strides in improving access to education over the past few decades there are still many areas where it is not fulfilling these goals. The Right to Education (RTE) Act, 2009, which mandates free and compulsory education for children between the ages of 6 and 14, has been a cornerstone in this regard. According to the Annual Status of Education Report (ASER) 2018, the enrollment rate for children in the 6-14 age group is above 95%. However, challenges persist in terms of quality, equity, and inclusiveness.

- **Quality of Education:** Despite high enrollment rates, the quality of education remains a concern. The ASER 2018 report highlights that a significant proportion of children in rural areas struggle with basic reading and arithmetic skills.
- **Infrastructure and Resources:** Many schools, especially in rural and remote areas, lack adequate infrastructure, teaching materials, and qualified teachers.
- **Gender Disparities:** Although gender parity in primary education has improved, disparities persist at the secondary and tertiary levels. Cultural norms and economic factors often impede girls' education.
- **Inclusive Education:** Children with disabilities, those from marginalized communities, and economically disadvantaged backgrounds face significant barriers to education.
- **Teacher Training:** There is a need for continuous professional development and training for teachers to equip them with modern pedagogical skills and knowledge.

## Initiatives and Policies

The Government of India has undertaken several initiatives to address these challenges and advance towards SDG 4:

- **Samagra Shiksha Abhiyan:** This integrated scheme aims to ensure inclusive and equitable quality education from pre-primary to higher secondary levels.
- **Beti Bachao, Beti Padhao:** Aimed at promoting the education of girls and addressing gender disparities.
- **Digital Initiatives:** Programs like DIKSHA (Digital Infrastructure for Knowledge Sharing) and SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) provide digital resources and online courses to enhance learning opportunities.
- **Skill Development Programs:** Initiatives like Pradhan Mantri Kaushal Vikas Yojana (PMKVY) focus on imparting vocational skills to youth, improving employability.

It has been suggested that to achieve SDG 4 by 2030, India needs to adopt a multi-faceted approach such as:

- **Strengthening Public Education:** Investing in infrastructure, teacher training, and educational resources is crucial to improve the quality of public education.



- **Promoting Equity:** Special measures are needed to support the education of girls, children with disabilities, and those from marginalized communities.
- **Community Participation:** Engaging communities in the education process can help address socio-cultural barriers and create a supportive environment for learning.
- **Leveraging Technology:** Expanding digital learning platforms and ensuring access to technology in remote areas can bridge educational gaps.
- **Monitoring and Evaluation:** Regular monitoring and evaluation of educational programs and policies are essential to track progress and make necessary adjustments.

### **About the Project**

While significant progress has been made, achieving this goal requires sustained effort, innovative approaches, and collaborative efforts from government, civil society, and the private sector. With this aim, the project was initiated in a low-income government school in a rural area near Uttarakhand's capital city of Dehradun in north India.

### **Motivation of Students**

Motivation of students is vital for their engagement and persistence in the educational process, significantly influencing educational outcomes. Motivated learners are focused and self-driven, requiring minimal external stimuli to maintain attention. Effective instructional design must address student motivation, which can be intrinsic (driven by challenge, fantasy, and curiosity) or extrinsic (focused on desired outcomes). Games, inherently containing intrinsic motivators, are valuable tools in making learning engaging and fun, aligning with Schank's "learning by doing" paradigm. Integrating traditional outdoor games into the educational process can enhance motivation by promoting active participation, relevance through familiar activities, confidence in a relaxed environment, and intrinsic satisfaction. This approach also fosters social development, cooperation, healthy physical activity, and cultural appreciation. Involving students in creating the learning scenario.

### **The Project Design**

Designed as a teaching aid, the snake and ladder project incorporated this traditional game into the curriculum to enhance the learning and teaching activity. The project included detailed instructional manuals for educational integration by combining elements of mathematics, geography, altitude awareness, history, and color recognition. The entire project was created in collaboration with the schoolteachers with constant feedback taken at every stage. Therefore, ensuring their role as knowledge creators in primary education.

By incorporating hands-on activities such as arranging jigsaw puzzles and playing a Snakes and Ladders game, the floor game offered an interactive learning experience that engaged students in active participation. Teachers customized the content, including images of Uttarakhand and the size and medium of the visual aids, making the game versatile and applicable to different educational contexts. They also made use of drawing exercises for geographical locations and altitudes, which enhanced the learning experience and set the game apart as a visually engaging educational tool.

## Skill Development

The game fostered the development of various skills such as critical thinking, problem-solving, numeracy, and spatial awareness, making it a comprehensive educational resource. By integrating complex concepts into a familiar game format, the floor game made learning more accessible and enjoyable for students. Students also applied their knowledge in practical scenarios, such as reading altitude values, identifying geographical features, and making comparisons between different locations, fostering a deeper understanding and retention of learning objectives.

## Snake and Ladder Game

This game is considered an effective method for overcoming issues such as limited vocabulary, poor pronunciation, lack of motivation, nervousness, shyness, fear of making mistakes, and anxiety about being teased by peers for not understanding the subject or grammar. Using board games in language classrooms to teach speaking is an effective way to reduce speaking anxiety and provide enjoyment for students. This approach allows students to study and practice speaking in an enjoyable and practical manner. While most of the reviews on snake and ladder deals with English language proficiency, the application of the snake and ladder game to incorporate information on regional locations and their names with altitudes has not been attempted and therefore presented a unique opportunity to combine English, mathematics, and geography in this game (Figure 1).

**Figure 1**

*Students of Primary School With Their Teacher and the Snake and Ladder Floor Game*



Source: UPES

## Game Design

The Unch-Neech puzzle was printed on paper according to the desired size or the number of students in the class. With the help of students, the puzzle was cut along the indicated lines and pasted onto cardboard, thermocol, or any other medium that suited the needs, ensuring

durability. Locations mentioned in the game were searched online and printed on separate papers. The printed images of locations were then pasted onto the empty areas of the Unch-Neech game, or alternatively, these areas were left empty for students to draw and paste their own representations.

When the puzzle was completed, students were asked to notice the term Moksh-Path mentioned at the top of the puzzle. It was explained that Snake and Ladder is an ancient Indian game also called Mokshapat or Moksha Patamu, created to impart moral lessons about karma and destiny. Ladders symbolized good deeds, while snakes represented evil actions. Teachers further read about the cultural significance of the game through the internet to enhance students' knowledge. It was ensured that the puzzle pieces were securely pasted and that the location images were clearly visible for effective learning during the game.

### **Implementation and Activities**

Students formed groups of 2 to 8, and the jigsaw pieces were laid out on the floor. They were instructed to start putting them together by organizing the pieces by numbers, either in ascending or descending order. Students were encouraged to identify which number came before or after a given digit, such as "What number comes before 3?" or "What number comes after 20?" They were asked to pay attention to the colors of the snakes and the angles of the ladders to assist in completing the puzzle. Students read the altitude numbers on the pieces to determine their placement in the puzzle, for instance, "What is the altitude of Ramgarh?" or "Which place has a higher altitude than Ramgarh?"

In the mathematics segment, students shared their ages and discussed which numbers were higher or lower. They took turns based on their age or birth date, moving either from lower to higher numbers or vice versa. Students rolled the dice and began playing the game accordingly, calculating their movements by adding or subtracting the numbers rolled on the dice from their current position. For example, if a student was on block 5 and rolled a two, they added  $5 + 2$  to move to block 7. If they climbed a ladder from block 9 to 27, they moved  $27 - 9 = 18$  places. Similarly, if they reached the mouth of the snake, they calculated how many numbers they climbed down to the tail of the snake using addition or subtraction.

When a student reached a box with a number missing, they recalled what number would come in that box. For example, if number 8 was missing from the puzzle, students were asked what number follows 7. If they reached a ladder at number 21 and climbed up to 60, students were asked about the missing numbers in between the ladder. If they reached the tail of the snake or the mouth of the snake, students recalled the number that should be mentioned in those boxes. Students read the altitudes mentioned on the locations they reached during the game, such as Tehri Garhwal at 1,016 meters and Nainital at 2,084 meters. They quickly calculated on paper or on the ground with chalk or pencil, determining which altitude was higher and the difference between heights using subtraction:  $2084 - 1016 = 1068$ .

### **Teaching Geography and Altitude**

Students read and spelled the names of different geographical locations in Uttarakhand mentioned on the box they landed on. They calculated the altitude based on the digits written on the box for units, tens, hundreds, and thousands. Students related the colors on the empty boxes to geography, such as blue representing water bodies like Sharda Sagar Lake, and white representing high altitude areas like Nanda Devi mountain peak covered with snow.

Images or printouts of the locations were shown to students, and they drew the geographical features and altitudes on paper. Students displayed their drawings of different geographical features and altitudes for comparison and observation. Using the individual jigsaw boxes from the Unch-Neech game, students revisited the altitude digits for the locations they depicted and wrote them down on the drawings. They compared the altitudes of different geographical features from various parts of Uttarakhand through their drawings and printed images, such as meadows, mountains, valleys, rivers, etc.

The game was adaptable for different levels of students, with special needs or accommodations considered for individual students to fully participate in the activity.

### **Conclusion**

Uniquely integrating mathematics, geography, and altitude awareness, the floor game Unch-Neech offered an interactive learning experience. Through activities like jigsaw puzzles and the snake and ladder game, it served as a teaching aid, with customizable content focusing on Uttarakhand's geography. Visual aids and drawing exercises engaged students while introducing the cultural significance of the snake and ladder game in India. Aimed at promoting critical thinking, problem-solving, retention, and numeracy skills, its innovative approach made complex concepts enjoyable and accessible. Students practically applied knowledge by relating mathematical concepts and altitude values to geographical features. Overall, its blend of education, interactivity, customization, and innovation made it a distinctive educational resource.

### **Author's Note**

This study was supported by UPES CSR department in 2004 Dehradun Uttarakhand India.

## References

- Hayuningtyas, N. (2022). The Implementation of Snake and Ladder Game in Teaching Speaking: The Advantages and The Disadvantages. *CREW Journal*, 1(2).
- Küfeoğlu, S. (2022). SDG-4 Quality Education: Emerging Technologies: Value Creation for Sustainable Development. Cham: Springer International Publishing.
- Sarabhai, K. V., & Purohit, S. R. (2023). Seeds of change: state of the education report for India 2023.
- Stojanovska, T. V., Connell, M. V., Malinovski, T., & Trajkovik, V. (2014). The educational prospects of traditional games as learning activities of modern students. *Proceedings of the European Conference on Games-Based Learning*.

**Contact email:** khushboobharti@gmail.com



## **The Use of AI-Powered Platforms in the Bachelor Thesis Writing Process: Benefits and Limitations**

Nato Pachuashvili, International Black Sea University, Georgia

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

The increasing use of Artificial Intelligence (AI) has revolutionised and transformed the entire educational system, including academia. AI-powered platforms have enhanced research processes and provided valuable support from finding sources to data analysis. The integration of AI in thesis writing has also assisted researchers at various stages of research since AI tools have accelerated the process, offering efficiency and accuracy. Furthermore, AI-driven platforms have offered the opportunity to generate citations and provide assistance with brainstorming ideas and narrowing down research questions. The aim of the present paper is to investigate the use of AI-powered platforms in the bachelor thesis writing process among year four graduating students at a private university in Georgia. To explore the application of AI tools in the research process, an online questionnaire was distributed to 30 participants. The survey focused on the benefits and limitations of utilising AI platforms in the thesis writing process. The findings of the study identified supportive AI-assisted platforms in academic writing, as well as addressed the challenges AI platforms may pose. Drawing on the research findings, the paper provided invaluable insights into effectively leveraging AI platforms to enhance the quality of research while adhering to the principles of academic integrity.

*Keywords:* artificial intelligence, bachelor thesis, academia, research, AI

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The advances in Artificial Intelligence (AI) technology have significantly altered the educational landscape and reshaped teaching and learning practices. AI-driven platforms enable educators to provide a tailored learning experience by adapting to individual students' proficiency, ability and preference (Abubakar et al., 2024). It is also argued that AI fosters a deeper understanding of the subject rather than rote memorisation, leading to the creation of personalised learning paths (Khatri & Karki, 2023). The educational focus has also shifted towards equipping students with technological skills for achieving quality education (Akinwalere & Ivanov, 2022). Furthermore, AI tools have automated teaching processes, enabling educators to easily track attendance and grade students' assignments timely. The latter has contributed to the reduction in administration burden and more emphasis on classroom interaction. It is also believed that an automated grading system and AI predictive algorithmic analytics enhance learning efficiency and streamline the educational process. Such innovation pushes back traditional assessment methods and enables a transition towards holistic educational practices, leading to fostering authenticity and lifelong learning practices (Khatri & Karki, 2023). Besides, AI technology provides assistance in the curriculum development in the following processes: generating study materials, creating lesson plans and lecture presentations, designing assessment rubrics and creating assessments (Abugre, 2021). In other words, the potential of AI in education processes has been proven to be immense, and it is expanding day by day.

AI-driven platforms also offer significant benefits in scientific research. They positively contribute to streamlining research processes and enhancing scholars' productivity. AI-powered platforms facilitate data analysis and automate research processes (Kotsis, 2024; Pigola et al., 2023). AI enables researchers to process a large amount of data quickly and efficiently, leading to the uncovering of new patterns and trends that are difficult to detect through manual processing (Kotsis, 2024; Pinzolit, 2023). In the modern era, where the amount of data has dramatically grown, traditional analytical methods have become outdated. An AI algorithmic system allows researchers to automate the research finding process, categorise papers and streamline the whole research writing process. Pinzolit (2023) also argues that such innovation in research leads to broadening research inquiry and promoting authenticity. Moreover, it creates an ethical and transparent environment for scholars.

Despite the above affordances, scholars identify a number of threats to using AI-driven platforms in academic research. As AI is trained on large datasets and operated as an algorithmic engine, AI-generated content may contain and perpetuate bias in the training data (BaHammam, 2023). This can lead to deviation from genuine content, contributing to generating inaccurate and skewed responses. In other words, AI platforms may blur the line between authenticity and AI-generated content (Kotsis, 2024). Biased information can lead to discriminatory results and concerns regarding fairness and transparency (Khatri & Karki, 2023; Wirzal et al., 2024). Another serious concern that needs to be addressed is ownership. AI-generated content cannot be granted ownership, which raises a serious issue of responsibility and accountability (Ersöz & Engin, 2024; Perkins & Roe, 2023). There were some instances of crediting ChatGPT as co-authors in scientific articles; however, this practice was met with disapproval from academia, since AI cannot be eligible to claim authorship. AI is thought to be unable to provide intellectual contribution and take responsibility for AI-generated content (BaHammam, 2023). The current practice in academia indicates that non-human-made content cannot be granted ownership due to the above-mentioned reasons. The consensus exists among scholars and research communities



that AI can neither take responsibility nor be the subject of copyright rules. In other words, AI-generated content cannot be guaranteed by copyright protection as academic work created by humans. This issue creates an urgency to create AI research policy to safeguard and recognise human authorship in academic content creation (Perkins & Roe, 2023).

Furthermore, AI can lead to a violation of academic integrity by generating fraudulent publications, spreading misinformation or manipulating data (Gatrell et al., 2024). The so-called paper mill produces content that is almost impossible to distinguish from authentic research, leading to undermining the credibility and breaching academic integrity. This practice eventually creates the potential of plagiarism, suppresses creativity and impedes critical thinking. Hence, conducting research requires rigorous dedication and strict adherence to academic integrity principles, which places human intelligence at the front line of the research process (Khatri & Karki, 2023). Moreover, AI may induce over-reliance on the platform, leading to diminishing critical thinking skills and creativity among researchers (Kotsis, 2024). If AI is not used effectively, its limitations may compromise its effectiveness (Chan, 2023).

Despite the above-mentioned ethical concerns, AI has been extensively used in the thesis writing process. Anik et al. (2023) argue that AI-powered platform, like ChatGPT, empowers students to generate research ideas, structure their thesis, and apply for language refinement or crafting abstracts. Ratih and Kastuhandani (2024) also claim that AI platforms can improve students' efficiency by speeding up their thesis writing process and enhancing writing quality. AI-driven platforms such as Perplexity, Elicit, Research Rabbit and ChatGPT make it easier to access scientific papers, summarise key sections and synthesise substantial volumes of data swiftly. The study conducted by Ratih and Kastuhandani (2024) also highlights AI's potential to modify research questions, refine research methodology and align the conceptual framework with research objectives. ChatGPT is mentioned to provide assistance in guiding students towards their research studies. In other words, the above-mentioned studies underscore the benefit of AI to enhance students at different research stages while writing their theses.

In light of the above-mentioned, the study aims to investigate the use of AI-powered platforms in the bachelor's thesis writing process at one of the private universities in Georgia. The study highlights the benefits and limitations of AI-driven platforms in the academic research process. By investigating the issue, the paper attempts to assess the extent to which AI tools are used in the thesis writing process and what limitations are encountered while using them. The study also aims to evaluate the participants' awareness of ethics associated with AI use and provides practical recommendations for its ethical use in research processes.

## **Literature Review**

Artificial Intelligence (AI) is broadly defined as technologies that have the capacity of performing tasks typically resembling human intelligence (Kohnke & Zaugg, 2025). In other words, this is simulated intelligence that can be expressed in various forms such as critical thinking, reasoning, problem solving, creativity and language comprehension. It encompasses various methods to automate tasks associated with human thinking (Dwivedi et al., 2023). AI models are trained on large datasets to recognise patterns and predict outcomes that might be overlooked by humans (Burger et al., 2023). Data AI relies on comes from various sources, such as articles, images, and social media, that is fine-tuned for tasks like responding to questions, language translation, summarising, etc. (Dwivedi et al., 2023). These tasks are

similar to human-made content; however, AI platforms accelerate the data analysis and make it more efficient. Moreover, AI tools use algorithms, a set of prediction tools designed to process data. These algorithms allow platforms to make predictions on patterns identified in data. Algorithms have shown a considerable evolution over time, contributing to processing data in its natural form; however, it has also posed a threat of mining unstructured data (Kohnke & Zaugg, 2025).

### **Current Use of AI at International Universities**

The current use of Artificial Intelligence (AI) in research processes ranges from its benefits to its limitations and ethical considerations. It offers a number of advantages for educators, researchers and students; however, these benefits are often compromised. There is an increasing interest in using AI as a supplementary tool in academic research; however, many universities do not have an ethical AI policy. The decision, whether or not to use AI in research, is often left to individual instructors. According to Caulfield (2025), as of February 2025, across 100 universities in the United States, 27% do not have clear AI guidelines, whereas 51% of universities assign decision-making responsibility to instructors. The use of AI is prohibited in 18% of universities, whereas an insignificant proportion of universities (4%) accept AI as a source to be cited in the paper if permitted by the instructor.

As demonstrated above, there is no universal AI policy that can govern universities towards incorporating AI in academic processes. International universities are working closely to implement AI-powered platforms in their curricula and address ethical issues. The AI revolution has accelerated educational processes, leaving educators with no choice but to keep pace with this innovation. However, the major challenge faced by academics is to redesign their practices and emphasise their ethical use. Financial backup of AI innovation has also fuelled the integration process into the current curriculum. The University of Florida has been one of the pioneering institutions in implementing AI across its 16 colleges. The University of New York and the University of Texas also highly emphasise their ethical integration in academic practices (Forward Pathway, 2025). The University of Michigan has also taken a lead in integrating AI in interdisciplinary research practices. The Michigan University researchers are actively involved in the AI policy-making process, mitigating data privacy, accountability and bias concerns associated with AI usage. The university acknowledges the importance of tight collaboration, emphasising the importance of policymakers and researchers across all disciplines (University of Michigan, 2025).

Other international institutions also embrace the use of AI in the academic writing process. While strictly adhering to academic integrity principles, Durham College accepts AI as a source and provides citation guidance. However, university students are advised to consult with their instructors on the use of ChatGPT in their assignments. If permitted, students are guided on citing AI content appropriately using the APA and MLA citation guides (Durham College Library, 2025). Apart from Durham College, universities in the UK have varied practices of AI usage. The University of Oxford supports the use of Generative AI tools such as ChatGPT, Claude, Bing Chat and Google Bard, but emphasises the importance of critical thinking in formulating scholarly-based arguments (University of Oxford, 2005). Some universities require students to submit a disclosure to declare the use of AI in their assignments. Moreover, the UK Research and Innovation is allocating a large sum of income to the exploration and use of AI in research processes (Chubb et al., 2021). Table 1 below reviews top universities and their practices with regard to AI use:

**Table 1**  
*The World's Top Universities and Their AI Policies*

University	AI use	Restrictions
Harvard University	Yes, with restrictions	Policies vary across schools and instructors. Generally, allows AI use for personal study and research, prohibits AI-generated content in assignments
Stanford University	Yes, with restrictions	AI use should be disclosed. AI use is prohibited in assignments and exams.
Massachusetts Institute of Technology (MIT)	Yes, with restrictions	AI use should be disclosed. AI-generated research results without disclosure are classed as plagiarism.
University of Cambridge	Yes, with restrictions	Permitted to use GenAI to support study research and formative work. However, using is for summative assessment varies across instructors and departments.
University of Oxford	Yes, with restrictions	Permitted to use GenAI to support personal study and research. However, bans on using AI as an author.
Imperial College London	Yes, emphasising threats	AI usage should be disclosed according to the faculty's requirements. Ethical use of AI is permitted.
Monash University, Australia	Yes, with restrictions	Has AI emphasising the responsible and ethical use of AI for students, staff and administration.
The University of Chicago	Yes, with restrictions	AI usage is not allowed unless permitted. The university strictly emphasises academic integrity principles.
Tsinghua University	Yes, with restrictions	No formal AI policy yet, but the university accepts the responsible use of AI in education.
University of Sheffield	Yes, with restrictions	Emphasises the use of AI, involving students to participate shaping AI policies and practices
University of Exeter	Yes, with restrictions	Allows to cite AI-generated content as personal communications. Students are required to disclose a list of AI tools and prompts used in academic assignment writing processes.

*Developed by the researcher based on* Harvard University (2025); University of Cambridge (2025); University of Sheffield (2024); Monash University (2025); University of Exeter (2025)

As seen in Table 1, university policies vary across departments and instructions. Almost all international universities encourage the use of Artificial Intelligence in academic processes with the aim of preparing students for an AI-driven future (Chan, 2023). Universities emphasise the importance of incorporating AI in the curriculum across all industries, ensuring students are equipped with technical skills to navigate a fast-evolving and technologically-driven workplace. Notwithstanding the necessity to implement AI in educational practices, universities are working closely to develop clear guidelines and strategies to prevent academic misconduct. Universities have been obliged to stipulate whether AI should be prohibited or allowed. They are advised to establish clear guidelines and procedures to suspect academic dishonesty and AI misuse, outlining consequences for violation (Ding, 2025).

## Current Use of AI at Georgian Universities

There are some attempts to integrate AI into educational practices in Georgia. Ilia State University has been one of the pioneering higher education institutions to respond to the emergence in education. Since 2021, Ilia State University has funded a number of artificial intelligence clubs through the American Embassy's Democracy Commission, with the focus on promoting students' curiosity about experimenting with AI (Ilia State University, 2025). The COVID-19 pandemic also accelerated the necessity of implementing AI to respond to higher education institutions in Georgia. The role of AI has also been highlighted as crucial by the learning and research process; The European Commission's Ethical Guidelines on AI usage have been translated into Georgian and disseminated across all regions. The guidelines emphasise the ethical use of AI and its responsible application in a school setting (EU Neighbours East, 2024).

Despite these tendencies, Higher Educational Institutions (HEIs) lack specific regulations and transparent practices for using AI in educational processes. Georgia's higher education law does not address AI usage in academic processes. Dzidziguri (2024) argues that strategic development, insufficient gap between lecturers and technical limitations prevent resourceful integration in educational settings. In this regard, quality assurance agencies should play a crucial role in regulating the use of artificial intelligence (AI) in the higher education system. Their responsibilities include establishing standards, ensuring ethical practices, evaluating the effectiveness of AI applications and promoting continuous improvement. Furthermore, there is no normative definition of AI, nor legislation related to its ethical use. This makes it problematic to regulate the use of Artificial intelligence in higher education institutions (Dzidziguri, 2024). Although it is acknowledged that AI provides educators and students with the potential to enhance the learning process, its unregulated use can lead to violations of ethical guidelines and other threats. AI policies are in urgent need to be created to emphasize fairness, transparency and responsible use of Artificial Intelligence (Dzidziguri, 2024).

## Research Methodology

The current study took a quantitative research approach to gain numerical data. The rationale behind selecting this methodology lies in its reliability and objectivity. The quantitative method reduces subjectivity and bias in research results and enhances the analysis of numerical data (Colwill et al., 2024). The Google survey, generated by the researcher, was administered to 30 graduating students at one of the private universities in Georgia. The survey aimed to investigate the frequency of AI-assisted platforms for the academic research-writing processes. The participants were also exposed to assessing the benefits of using AI-driven platforms in the academic writing process. A Likert-scale questionnaire focused on the following aspects of AI usage: enhancing understanding of complex issues, generating ideas, finding sources or refining research papers. The last part of the survey asked the participants to evaluate the threats associated with using AI in academic processes. The purpose was to assess participants' awareness of concerns associated with academic integrity. The questionnaire also aimed to assess whether the selected university had an AI policy and principles to guide its thesis writing process.

## Results

The first part of the survey asked the participants to select the most frequently used AI-assisted platforms for academic research. As seen in Table 2, the most commonly used AI

platform is ChatGPT (100%), followed by Grammarly (77%) and Google Gemini (36%). Approximately 17% of the participants selected Elicit, whereas less frequently used platforms are Perplexity (10%), Acrobat AI assistant (10%), Scite.ai (7%), Cause (7%) and Litmaps (3%). None of the participants selected Copilot as an assistive AI platform in their thesis writing process.

**Table 2**

*Types of AI-Assisted Platforms*

<b>AI-assisted platform</b>	<b>%</b>
ChatGPT	100%
Perplexity	10%
Claude	7%
Grammarly	77%
Scite.ai	7%
Elicit	17%
Litmaps	3%
Acrobat AI assistant	10%
Deepseek	13%
Gemini	37%
Copilot	0%

The second part of the survey investigated the frequency of using AI platforms in the academic writing process. As seen in Table 3, the most frequent activities conducted on AI platforms are generating research ideas (37%) and research question formulation assistance (33%). This is also confirmed by the highest mean score (3.87). 50% of the participants always or often use AI tools for summarising literature (#5) and proofreading papers (#8). AI-assisted platforms are also commonly used for narrowing down research topics (30%) and analysing research findings (23%). As regards the frequency of other activities, suggesting methodology was identified as rarely used by 23% of the participants ( $m = 3.20$ ). 17% of the research sample also indicated that they never use AI-assisted platforms for creating references ( $m = 3.47$ ). Moreover, AI-driven platforms are never approached for synthesising literature (10%,  $m = 3.20$ ) and analysing research (3%,  $m = 2.87$ ). The pattern of mean scores (around 3) suggests the average response across all participants is 3 (sometimes) for all the listed activities. This can also be confirmed by the mode, which indicates that the most commonly selected response was 3 (sometimes). Standard deviation illustrates how the responses are spread around the mean score. This number varies between 0.94 and 1.32, indicating the participants' answers varied across all listed options.

**Table 3**  
*Frequency of Using AI-Assisted Platforms*

#	Statement	Always	Often	Some-times	Rarely	Never	mean	Median	mode	St. dev
1	Generating research ideas	13%	37%	43%	7%	0%	3.87	4	3	0.94
2	Suggesting methodologies	10%	20%	37%	23%	10%	3.20	3	3	1.19
3	Drafting research paper structure	20%	27%	33%	13%	7%	3.67	4	3	1.18
4	Creating references	20%	27%	27%	10%	17%	3.47	4	3	1.32
5	Summarising literature	23%	27%	30%	13%	7%	3.53	4	3	1.21
6	Proofreading and editing	27%	23%	33%	13%	3%	3.63	4	3	1.11
7	Narrowing down research topic	30%	30%	33%	7%	0%	3.83	4	3	1.01
8	Research questions formulation	17%	33%	33%	13%	3%	3.47	4	3	1.17
9	Analysing research findings	23%	13%	50%	3%	10%	3.87	4	3	0.94
10	Synthesizing literature	7%	20%	47%	13%	13%	3.20	3	3	1.19

The third part of the survey concerned participants' assessment of the affordances of AI-assisted platforms. They were asked the questions to agree or disagree with the statements, ranging from totally agree = 5, agree = 4, neutral = 3, disagree = 2, totally disagree = 1). As seen from Table 4, all the participants agreed or totally agreed that AI-driven platforms contribute to organising the content of the paper (100%). This can be confirmed by the highest mean score ( $m = 4.43$ ), indicating the participants' responses closer to 5 (totally agree). A similar trend was observed with #8, a significant majority of the participants with regard to managing the academic paper writing process, 96% of them agreeing or totally agreeing, with only 2% remaining neutral. Exactly, half of the participants the AI-assisted platforms accelerate the research paper-writing process and enhance their understanding of complex issues (#2; #3), with 17% remaining neutral with the former and 7% with the latter statement. A small proportion of the participants (3%) did not agree with the statement that AI platforms help them improve the grammar and writing style of their theses (#4; #5). This is also confirmed a considerably lower mean scores for these statements, 3.70 and 3.80, respectively. Surprisingly, apart from 3% of the participants (#6; #7), none of the statements were totally disagreed. As regards other statistics, the median ranges between 4-5, indicating that the most frequently selected answers were agree or totally agree. Most of the mean scores are above 4.00, meaning that answers are closer to totally agree. Unlike the previous table, the standard deviation is below 1 in most cases, indicating a strong similarity in participants' answers.

**Table 4**  
*Benefits of Using AI-Assisted Platforms*

#	Statement	TA	A	N	D	TD	mean	Median	mode	St. dev
1	AI has helped me organise the content of my paper	43%	57%	0%	0%	0%	4.43	5	5	0.59
2	AI has accelerated my research paper writing process	50%	33%	17%	0%	0%	4.17	4	5	0.91
3	AI has enhanced my understanding of complex academic context	50%	40%	7%	3%	0%	4.20	4	5	0.87
4	AI has helped me improve my grammar and writing style	30%	40%	27%	3%	0%	3.70	4	4	1.02
5	AI has helped me finding sources easily	37%	43%	17%	3%	0%	3.80	4	4	0.95
6	AI has helped me generate more ideas	57%	37%	3%	0%	3%	4.40	5	5	0.77
7	I feel more confident when I use AI tools	33%	40%	20%	3%	3%	3.70	4	4	1.06
8	AI has made my academic research paper writing process manageable	43%	53%	3%	0%	0%	4.40	5	5	0.67

The following part of the survey investigated the participants' awareness of limitations associated with the AI usage in the thesis writing process. As seen in Table 5, the majority of the participants (90%) agreed or totally agreed that AI may provide inaccurate information, while only 10 % remained neutral. This can be confirmed by high means core ( $m = 37$ ), indicating a high level of agreement with the given statement (#1). The participants' responses varied on #2. 67% agreed or totally agreed, being uncertain on how to depend on AI, while others remained neutral (17%) or disagreed (13%). A similar trend is observed with #5. The majority of the participants are concerned about accidentally getting involved in academic dishonesty, while 17% of them disagreed. A positive pattern emerged with #7 and #8. A significant majority of the participants (87%) are aware of biased information that AI-generated content may carry, whereas 73% of them agreed or totally agreed that they are aware of data privacy concerns, with 27% remaining neutral. As regards other statistical data, mean scores range between 3.40 and 4.37, indicating that the participants' responses are mostly between neutral and totally agree. Standard deviation, varying between 0.77 and 1.22, indicates that some items have strong agreement, while other statements show variation in responses.

**Table 5**  
*Limitations of Using AI-Assisted Platforms*

#	Statement	TA	A	N	D	TD	mean	Median	mode	St. dev
1	Concerned AI may provide inaccurate information	47%	43%	10%	0%	0%	4.37	5	5	0.78
2	Uncertain how much to rely on AI	30%	37%	17%	13%	3%	3.40	4	4	1.22
3	Question the authorship of AI content	23%	50%	27%	0%	0%	3.90	4	4	0.91
4	Worried AI may violate academic integrity principles	47%	37%	13%	3%	0%	4.17	4	5	0.98
5	May accidentally engage in academic dishonesty	30%	43%	7%	17%	3%	3.60	4	4	1.18
6	Worried AI can create over-reliance	57%	30%	13%	0%	0%	4.37	5	5	0.77
7	Aware AI-generated content may be biased	57%	30%	23%	3%	0%	4.23	4	5	0.85
8	Aware data privacy is not guaranteed when using AI	40%	33%	27%	0%	0%	3.90	4	4	0.95

The participants were also asked to indicate whether clear guidelines on AI usage had been provided by the university. 53% responded negatively to this statement, whereas 47% answered yes. As regards future use of AI in academic writing processes, 87% of the participants think IA-assisted platforms should be used with retractions, whereas 10% believe AI should be used without any restrictions. A tiny fraction of the participants remains uncertain of its use.

## Discussion

The above-discussed statistics indicate that AI-assisted platforms have massively accelerated the research paper writing process (83%). The platforms have also been providing assistance with organising research paper content (100%) and enhanced understanding of complex contexts (90%). Other benefits identified by the participants include finding sources (80%) and providing proofreading and editing help (70%). Positive trends emerged with generating ideas using AI (94%) and building confidence (73%), with an insignificant minority (3%) responding positively to the statement.

Furthermore, AI-assisted platforms have often been used for the following research activities: generating research ideas (37%), drafting research paper structure (37%), narrowing down research topics (30%), research question formulation (33%) and analysing research findings (50%). A rare utilisation of AI-assisted platforms includes the following: suggesting methodologies (23%), summarising literature (13%), Proofreading and editing (13%) and synthesising literature (13%).



As regards the limitations of using AI-assisted platforms, the majority of the participants are concerned with inaccuracy (90%) and bias (87%) that AI-generated content may carry. The issue of authorship was also identified as a threat for the participants (73%), with almost a quarter remaining neutral. The participants are also aware of the violation of academic integrity principles while using AI in the thesis writing process (86%). Only a fifth of the participants (20%) disagreed with getting accidentally involved in academic dishonesty while using the platforms.

### **Conclusion**

The paper employed a quantitative method to investigate 30 university students' attitudes and practices of using AI-assisted platforms in their thesis writing process. The study looked into the benefits of using AI-assisted platforms, such as organising research paper content, enhancing understanding of complex contexts, improving grammar and writing style, finding sources and generating research ideas. Moreover, the participants' positive responses indicated that AI-assisted platforms contribute to building confidence and making the academic paper writing process more manageable. The study also investigated the limitations associated with using AI in research processes. The participants expressed their concerns in relation to inaccuracy and bias in AI-generated content, uncertainty around attributing authorship to AI-generated content, violation of academic integrity principles and over-reliance on AI platforms.

The study further investigated the types of AI-assisted platforms and the frequency of their use. As emerged, ChatGPT was listed as the most commonly used platform (100%), followed by Grammarly (77%), Google Gemini (37%), Elicit (17%), Perplexity (10%), and Acrobat AI Assistant (10%). The least used AI platforms emerged to be Claude (7%) and Litmaps (3%). Copilot received no response from the participants.

It is also worth noting that the university where the research was conducted does not have an AI policy yet, which might have been the reason why clear AI guidelines had not been given to the participants. However, almost all participants expressed the opportunity to use AI with restrictions in their academic writing processes.

### **Recommendations**

Based on the above conclusions, the following recommendations can be drawn: The university should have clear guidelines for using Artificial Intelligence (AI) in academic processes. Since AI has revolutionised academia, universities appear to be at the forefront of this innovation; therefore, it is advisable to implement the ethical use of AI. Moreover, workshops and training sessions should be provided to university students to raise awareness of academic integrity principles and concerns associated with the unethical use of AI.

### **Research Limitations**

The present research has a number of limitations. Firstly, the sample size comprised 30 university graduating students affects the generalizability of the research results to a large audience. The research context was also limited to one university, which again restricts the generalizability of outcomes. However, this small-scale study has revealed invaluable insights into students' practices of using AI-assisted platforms in the thesis writing process. Further

longitudinal research into the issue will provide better insight into the benefits and limitations of using AI-driven platforms in the scientific research writing process.

## References

- Abubakar, U., Falade, A. A., & Ibrahim, H. A. (2024). Redefining student assessment in Nigerian tertiary institutions: The impact of AI technologies on academic performance and developing countermeasures. *Advances in Mobile Learning Educational Research*, 4(2), 1149–1159.
- Abugre, J. B. (2021). Embracing artificial intelligence in Sub-Saharan higher educational institutions. In D. Tsang & H. H. Kazeroony (Eds.), *Management education and automation* (pp. 138-151). Taylor & Francis.
- Akinwalere, S. N., & Ivanov, V. (2022). Artificial intelligence in higher education: Challenges and opportunities. *Border Crossing*, 12(1), 1-15.  
<https://www.doi.org/10.33182/bc.v12i1.2015>
- Anik, M. H., Chowdhury, R. N., & Khan, N. (2023). Embracing AI assistants: Unraveling young researchers' journey with ChatGPT in science education thesis writing. *Research Square*. 1-29, <https://doi.org/10.21203/rs.3.rs-3481002/v1>
- BaHammam, A. S. (2023). Balancing innovation and integrity: The role of AI in research and scientific writing. *Nature and Science of Sleep*, 15, 1153–1156.  
<https://doi.org/10.2147/NSS.S455765>
- Burger, B., Kanbach, D. K., Kraus, S., Breier, M., & Corvello, V. (2023). On the use of AI-based tools like ChatGPT to support management research. *European Journal of Innovation Management*, 26(7), 233–241. <https://doi.org/10.1108/EJIM-02-2023-0156>
- Caulfield, J. (2025, February 21). *University policies on AI writing tools: Overview & list*. Scribbr. <https://www.scribbr.com/ai-tools/chatgpt-university-policies/>
- Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. *International Journal of Educational Technology in Higher Education*, 20(1), 1-25 <https://doi.org/10.1186/s41239-023-00408-3>
- Chubb, J., Cowling, P., & Reed, D. (2022). Speeding up to keep up: Exploring the use of AI in the research process. *AI & Society*, 37(4), 1439–1457.  
<https://doi.org/10.1007/s00146-021-01259-0>
- Colwill, M., Pollok, R., & Poullis, A. (2024). Research surveys and their evolution: Past, current and future uses in healthcare. *World Journal of Methodology*, 14(4).  
<https://doi.org/10.5662/wjm.v14.i4.93559>
- Ding, N. (2025). Ethical considerations in the application of artificial intelligence in education. *International Journal of Education and Humanities*, 19(1), 178–182. ISSN 2770-6702.
- Durham College Library. (2025, May 26). *Artificial Intelligence ethics*.  
<https://guides.library.durhamcollege.ca/c.php?g=732371&p=5262466>

- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koochang, A., Raghavan, V., Ahuja, M., Albanna, H., Albashrawi, M. A., Al-Busaidi, A. S., Balakrishnan, J., Barlette, Y., Basu, S., Bose, I., Brooks, L., Buhalis, D.,...& Wright, R. (2023). Opinion Paper: “So what if ChatGPT wrote it?” Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, 71, 1-63.  
<https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- Dzidziguri, N. (2024, November 14-16). *Universities and the challenges of digital transformation: Experiences from Georgia*. [Paper Presentation]. European Quality Assurance Forum Twente, Netherlands.  
[https://www.eua.eu/images/publications/Conference\\_papers/P2\\_Dzidziguri.pdf](https://www.eua.eu/images/publications/Conference_papers/P2_Dzidziguri.pdf)
- Ersöz, A. R., & Engin, M. (2024). Exploring ethical dilemmas in the use of artificial intelligence in academic writing: Perspectives of researchers. *Journal of Uludag University Faculty of Education*, 37(3), 1190–1208.  
<https://doi.org/10.19171/uefad.1514323>
- EU Neighbours East. (2024, June 19). *EU’s ethical guidelines on the use of AI and data in teaching are now available in Georgian*. <https://euneighbourseast.eu/news/latest-news/eus-ethical-guidelines-on-the-use-of-ai-and-data-in-teaching-are-now-available-in-georgian/>
- Forward Pathway. (2025, March 29). *The rise of AI in higher education: University strategies, ethical considerations, and future prospects – Case studies of UF, CUNY, and UT Austin*. <https://www.forwardpathway.us/the-rise-of-ai-in-higher-education-university-strategies-ethical-considerations-and-future-prospects-case-studies-of-uf-cuny-and-ut-austin>
- Gatrell, C., Muzio, D., Post, C., & Wickert, C. (2024). Here, there and everywhere: On the responsible use of artificial intelligence (AI) in management research and the peer-review process. *Journal of Management Studies*, 61(3), 739–751.  
<https://doi.org/10.1111/joms.13045> [livrepository.liverpool.ac.uk+5](https://livrepository.liverpool.ac.uk+5)
- Harvard University. (2025). *AI learning resources*. Harvard University.  
<https://www.huit.harvard.edu/ai/guidelines>
- Ilia State University. (2025, June 24). *Artificial Intelligence clubs*.  
<https://iliauni.edu.ge/en/iliauni/units/developmentoffice/mimdinare-proeqtebi/amerikis-saelchos-grantebi/artificial-intelligence-clubs.page>
- Khatri, B. B., & Karki, P. D. (2023). Artificial intelligence (AI) in higher education: Growing academic integrity and ethical concerns. *Nepalese Journal of Development and Rural Studies*, 20(1), 1-7. <https://doi.org/10.3126/njdrs.v20i01.64134>
- Kohnke, S., & Zaugg, T. (2025). Artificial Intelligence: An untapped opportunity for equity and access in STEM education. *Education Sciences*, 15(1), 68-94.  
<https://doi.org/10.3390/educsci15010068>

- Kotsis, K. (2024). Artificial Intelligence creates plagiarism or academic research? *European Journal of Arts, Humanities and Social Sciences*, 1(6), 169-179.  
DOI:10.59324/ejahss.2024.1(6).18
- Perkins, M., & Roe, J. (2023). Academic publisher guidelines on AI usage: A ChatGPT-supported thematic analysis. *F1000Research*, 12, 1-34.  
<https://doi.org/10.12688/f1000research.142411.1>
- Pigola, A., Scafuto, I. C., Costa, P. R. C., & Nassif, V. M. J. (2023). Artificial Intelligence in academic research. *International Journal of Innovation – IJI*, 11(3), 1-9,  
<https://doi.org/10.5585/2023.24508>
- Pinzolit, R. (2023). AI in academia: An overview of selected tools and their areas of application. *MAP Education and Humanities*, 4, 37-50.  
<https://doi.org/10.53880/2744-2373.2023.4.37>
- Ratih, M. C., & Kastuhandani, F. C. (2024). Students' lived experiences in utilizing artificial intelligence for thesis writing. *NUSRA: Jurnal Penelitian dan Ilmu Pendidikan*, 5(2), 760–769.
- University of Cambridge. (2025). *Generative AI and education*. Blended Learning Service.  
<https://blendedlearning.cam.ac.uk/artificial-intelligence-and-education/generative-ai-and-education>
- University of Exeter. (2025). *Referencing generative AI*.  
<https://libguides.exeter.ac.uk/referencing/generativeai>
- University of Michigan. (2025). *The ethics of artificial intelligence*. UM Research.  
<https://research.umich.edu/news-and-issues/michigan-research/ethics-of-artificial-intelligence/>
- University of Oxford. (2005). *Use of generative AI tools to support learning*.  
<https://www.ox.ac.uk/students/academic/guidance/skills/ai-study>
- University of Sheffield. (2024, June 21). *Principles for generative AI in learning and teaching*. <https://www.sheffield.ac.uk/saas/elevate/ai-principles>
- Wirzal, M. D. H., Md Nordin, N. A. H., Abd Halim, N. S., & Bustam, M. A. (2024). Generative AI in science education: A learning revolution or a threat to academic integrity? A bibliometric analysis. *Jurnal Penelitian dan Pengkajian Ilmu Pendidikan: e-Saintika*, 8(3), 319–351.
- Zyoud, M. M., Bsharat, T. R. K., & Dweikat, K. A. (2024). Quantitative research methods: Maximizing benefits, addressing limitations, and advancing methodological frontiers. *ISRG Journal of Multidisciplinary Studies*, 2(4), 11–14.  
<https://isrgpublishers.com/isrgjms/>

**Contact email:** npachuashvili@ibsu.edu.ge



## **Procrastination Among University Students in Singapore: Its Relationships With Time Management and Emotional Regulation**

Mo Chen, University of Saint Joseph (Macao), Macao SAR, China

Jia Min Chung, NUS High School, Singapore

Jeong Won Mun, Nanyang Junior College, Singapore

The Paris Conference on Education 2025

Official Conference Proceedings

### **Abstract**

Procrastination is consistently viewed as problematic to academic success and students' general well-being. There are prevailing questions regarding the underlying and maintaining mechanisms of procrastination, which are yet to be learned. The present research study examines the status of procrastination among university students in Singapore and its relationships with time management and emotional regulation. A total of 105 participants completed our survey mainly containing two scales – the *Pure Procrastination Scale* (PPS) with a total of 12 items, as well as the *Assessment of Time Management Skills* (ATMS) with a total of 11 items in the time management subscale and 5 items in the regulation of emotion subscale. The results of our survey suggest that there is a negative relationship between procrastination and time management, as well as a negative relationship between procrastination and emotional regulation. Students with a disability tend to significantly procrastinate more than students without a disability. Procrastination levels were also reported to not have changed before, during, and after the COVID-19 pandemic, implying that online courses can be deployed without much concern for students' procrastination levels.

*Keywords:* procrastination, academic procrastination, time management, emotion regulation, university students

**iafor**

The International Academic Forum

[www.iafor.org](http://www.iafor.org)

## Introduction

In the field of psychology, procrastination is often defined as the voluntary delay of an important activity, despite being aware of the negative consequences that will result from the delay. Sometimes, people do not necessarily procrastinate because they are lazy (Johnson, 2021). Procrastination is typically understood as an issue of self-regulation or time management (Wolters et al., 2017). Time management is defined as “a form of decision making used by individuals to structure, protect, and adapt their time to changing conditions” (Aeon & Aguinis, 2017, p. 311). Simply put, it is a cluster of skills that aid one’s ability to plan the hours in a day and organise one’s workload.

Neuroscientists pointed out that procrastination has roots in our evolutionary development, with two key parts of the brain vying for control. Specifically, procrastination is a battle between an ancient part of the brain called the limbic system and a relatively younger part known as the prefrontal cortex. The limbic system is a set of brain structures containing the pleasure centre, while the prefrontal cortex controls planning and decision making. The prefrontal cortex is less developed and thus weaker, so oftentimes the limbic system wins out, leading to procrastination (Neurosurgery, 2018). Hence, it is proposed that procrastination can also be understood as an emotion-focused coping strategy, and procrastination should be interpreted as an emotion management problem or emotional regulation problem, instead of a time management problem (Johnson, 2021).

No matter whether procrastination is a time management problem or an emotional regulation problem, importantly, the student population is especially prone to procrastination, with an estimated prevalence of 50–95% (Steel, 2007). This is no exception for university students. Past research has shown that academic procrastination is very common among university students — almost all occasionally procrastinate in their studies (Rothblum et al., 1986; Steel, 2007). According to the American Psychological Association (APA), approximately 80% to 95% of university students succumb to procrastination when completing their coursework. Approximately 30% to 60% of undergraduate students report regular postponement of educational tasks including studying for exams, writing term papers, and reading weekly assignments, to the point at which optimal performance becomes highly unlikely (Ellis & Knaus, 1977; Pychyl et al., 2000). Therefore, this study aims to investigate university students’ procrastination tendency, as well as its relationship with time management skills and emotional regulation skills, in the Singapore context, a country well-known for its emphasis on meritocracy in education.

## Evidence on Procrastination Among University Students

By far, there are over ten self-report measures of procrastination that have been psychometrically validated, such as the Pure Procrastination Scale (PPS; Steel, 2010). Research found that procrastination can be related to several factors. Firstly, results show that procrastination behaviour is more commonly found in male students than females (Balkis & Duru, 2017). Procrastination was also reported to be most prevalent among the youngest cohort, ages 14 to 29 (Beutel et al., 2016). Cases of severe procrastination, as determined using the PPS, are characterised by higher levels of anxiety, depression, and stress than the less severe cases (Johansson et al., 2023). Data also indicates that inattention is correlated with procrastination (Niermann & Scheres, 2014). Many adults with attention-deficit/hyperactivity disorder (ADHD) struggle with chronic procrastination (Ferrari & Sanders, 2006).



The relationship between procrastination and self-esteem as well as self-efficacy was revealed among students. It is assumed that procrastination is related to low self-esteem, either as a determinant or a consequence. Self-esteem describes a person's overall subjective sense of personal worth or value regardless of the circumstances (Hajloo, 2014). The relationship between procrastination and self-esteem has received considerable attention in the procrastination literature. Procrastination has been described as a self-protective strategy that masks fragile self-esteem, and numerous studies have found a significant inverse relationship between self-report procrastination and self-esteem (Hajloo, 2014).

In particular, a previous study examined the issue of procrastination among university students in Singapore and in Canada (Klassen et al., 2010). A total of 1,145 university students from Canada and Singapore participated in the study. Sub-study 1 involved 418 participants and used the Tuckman's 16-item procrastination measure as well as two components of the Motivated Strategies for Learning Questionnaire (Pintrich et al., 1993), which includes five items from the MSLQ Self-Efficacy for Learning and Performance scale. Relationships between procrastination and motivation variables were found to be similar across the two country contexts, with self-efficacy for self-regulated learning being most negatively associated with procrastination in both contexts. In sub-study 2, 389 participants from Canada and 337 from Singapore completed six measures assessing various behaviours associated with procrastination. First, participants rated their daily procrastination. Second, participants completed a descriptive measure (adapted from Ferrari & Scher, 2000) of five avoidance tasks (i.e., reading tasks, writing tasks, studying tasks, research tasks, and talking with the instructor) that engendered procrastination. Third, participants rated the frequency of 14 replacement activities they engaged in when they perceived themselves to be procrastinating. Fourth, participants rated the negative impact of procrastination with four response options: "Not at all", "Not too much", "Quite a lot", and "Very much." Fifth, participants completed a three-item, 7-point procrastination scale (Ackerman & Gross, 2005) that showed acceptable reliability in both contexts. Sixth, participants completed the self-efficacy for self-regulated learning scale (Zimmerman et al., 1992) used in Study 1. Patterns of procrastinating behaviour and the negative impact of procrastination were examined and compared between Canadian and Singaporean undergraduates. Participants in both contexts reported writing to be the academic task most prone to procrastination. More Singaporeans than Canadians were classified as negative procrastinators (i.e., they rated procrastination as a negative influence on academic functioning). In both contexts, negative procrastinators spent more time procrastinating than neutral procrastinators (i.e., they tend to waste more time on other, more appealing tasks than the important tasks they have to settle) and displayed lower self-efficacy for self-regulated learning. However, the study did not measure the link between negative procrastination and self-esteem; it suggests that future research might examine the direction and intensity of the association between self-esteem and negative procrastination.

## **Background and Purpose of the Current Study**

Singapore's population size is approximately 5.9 million as of 2022 and it lies about one degree of latitude north of the equator. There are currently 34 universities in Singapore, of which six are nationally publicly funded. During the lockdown due to SARS-CoV-2 (coronavirus lockdown), from April 2020 to June 2020, there has been a tremendous increase in the number of students taking online courses. As a result of some level of autonomy offered in online courses, students need to exert a higher level of self-control in their online actions, for example, to overcome learner isolation and less spontaneous online interaction which can cause procrastination in distance learning (Pychyl, 2011).

After the Covid-19 pandemic was declared, several countries adopted strict restrictions that abruptly shifted the average citizen's daily activities to remote settings. These changes in daily routines provoked large amounts of emotional distress (Xiong et al., 2020), which were also amplified by the uncertainty of living in a pandemic (Holmes et al., 2020). If you're fuelled by anxiety, you may feel that you are inadequate, incapable, or a failure. To deal with these stressful situations people often ended up procrastinating in fear of a negative or unknown outcome (McLean Hospital, 2022). The pandemic has caused increased stress, anxiety, and depression, which could lead to more individuals suffering from those underlying conditions, and lead to more procrastination. Hence, it is important and relevant to examine this issue, especially during this period of transitioning into the post-pandemic. The data collection of this study started around mid-September 2022. During this period of time, Singapore was at a transition state where it opened up its economy and social activities resumed. This was also the period where COVID measures were relaxed, and masks only had to be worn on public transport and healthcare facilities. To fill in the research gap described above, our study is aimed to examine the status of procrastination amongst university students in Singapore, as well as its relationship with some other variables (e.g., time management, emotional regulation).

Our research questions and hypotheses for this study are as follows:

RQ1: Is there a negative correlation between procrastination and time management skills?

*Hypothesis:* Procrastination has a negative relationship with time management skills. Managing time effectively can help one feel that they are in control of their workload, thus increasing productivity and improving confidence. As a result, one would feel less inclined to procrastinate. Past research has found that there is a statistically significant, negative correlation (of moderate strength) between procrastination and time management (Ocak & Boyraz, 2016).

RQ2: Is there a negative correlation between procrastination and emotional regulation skills?

*Hypothesis:* Procrastination has a negative relationship with emotional regulation skills. Difficulty in emotion regulation, especially the ones' belief about their ability in regulating unpleasant emotions effectively, is important in procrastination (Bytamar et al., 2020). When procrastinators are faced with tasks or situations that are seen as difficult or aversive, they prefer to regulate the negative emotions of the task immediately instead of pursuing their goals. In other words, rather than using adaptive emotion regulation strategies, they use procrastination as a way of regulating their emotions. As such, those with poorer emotion regulation are hypothesised to be more likely to succumb to procrastination.

RQ3: Does procrastination differ by certain demographic variables (e.g., gender, major, the presence of special educational needs) among university students in Singapore?

*Hypotheses:* 1) Female students have lower levels of procrastination than male students. A study has shown that female students reported lower levels of academic procrastination as compared to their male counterparts (Balkis & Duru, 2017).

- 2) STEM and non-STEM students could have different levels of procrastination. In one prior study, the comparison of the degree of procrastination among different high school sections revealed that students who procrastinated most were those enrolled in the Technology section, followed by the Arts, the Social Sciences, the Humanities, and finally, those who procrastinated the least were those enrolled in the Science section (Romero, 2013).
- 3) University students with special education needs have a higher tendency to procrastinate. Students with learning disabilities often exhibit high levels of learned helplessness, including diminished persistence. Also, these students were reported to have lower self-report emotional intelligence and self-efficacy. Previous studies found that they reported higher procrastination (Pychyl, 2014).

RQ4: Do students' procrastination differ at different stages of the pandemic (i.e., before the start of the pandemic when it was mostly face-to-face learning, during the pandemic when it was mostly online learning, and after the pandemic when it was mostly face-to-face learning again)?

*Hypothesis:* Students' procrastination differs at different stages of the pandemic. A study has shown that students have reported low engagement and participation in online classes, as compared to physical classes. This finding is attributed to the fact that online learning during the COVID-19 pandemic has negatively impacted procrastinators with regards to their desire to study (Melgaard et al., 2022), heightening their level of procrastination. As such, between the two time periods, students would have most likely shown greater levels of procrastination during the pandemic as compared to before the start of the pandemic. However, based on the existing evidence, it is difficult to make a hypothesis regarding how students' procrastination might have differed after the pandemic when it was mostly face-to-face learning again.

## **Method**

Ethical approval was obtained from the National Technological University Institutional Review Board prior to the commencement of this study (IRB-2022-305). Participants' consent was obtained prior to the start of the survey.

## **Participants**

The target participant pool for our research was students currently studying in local universities. The participants of our survey had to meet the following criteria at the time of the study: 1) have stayed in Singapore for 1 year, 2) are currently staying in Singapore, and 3) are currently full-time students in one of the universities in Singapore. Responses from 228 students across the universities in Singapore were collected over the span of 2 months from October to November 2022. After removing incomplete responses, 105 student responses were included in the analysis. No incentives were provided for participants, and they participated in the study purely on a voluntary basis.

## Research Design

This study adopted a cross-sectional survey design.

### Survey

The survey was designed to evaluate each participant's level of procrastination, time management ability, and emotional regulation ability. To do so respectively, the survey comprised the 12-item PPS (Steel, 2010), the 11-item Time Management (TM) subscale of the Assessment of Time Management Skills (ATMS; White et al., 2013), and the 5-item Regulation of Emotion (ER) subscale of the ATMS. The PPS is a 5-point rating scale, with a total score ranging from 12 to 60 (a higher score indicating a higher tendency to procrastinate). The ATMS is a 4-point rating scale. For the TM subscale, the possible total score ranges from 11 to 44 with a higher score indicating better time management skills; for the ER subscale, the possible total score ranges from 5 to 20 with a higher score indicating better emotional regulation skills. The survey also included three COVID-19 specific procrastination items. In addition, the survey contained seven demographic items, asking respondents' age, sex, ethnicity, diagnosed disabilities (if any), university, university major, and year of study. Finally, there was an item to ask if the participant procrastinated to sleep last night or not.

### Procedures

The survey was disseminated to participants through the following methods: 1) uploading the details of the survey as well as the survey link and QR code on social media platforms such as Telegram, Discord, Reddit, and Instagram, 2) sending emails to all six autonomous universities in Singapore, 3) sending emails to specific departments of selected universities, namely National University of Singapore (NUS) Psychology department, Nanyang Technological University (NTU) Psychology department, NTU sociology as well as Singapore Management University (SMU) Social Sciences department since these departments were considered as being more prone to help with the dissemination of the survey.

### Data Analysis

Six reversely worded items on the ATMS were reversely coded. Afterwards, the total scores for each of the three measures (i.e., PPS, TM, and ER), as well as the descriptive analyses for each item on these measures, were calculated. To supplement the validity of the reported procrastination, we performed an independent samples *t*-test to compare the PPS scores of participants who procrastinated to sleep the night before, as compared to those who did not. To answer RQ1, a Pearson Correlation Coefficient was computed to assess the linear relationship between the participants' scores on the PPS scale and on the TM scale. To answer RQ2, a Pearson Correlation Coefficient was computed to assess the linear relationship between the participants' scores on the PPS scale and on the ER scale. To answer RQ3, independent samples *t*-tests were performed to compare the means of PPS scores of different demographic groups. To answer RQ4, a one-way ANOVA was conducted to compare the procrastination levels of students before the outbreak of COVID-19 (when there were mostly face-to-face courses), after the outbreak of COVID-19 (when there were mostly online courses), and after the outbreak of COVID-19 (when there were mostly face-to-face courses again).

## Results

### Description of the Participants

Regarding the affiliated universities, the largest group of participants were from NTU ( $N = 44$ , 41.9%), followed by NUS ( $N = 29$ , 27.6%), Singapore Institute of Technology ( $N = 12$ , 11.4%), Singapore University of Technology and Design ( $N = 5$ , 4.8%), SMU ( $N = 4$ , 3.8%) and Singapore University of Social Sciences ( $N = 3$ , 2.9%). There were eight participants (7.6%) indicating they were from other universities. More females ( $N = 58$ , 55.2%) participated in the survey than males ( $N = 43$ , 41.0%), with four (3.8%) indicating a preference of not to say or indicating as others. Majority of the participants were Chinese ( $N = 83$ , 79.0%) followed by Malays ( $N = 8$ , 7.6%), Indians ( $N = 6$ , 5.7%), Others ( $N = 5$ , 4.8%), and Eurasians ( $N = 3$ , 2.9%). Studying the ethnic mix of the Singaporean population, as of June 2022, the percentages of Chinese, Malay, Indian and other races were 75.7%, 15.2%, 7.5%, and 1.6% respectively (Singapore Department of Statistics et al., 2022). This data shows that our study generally represents the ethnic composition in Singapore, though there seems to be an over-representation of the Chinese and Eurasian populations, and an under-representation of the Malay and Indian populations.

Most of the participants were generally on the younger end, aged 21-25 ( $N = 95$ , 90.5%) and a smaller portion belonged to the age groups 26-30 ( $N = 8$ , 7.6%) and 31-35 ( $N = 2$ , 1.9%). The mean age and standard deviation are 22.7 and 2.3 respectively. There were 33 Year 1 students (31.4%), 20 Year 2 students (19.0%), 27 Year 3 students (25.7%), 17 Year 4 students (16.2%), one Year 5 student (1.0%), six Master students (5.7%), and one doctoral student (1.0%). Seventy (66.7%) were from STEM majors while 35 (33.3%) were from non-STEM majors.

Among the 105 participants, a small fraction of them indicated that they had diagnosed physical, mental disabilities, or special education needs (i.e., Dyslexia, ADHD, Asperger's syndrome, Depression, Hearing Loss, Anxiety Disorder, or Autism) ( $N = 17$ , 16.2%), whereas the rest ( $N = 88$ , 83.8%) indicated they did not have a disability. Lastly, seventy-three (69.5%) participants indicated they procrastinated to sleep last night while 32 (30.5%) indicated they did not.

### Descriptive Results of the Measures

In general, on the PPS scale, the mean and standard deviation of the total score for each participant were 37.9 and 11.4, respectively. On the TM subscale, the mean and standard deviation of the total score for each participant were 28.2 and 4.6, respectively. On the ER subscale, the mean and standard deviation of the total score for each participant were 12.1 and 4.3, respectively. In addition, there was a statistically significant difference on PPS scores in students who reported having procrastinated to sleep the night before ( $M = 39.77$ ,  $SD = 10.68$ ) compared to those who did not ( $M = 32.28$ ,  $SD = 11.31$ );  $t(103) = 3.25$ ,  $p = .0016$ . This result provides additional validity evidence for the PPS scale in assessing the participants' procrastination levels.

### Relationship Between Procrastination and Time Management

Consistent with our hypothesis, the procrastination levels and time management skills were found to be significantly negatively correlated,  $r(103) = -.75$ ,  $p < .00001$ . The Pearson

correlation indicates a large-size magnitude of the relationship between these two variables. This result meant that university students who had better time management skills tended to have a lower tendency to procrastinate, or students who had a higher tendency to procrastinate tended to have worse time management skills.

### **Relationship Between Procrastination and Emotional Regulation**

Consistent with our hypothesis, the procrastination levels and emotional regulation skills were found to be strongly negatively correlated,  $r(103) = -.48$ ,  $p < .00001$ . The Pearson correlation indicates a moderate-size magnitude of the relationship between these two variables. This result meant that university students who had better emotional regulation skills tended to have a lower tendency to procrastinate, or students who had a higher tendency to procrastinate tended to have worse emotional regulation skills.

### **Procrastination in Relation to Key Demographic Variables**

Contrary to our hypothesis, there was no statistically significant difference between the PPS scores in females ( $M = 37.38$ ,  $SD = 9.95$ ) and in males ( $M = 38.95$ ,  $SD = 13.84$ );  $t(101) = 0.67$ ,  $p = .50$ . This result implies that there is no significant difference between the procrastination levels in female and male university students in the current study.

Different from our hypothesis, there was no statistically significant difference between the PPS scores in STEM students ( $M = 38.12$ ,  $SD = 11.70$ ) and the scores in non-STEM students ( $M = 37.06$ ,  $SD = 11.02$ );  $t(103) = 0.45$ ,  $p = .66$ . This result implies that there is no significant difference between the procrastination levels in STEM and non-STEM students.

In accordance with our hypothesis, there was a statistically significant difference between the PPS scores of students with a disability ( $M = 45.12$ ,  $SD = 13.96$ ) and the scores of those without a disability ( $M = 36.46$ ,  $SD = 10.41$ );  $t(103) = 2.96$ ,  $p = .004$ . This result implies that students with a disability reported higher procrastination levels than students without a disability.

### **Procrastination at Different Time Points of the COVID-19 Pandemic**

Contrary to our hypothesis, there was no statistically significant difference for the procrastination levels across the three time points of the COVID-19 pandemic,  $F(2, 312) = 1.09$ ,  $p = .34$ .

## **Discussion**

The finding of a negative relationship of a strong strength between procrastination and time management in this study is consistent with a previous study conducted by Ocak and Boyraz (2016), where it was found that there was a statistically significant and moderate level of a negative relation between academic procrastination and time management. As a result, students with higher time management skills might be expected to show less tendency towards academic procrastination. The finding of a negative relationship of a moderate strength between procrastination and emotional regulation is once again consistent with a previous study conducted by Jobaneh et al. (2016). Their study found that emotion regulation could negatively and significantly predict by around 18 percent of the variance of procrastination scores among university students. This result goes to show that emotional

regulation is a factor affecting procrastination, and with better emotional regulation skills, students could be less likely to fall into the traps of academic procrastination. As such, the results of our current study imply that time management and emotional regulation skills are crucial and the education systems in Singapore should include more support to equip students with both skills, so as to lower the procrastination levels among students. In addition, a relatively stronger correlation was found in our sample between procrastination and time management, compared to the relation between procrastination and emotional regulation, which has not been reported in prior literature. The finding suggests that university students who procrastinate may have a higher tendency to do so due to their lack of time management skills than their lack of emotional regulation skills. It has been much debated whether procrastination should be interpreted as a time management problem or an emotional regulation problem (Johnson, 2021; Wolters et al., 2017). The findings of our study show that procrastination could be more strongly associated with time management issues.

The procrastination level did not differ between the two sexes in this study, which does not support the finding by Balkis and Duru (2017) that female students reported lower levels of academic procrastination as compared to their male counterparts. According to the World Economic Forum's Global Gender Gap Report (2022), Turkey ranks 101st in educational attainment for women while Singapore ranks 65th. Hence Singapore could have greater gender equality in education which helps explain the current study's finding that procrastination level did not differ between the two sexes. In other words, culture in relation to gender equality may be a broader factor that could influence the gender differences in terms of procrastination.

This study also found that there is no significant difference in procrastination levels between students majoring in STEM majors and those majoring in non-STEM ones. This is not quite in line with existing literature that suggests that amongst high school students, while those studying Technology procrastinate the most, those studying Science procrastinate the least (Romero, 2013). The sample difference (i.e., university vs. high school students) might help explain these different findings. This finding from our study could debunk any misleading stereotypes that non-STEM majors are less hardworking (Kennedy et al., 2020), and thus hopefully improve Singaporeans' perceptions of non-STEM majors.

Importantly, this study found that students with a disability procrastinate significantly more than students who do not have a disability. This finding is in accordance with existing literature that has shown how disabilities result in learned helplessness (Kumar et al., 2022; Pychyl, 2014), which often results in greater academic procrastination (Prihadi et al., 2018). As such, educational staff should be aware to better cater to university students with a disability or special education needs (e.g., an extension of deadlines, more guidance in their work). More research can be done to understand how curriculum can be modified to help those with a disability so that they are not disadvantaged compared to their counterparts due to their higher tendency of procrastination.

Interestingly, this study found that there is no significant difference in procrastination levels at three time points related to COVID-19, with respect to the differences in the proportion of online and face-to-face courses. This finding would imply that online courses could be employed without concern for students' procrastination levels. However, existing literature claims that online learning during the COVID-19 pandemic has reduced students' willpower to study, thus resulting in an increase in procrastination levels (Melgaard et al., 2022). This discrepancy could be due to the fact that the scale we deployed to measure COVID-19

procrastination levels only comprised one item for each time point and relied on each participant's potentially biased assessment of their own procrastination level. It is also plausible that it is difficult for participants to retrospectively rate their procrastination level accurately.

### **Limitations and Future Research Directions**

As a whole, this study has succeeded in surveying university students in Singapore to learn more about their procrastination levels. However, the results of this study may be biased due to participant selection bias, as the survey was largely spread through social media alone. As such, participants of the survey would tend to be students that spend more time on social media. Past studies have shown that students who spend more time on social media tend to have higher academic procrastination levels (Muslikah & Andriyani, 2018). Future research can reach out to more students through other methods (e.g., distributing flyers, pasting posters, hardcopy survey forms, etc.) to prevent or minimize such bias. Secondly, the study was cross-sectional with data collected at one time only, which only provides correlational findings. Longitudinal cross-lagged studies could be conducted in the future to further explore the potential causal relationships among potential time management skills, emotional regulation skills, and procrastination. Thirdly, the procrastination data collected in the study were all based on students' self-report. Future research could consider taking more objective data (e.g., asking students to record the occurrence or non-occurrence of their procrastination on important academic and life activities within a certain time period). Last but not least, we investigated and interpreted the 'procrastination' from a more negative perspective in this study, whereas future research could also probe into neutral procrastination as explored in Klassen et al. (2010).

### **Conclusion**

In this study, we have gained some insight into the procrastination levels, time management skills, and emotional regulation skills among the university students in Singapore. Alongside with some interesting findings, our study poses more questions for future research and practice, e.g., the issue of procrastination among university students with diagnosed disabilities or special educational needs, including those who are troubled by mental health issues (e.g., depression, anxiety, etc.), which are considered as 'diagnosed disabilities' in the current study. With this, the higher education systems in Singapore may become more increasingly inclusive with greater sensitivity to all students' individual needs, as the higher education in Singapore is embracing hybrid learning.

### **Acknowledgements**

We would like to express our gratitude to Research Assistant Mr Tan Han Wei Ken and Research Associate Mr Tan Puay Yon Clarence for their generous assistance in guiding us in participant recruitment. We would also like to thank the second and third authors' internal Teacher-Mentor, Dr Chiam Sher-Yi, for his support and feedback, as well as their individual school Teacher Coordinators, Dr Julien J. P. Maury and Mr Goh Kien Soon, for their guidance. We would also like to sincerely thank all survey respondents for participating in our questionnaire, with special thanks to those who have selflessly helped in disseminating our survey to more students.



## References

- Ackerman, D. S., & Gross, B. L. (2005). My instructor made me do it: Task characteristics of procrastination. *Journal of Marketing Education*, 27(1), 5–13.  
<https://doi.org/10.1177/0273475304273842>
- Aeon, B., & Aguinis, H. (2017). It's about time: New perspectives and insights on time management. *Academy of Management Perspectives*, 31(4), 309–330.  
<https://doi.org/10.5465/amp.2016.0166>
- Balkis, M., & Duru, E. (2017). Gender differences in the relationship between academic procrastination, satisfaction with academic life and academic performance. *Electronic Journal of Research in Educational Psychology*, 15(1), 105–125.  
<https://doi.org/10.14204/ejrep.41.16042>
- Beutel, M. E., Klein, E. M., Aufenanger, S., Brähler, E., Dreier, M., Müller, K. W., Quiring, O., Reinecke, L., Schmutzer, G., Stark, B., & Wölfling, K. (2016). *Procrastination, distress and life satisfaction across the age range – A German representative community study*. PLOS ONE, 11(2), e0148054.  
<https://doi.org/10.1371/journal.pone.0148054>
- Bytamar, M. J., Saed, O., & Khakpoor, S. (2020). Emotion regulation difficulties and academic procrastination. *Frontiers in Psychology*, 11, 524588.  
<https://doi.org/10.3389/fpsyg.2020.524588>
- Ellis, A., & Knaus, W. J. (1977). *Overcoming procrastination*. Institute for Rational Living.
- Ferrari, J. R., & Sanders, S. E. (2006). Procrastination rates among adults with and without AD/HD: A pilot study. *Counseling and Clinical Psychology Journal*, 3(1), 2.
- Ferrari, J. R., & Scher, S. J. (2000). Toward an understanding of academic and nonacademic tasks procrastinated by students: The use of daily logs. *Psychology in the Schools*, 37(4), 359–366. [https://doi.org/10.1002/1520-6807\(200007\)37:4<367::AID-PITS7>3.0.CO;2-Y](https://doi.org/10.1002/1520-6807(200007)37:4<367::AID-PITS7>3.0.CO;2-Y)
- Hajloo, N. (2014). Relationships between self-efficacy, self-esteem and procrastination in undergraduate psychology students. *Iranian Journal of Psychiatry and Behavioral Sciences*, 8(3), 42–49.
- Holmes, E. A., O'Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., Ballard, C., Christensen, H., Cohen Silver, R., Everall, I., Ford, T., John, A., Kabir, T., King, K., Madan, I., Michie, S., Przybylski, A. K., Shafran, R., Sweeney, A., Worthman, C. M., ... Bullmore, E. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet. Psychiatry*, 7(6), 547–560. [https://doi.org/10.1016/S2215-0366\(20\)30168-1](https://doi.org/10.1016/S2215-0366(20)30168-1)
- Jobaneh, R.G., Mousavi, S.V., Zanipoor, A., & Seddigh, M. (2016). The relationship between mindfulness and emotion regulation with academic procrastination of students. *Education Strategies in Medical Sciences*, 9, 134–141.

- Johansson, F., Rozental, A., Edlund, K., Côté, P., Sundberg, T., Onell, C., Rudman, A., & Skillgate, E. (2023). Associations between procrastination and subsequent health outcomes among university students in Sweden. *JAMA Network Open*, 6(1), e2249346. <https://doi.org/10.1001/jamanetworkopen.2022.49346>
- Johnson, N. (2021, March 3). *Are you procrastinating more? Blame the pandemic*. National Geographic. <https://www.nationalgeographic.com/science/article/are-you-procrastinating-more-blame-the-pandemic>
- Kennedy, B., Hefferon, M., & Funk, C. (2020, August 21). *Half of Americans think young people don't pursue STEM because it is too hard*. Pew Research Center. <https://www.pewresearch.org/fact-tank/2018/01/17/half-of-americans-think-young-people-dont-pursue-stem-because-it-is-too-hard/>
- Klassen, R. M., Ang, R. P., Chong, W. H., Krawchuk, L. L., Huan, V. S., Wong, I. Y.F., & Yeo, L. S. (2010). Academic procrastination in two settings: Motivation correlates, behavioral patterns, and negative impact of procrastination in Canada and Singapore. *Applied Psychology: An International Review*, 59(3), 361–379. <https://doi.org/10.1111/j.1464-0597.2009.00394.x>
- Kumar, P., Rathee, S., & Sunita, S. K. (2022). Learned helplessness among persons with disabilities: Concept, causes and developing self-defense Skills. *Comprehensive Textbook on Disability; Chavan, BS, Wasim, A., Kumari, GR, Eds.*
- McLean Hospital. (2022, December 4). *The Real Reason You're Procrastinating*. <https://www.mcleanhospital.org/essential/procrastination>
- Melgaard, J., Monir, R., Lasrado, L. A., & Fagerstrøm, A. (2022). Academic procrastination and online learning during the COVID-19 pandemic. *Procedia Computer Science*, 196, 117–124.
- Muslikah, M., & Andriyani, A. (2018). Social media user students' academic procrastination. *Psikopedagogia Jurnal Bimbingan Dan Konseling*, 7(2), 53–57.
- Neurosurgery. (2018, August 29). *The Science Behind Procrastination*. UPMC HealthBeat. <https://share.upmc.com/2015/07/the-science-behind-procrastination/>
- Niermann, H. C., & Scheres, A. (2014). The relation between procrastination and symptoms of attention-deficit hyperactivity disorder (ADHD) in undergraduate students. *International Journal of Methods in Psychiatric Research*, 23(4), 411–421. <https://doi.org/10.1002/mpr.1440>
- Ocak, G., & Boyraz, S. (2016). Examination of the relation between academic procrastination and time management skills of undergraduate students in terms of some variables. *Journal of Education and Training Studies*, 4(5). <https://doi.org/10.11114/jets.v4i5.1313>

- Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement*, 53(3), 801–813. <https://doi.org/10.1177/0013164493053003024>
- Prihadi, K., Tan, C. Y., Tan, R. T., Ling Yong, P., Yong, J. H., Tinagaran, S., & Yeow, J. L. (2018). Procrastination and learned-helplessness among university students: The mediation effect of internal locus of control. *Electronic Journal of Research in Education Psychology*, 16(46), 579–595. <https://doi.org/10.25115/ejrep.v16i46.2236>
- Pychyl, T. A. (2011). *Procrastination and performance in online learning*. <https://www.psychologytoday.com/us/blog/dont-delay/201107/procrastination-and-performance-in-online-learning>
- Pychyl, T. A. (2014). *Learning disabilities and academic procrastination*. <https://www.psychologytoday.com/intl/blog/dont-delay/201403/learning-disabilities-and-academic-procrastination>
- Pychyl, T. A., Lee, J. M., Thibodeau, R., & Blunt, A. (2000). Five days of emotion: An experience sampling study of undergraduate student procrastination. *Journal of Social Behavior and Personality*, 15(5), 239–254. <http://psycnet.apa.org/psycinfo/2002-10572-019>
- Romero, M. (2013). Comparing procrastination in arts, sciences, technology, social sciences and humanities high school students. *EDULEARN13 Proceedings*, 3465. <https://library.iated.org/view/ROMERO2013COM>
- Rothblum, E. D., Solomon, L. J., & Murakami, J. (1986). Affective, cognitive, and behavioral differences between high and low procrastinators. *Journal of Counseling Psychology*, 33(4), 387–394. <https://doi.org/10.1037/0022-0167.33.4.387>
- Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin*, 133(1), 65–94. <https://doi.org/10.1037/0033-2909.133.1.65>
- Steel, P. (2010). *Pure Procrastination Scale*. PsycTESTS Dataset. <https://doi.org/10.1037/t10499-000>
- White, S. M., Riley, A., & Flom, P. (2013). Assessment of Time Management Skills (ATMS): A practice-based outcome questionnaire. *Occupational Therapy in Mental Health*, 29(3), 215–231. <https://doi.org/10.1080/0164212x.2013.819481>
- Wolters, C. A., Won, S., & Hussain, M. (2017). Examining the relations of time management and procrastination within a model of self-regulated learning. *Metacognition and Learning*, 12(3), 381–399.
- World Economic Forum. (2022, July). *Global Gender Gap Report 2022*. [weforum.org. https://www3.weforum.org/docs/WEF\\_GGGR\\_2022.pdf](https://www3.weforum.org/docs/WEF_GGGR_2022.pdf)

Xiong, J., Lipsitz, O., Nasri, F., Lui, L. M. W., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A., & McIntyre, R. S. (2020). Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of affective disorders*, 277, 55–64. <https://doi.org/10.1016/j.jad.2020.08.001>

Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal*, 29(3), 663–676. <https://doi.org/10.3102/00028312029003663>

**Contact emails:** mo.chen@usj.edu.mo  
h1810027@nushigh.edu.sg  
munjeongwonn@gmail.com

## **The Impact of Trauma on Children's Mental Health and School Performance: A Case Study of the Beirut Blast**

Rayyane Shukr, Lebanese International University, Lebanon

The Paris Conference of Education 2025  
Official Conference Proceedings

### **Abstract**

Schools in Lebanon face challenges in supporting students' mental health, especially after traumatic events like the Beirut Explosion on August 4th. Many students struggle with unhealed trauma, which affects their academic performance. This study highlights that schools are not adequately equipped or trained to handle students with trauma, partly due to a lack of research on children's mental health in Lebanon. This qualitative multiple case study explores the impact of trauma on middle school students' performance, teachers' experiences with these students, the effect of teachers' preparedness on students' school performance, and the overall impact of the explosion on students' mental health. The theoretical framework used for this study is based on 1) Maslow's (1943) theory of motivation, (2) Vygotsky's (1978) social learning theory, (3) Piaget's cognitive development theory, and (4) Machover's (1949) psychoanalytic theory. Moreover, a conceptual framework was also formulated as an extension of the theoretical lens. Data collection was done among 10 students in middle school, between the ages of 11 and 14. The instruments used to collect data were the Three Pictures Test, semi-structured interviews, and the Academic Performance Questionnaire. Data analysis was based on Grounded Theory Analysis employing open and axial coding. The study implies that inadequately trained school staff can negatively impact traumatized students academically, socially, behaviorally, and emotionally. The results suggest that implementing trauma-informed school strategies and training will help instructors feel more confident in supporting students with trauma, creating a safer school environment, and improving students' academic performance.

*Keywords:* trauma, Beirut explosion, education, psychological impact, academic performance

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

After the Beirut explosion on August 4<sup>th</sup>, many children were left traumatized and untreated. For some children, thriving in school after this traumatic event is challenging. Children who have been exposed to this trauma display a variety of reactions that include problems in memory, attention, self-regulation, and impulse control (Ardino, 2011; Maschi et al., 2009; Simpson et al., 2011). Moreover, students exposed to trauma have needs that the school faculty and staff may not be able to meet without proper training. As a result, these students will be more subject to suspension or failure, or they may even have lower achievement scores and language delays. (Brunzell et al., 2015). However, the Lebanese curriculum focuses solely on the cognitive development of the children, and excludes the emotional and mental development. For this reason, this qualitative case study will highlight the academic difficulties that Lebanese children with trauma are facing after the Beirut explosion, and will call for the need to integrate trauma-informed school strategies in the Lebanese curriculum to increase student achievement.

## Background

Numerous national and cross-national studies published on childhood trauma and its cognitive and academic effect. The reported cross-national rate of childhood adversities is 38.8%, and that of lifetime traumatic events in European countries is 64% (Kessler et al., 2010; Darves-Bornoz et al., 2008). However, there were no studies published on childhood trauma on a national level, in Lebanon and all the Arab world. Also, several studies have documented exposure of Lebanese youth to war trauma (Chimienti et al., 1989; Cordahi et al., 2002; Karam et al., 2007; Karam et al., 2008; Karam et al., 1996; Saigh, 1991), and very few to childhood adversities (Usta & Farver, 2010). Another national study by done in 2014, entitled “Childhood Adversities and Traumata in Lebanon: A National Study” (Itani et al., 2014) studied four types of trauma: neglect and abuse, parental loss, parent psychopathology, and other types of trauma that involve the family and the economic situation. The sample in the study targeted Lebanese adults. Results of the study showed that more than a quarter of Lebanese adults experienced a childhood adversity and almost half (47.3%) of them experienced a traumatic event before the age of 18 (Itani et al., 2014).

## Significance

The acquired knowledge of the results of this research raises big questions about the current situation of the Lebanese curriculum and the projection of students dealing with trauma and mental health problems. Generation of talent and creativity could be missed due to the scarcity of proper knowledge and training in the field of children trauma that would help these children reach their goals.

This study is beneficial to all schools, teachers, parents, caregivers, and schools in early childhood settings. Parents and caregivers will benefit from these strategies and will apply them in their homes to help their children heal and grow. The results of the study might also motivate curriculum developers to integrate concepts of trauma-informed teaching and for school principals to train their teachers on how to deal with traumatized children.

## Theoretical Framework

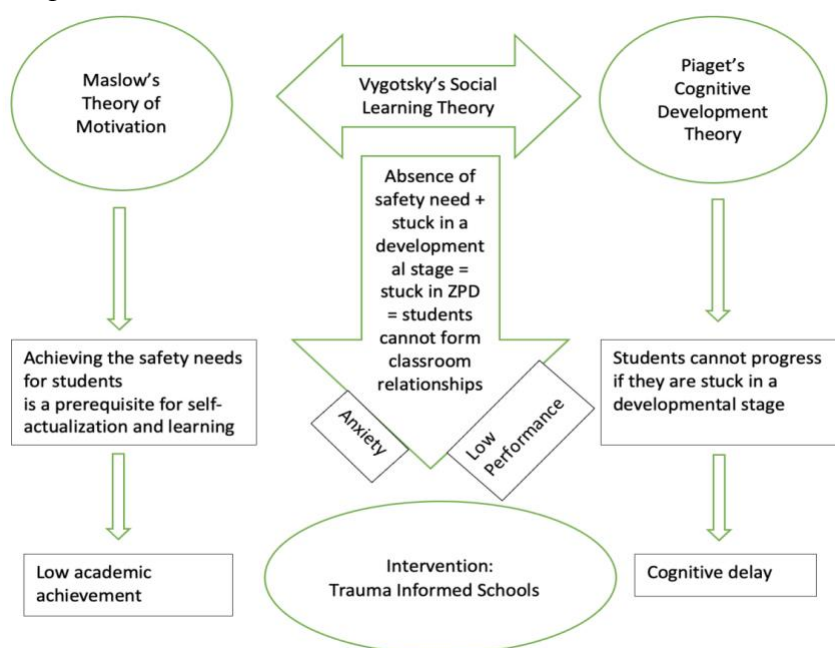
Four theories serve as a premise of this study: (1) Maslow's (1943) theory of motivation, (2) Vygotsky's (1978) social learning theory, (3) Piaget's cognitive development theory, and (4) Machover's (1949) psychoanalytic theory. These theories reinforce the objective of this study that children must feel physiologically and mentally safe in order to achieve educational and developmental milestones.

## Conceptual Framework

The conceptual framework of this study is rooted in Maslow's (1943) theory of motivation, which includes a hierarchy of five basic types of need: physical needs, security needs, social needs, esteem needs, and self-actualization needs. According to Maslow, if the basic needs are not met, higher needs won't be attained. These students will zone out during class because of their constant feeling of insecurity and uncertainty, which negatively affects their academic performance.

Moreover, Piaget's (1936) Cognitive Development Theory explains that students cannot progress if they are stuck in a developmental stage. This will also lead to cognitive delay which affects academic achievement. The association between Maslow's Theory and Piaget's is developed by Vygotsky's (1978) Social Learning Theory. If students are not feeling safe in their classroom and they are not developmentally progressing, then they will also be stuck in the zone of proximal development (ZPD).

**Figure 1**  
*Conceptual Framework*



## Purpose of the Study

The purpose of this qualitative study is to describe the school experience of ten to fifteen children experiencing trauma or mental health problems after the explosion. The study aims to analyze how the concept of childhood trauma and mental health affect the academic

performance, and recommends the implementation of trauma-informed school principles in the Lebanese curriculum.

## Research Questions

This study aims to collect data from participants to answer the following questions:

**RQ1:** How are traumatized middle school students who survived the Beirut explosion performing in school?

**RQ2:** What are teachers' experiences with middle school students post Beirut explosion?

**Sub-question:** To what extent teachers' preparedness in teaching students with mental problems affect the traumatized students' school performance?

**RQ3:** What is the effect of the Beirut explosion on the students' mental health?

## Limitations

This research was limited by factors of the study design. Since this dissertation took a qualitative study design approach, there is a limitation based on the interpretation of the answers of the participants. Moreover, another limitation is the number of participants in the study. The researcher could not have a larger pool of participants due to the COVID-19 pandemic and lockdown. Most importantly, many parents did not want their kids to participate claiming that the Beirut explosion had no effect on their kid's mental health and that their kids are fine. Additionally, another limitation of the study is the teacher interviews that were conducted online. It would have been optimal for the interviews to be conducted face-to-face so that the researcher can interpret body language. Moreover, another limitation is having only female teacher participants and only one male student participant. This was also due to the belief of the parents that girls are more sensitive to these issues than boys, which limited my number of male participants. Finally, there is a limitation in using projective drawing as a tool in detecting trauma since there was one participant who displayed trauma indicators in the interview but not in the drawings.

## Delimitations

Delimitations are the choices the researcher takes that sets the boundaries for the research study (Theofanidis & Fountouki, 2018). The first delimitation of this research study is the chosen age group for the students to participate. The researcher chose this age group after reading several studies that targeted other age groups and after concluding that this age groups is more sensitive to trauma. Another delimitation is the chosen geographical location for the study. The researcher targeted the closest areas to the explosion to provide richness for the data collected. Moreover, sampling remained open among teachers until saturation was reached.

## Literature Review

This literature review will provide an understanding of how childhood trauma inflicted by the Beirut explosion on August 4<sup>th</sup> affects the process of learning and how a curriculum intervention in Lebanese schools based on the idea of trauma-informed schools helps children cope, learn, and decrease their mental and physical damages.



## Mental Health in Children

Studies done in Lebanon about mental health in children reveal concerning numbers. These studies show that approximately 25% of children are living with at least one mental disorder, with only 6% of those affected having ever sought professional mental health help (Maalouf et al., 2016). This study was confirmed in 2020 when results revealed that 94% of children have not received any treatment (Maalouf et al., 2020). Moreover, Embrace, a non-profit organization (NGO), which works on raising awareness about mental health in Lebanon, conducted a study after the Beirut explosion. This study collected data from 701 individuals (age group 24-45) and the results were that 77% of these individuals were feeling anxious and stressed after one week of the explosion. These people were surveyed again after one month of the explosion using Maysay App for data collection. Shockingly, 80% of them still experienced symptoms of anxiety and developed post-traumatic stress disorder (PTSD) (Embrace, 2020).

## Childhood Trauma

Darine Al Masri, president of Kidproof Safety, explains in her guide that supports Lebanese educators in times of trauma, pandemic, and e-learning, that any situation that leaves a person overwhelmed and isolated can result in trauma, adding that, “it is not the objective circumstances that determine whether an event is traumatic, but your subjective emotional experience of it” (Al Masri, 2020, p.7). That being said, not all children were traumatized by the blast because trauma is personal; it affects people differently. Further additional research shows that children who experienced trauma have higher rates of mental health disorders and behavioral challenges than children without these traumatic experiences (Holmes et al., 2015; Layne et al., 2011; Mendelson et al., 2015; Perfect et al., 2016).

## Effect of Trauma on School Students

Students’ social emotional well-being is directly linked to academic achievement (Substance Abuse and Mental Health Services Administration, 2014). Recent studies on trauma revealed that students exposed to traumatic incidents exhibit misconduct and disobedience that are mostly perceived in the classroom; teachers and students complain about them the most and they are usually called the “class clowns” (Perfect et al., 2016; Substance Abuse and Mental Health Services Administration, 2014). Moreover, students with trauma are usually labeled as students with attention-deficit hyperactivity disorder (ADHD), oppositional defiance disorder, acute stress disorder, conduct disorder, reactive attachment, and disinhibited social engagement (Blodgett & Lanigan, 2018; Brunzell et al., 2015).

## Trauma-Informed Schools

In the book *Creating Trauma-Informed Schools*, Dombo, E.A., and Sabatino, C.A. (2019) explain that “for a school to be considered trauma-informed, the services and care must be provided in the context of an organization-wide approach grounded in an understanding of trauma and its consequences, with a focus on strengths, healing, and resilience” (p. 58). To achieve this, there should be a change in the manner of the questions or statements targeted at students, either from staff or faculty. Al Masri (2020) suggested in her guide “A Walk in Your Shoes” that school leadership can integrate Socio-Emotional Learning (SEL) programs and prioritize it in a school’s curriculum, like Kidproof’s Protect Ed program.

## **Teacher's Readiness With Children Trauma**

Students who have been exposed to trauma have a hard time reaching age-appropriate milestones, especially in areas of academics and communication, which often labels them as children with ADHD or special needs (Statman-Weil, 2015). For this reason, teachers treat them using synonymous strategies because both types of children can be unmanageable in a classroom setting (Esturgó-Deu & Sala-Roca, 2010; Ford et al., 2009; Pritchard et al., 2009). For this reason, teachers must be trained using trauma-informed teaching strategies to teach students from a traumatic background.

## **Use of Art in Trauma and Mental Health**

Studies have provided evidence for the importance of projective drawings in assessing trauma, PTSD, or any other mental health difficulty. One of the projective drawing techniques, The Three Pictures Test: Past, Present, and Future, was administered on 14 children who survived an earthquake that took place on April 6, 2009, in the region of Abruzzi, Italy (Giordano, 2017). This test was developed by the psychiatrist Crocq (1999), and is meant to be administered on children who survived any kind of natural or environmental catastrophe.

## **Research Design**

The choice of paradigm in this study is a qualitative multiple case study as it allows me to connect with my participants openly and develop trustful relationships. Yin (2018) explained that multiple case studies is a “set of case studies with exemplary outcomes in relation to some evaluation question” (p. 59), adding that multiple case studies allow more rigorous, meaningful, and thorough information about each participant (Yin, 2009). For these reasons, the multiple case study approach seems to be the best application that will give voice to many traumatized children.

## **Study Participants**

The sample will be drawn from a population of 10 to 15 children in middle school, equally divided between males and females. These children will have to possess three criteria to participate in this study: (1) living in near proximity to the explosion cite like the districts of Beirut port, Gemmayze, Mar Mkhael, or Ashrafeye, (2) enrolled in a private educational institution, and (3) between the ages of eleven and fourteen. Moreover, this specific age group was chosen based on studies done which concluded that this age group is very sensitive in terms of emotional, cognitive, and endocrinological development (Charmandari et al., 2003).

The sampling method that will be used to select participants is convenient sampling based on a database of families affected by the explosion.

## **Instrumentation**

The specific method to be used is based on a Projective drawing tool, “Three Pictures Test: Past, Present, and Future,” followed by semi-structured interviews with them and their teachers, and an Academic Performance Questionnaire. These three methods will be used to produce generalizability and allow for triangulation, which adds to the study's credibility.

## **Academic Performance Questionnaire**

This questionnaire is composed of ten items to measure the past and present performance of students in academics. Syed et al. (2017) conducted a study, “The Effect of Terrorist Attack of December 16, 2014 on Academic Performance of School Children of Peshawar” which showed that the alpha reliability of the scale retrospectively was .77 whereas the alpha reliability of the academic performance after the traumatic event was .74.

## **Semi-structured Interviews**

Semi-structured interview approach will be adopted with children after I conduct the “Three Pictures Test tool” and with their teachers in order to check the reliability of the Academic Performance Questionnaire. An IRB approval will be given from the Lebanese International University, IRB board. Also, participation in this research will have implied consent. Also, issues of confidentiality will be discussed with the parents, children, and teachers. The interviews will be taped, transcribed, and noted.

## **Data Collection**

The study will use the database of the NGO, Partnership with Resource Development (PRD), to contact families previously visited and introduced to their children. Due to COVID-19, communication will be via phone. After obtaining the children's consent, a projective drawing tool will be sent by email for participants to complete and return. Following this, the children will be contacted again for a semi-structured interview and to complete an Academic Performance Questionnaire, which has been validated through alignment tables. Once the data is collected, the children will be asked to connect with one of their teachers for a further semi-structured interview via phone or online platforms. The validity of the Academic Performance Questionnaire will be tested by aligning it with the research questions.

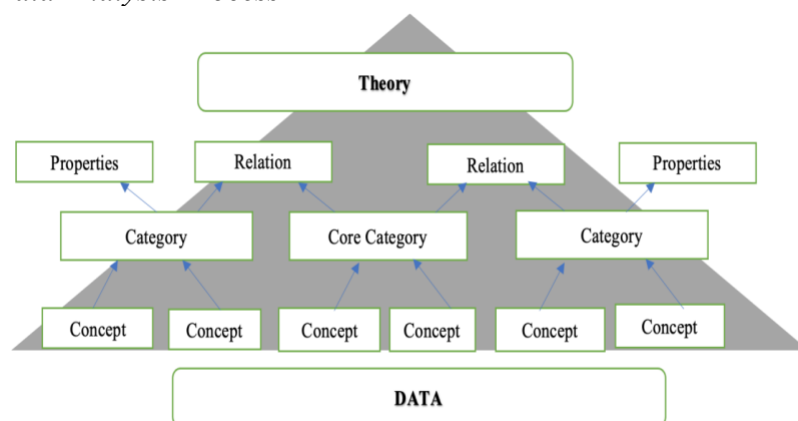
## **Data Analysis**

Data will be analyzed built on Grounded Theory Analysis with open and axial coding. Children's drawings will be analyzed based on four broad categories: (1) Negative/ mixed affected quality as rated by the expressions of faces, (2) Estrangement from the rest of the family, (3) strong contrasting colors and (4) incomplete figures.

## **Constant Comparative Methods**

There will be constant comparison between the data to come up with concepts that eventually lead to a theory (Creswell, 2013). I will stop comparing data and deriving concepts when theoretical saturation is reached and a theory is developed.

**Figure 2**  
*Data Analysis Process*



## Ethical Considerations

Prior to the study implementation, the researcher sought approval from the Lebanese International University Review Board (IRB) to ensure ethical treatment of participants and research design.

## Findings

This qualitative study aimed to explore the school experience of children affected by trauma following the Beirut explosion and its impact on academic performance. Due to limitations, only five participants were interviewed, along with five teachers from different school districts. The findings highlighted five themes regarding post-explosion teaching challenges, including disrupted behavior, delayed assignments, failure to complete tests, panic attacks, and silence during sessions, possibly linked to depression or sadness.

## Setting

This study took place in a community setting, allowing individual interactions with participants. Children spent 20-30 minutes drawing their house before, during, and after the explosion, followed by interviews in their rooms to express emotions. However, in two cases, parental presence during interviews appeared to make the children anxious, possibly impacting the authenticity of their answers and drawings.

## Participants

There were five willing children that participated in this research. Although this number is much lower than expected due to unexpected circumstances, their contributions and efforts were remarkable. Moreover, five teachers who taught these individuals were interviewed over different online platforms.

## Demographics

The student participants included four females and one male. Their age ranged from 11 to 14 years with an average age of 12.5 years old. All students were Lebanese. Moreover, the demographics of the teachers included gender, age, years of experience, subject taught, and

level of education. All teachers were female. Their ages ranged from 28 to 53 years making the average age of participants 39.4 years old. All the participants for this study were given pseudonyms to protect their identity.

## Data Collection

The data collection process began with demographic information and the Three Pictures Test, followed by interviews with participants, recorded with their consent, lasting 20–40 minutes each. After that, a debriefing process was done and I provided mental health resources, like the NGO Embrace located in Beirut. After data collection, student drawings were combined into a collage, analyzed, and categorized using Grounded Theory. The interviews were then linked to the drawings to identify themes and patterns, which were organized into tables for further analysis.

Data collection from teachers was conducted virtually using Google Meet and WhatsApp due to challenges like long distance, lockdown, and the fuel crisis. Interviews were conducted, lasting up to 40 minutes, and included the Academic Performance Questionnaire.

## Data Analysis

Data analysis is based on Grounded Theory analysis followed by open and axial coding.

Trauma indicators that were employed include the following: (1) Symbols of death and destruction, (2) Absence of people, (3) Blurred drawings, (4) Absence of colors, (5) Missing or injured body part, (6) Strong color contrast, (7) Dark colors. Based on these trauma indicators, drawings were labeled as high trauma-load and low-trauma load (Baráth, Á., 2019). The table below shows the trauma indicators revealed in the drawings of the participants.

**Table 1**  
*Trauma Indicators in Children's Drawings*

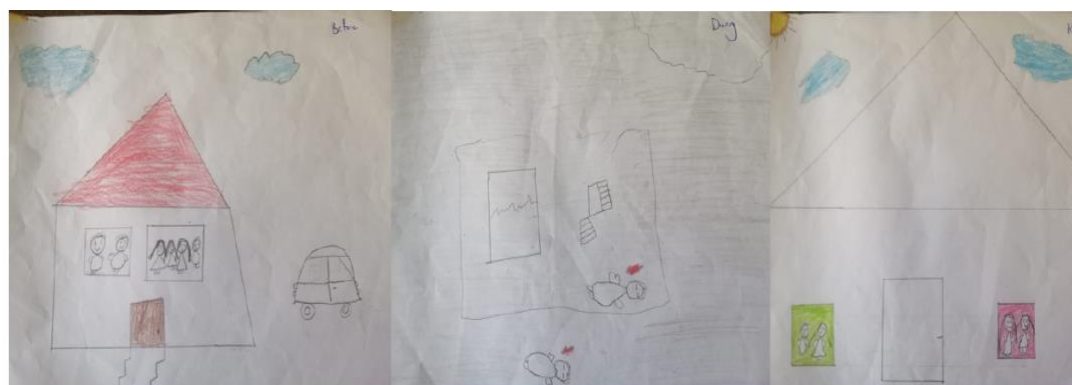
Name/ Trauma Indicator	Adam	Sara	Rana	Maria	Nisrine
Symbols of death or destruction	1	1	1	1	1
Absence of people	1	0	1	0	0
Blurred drawings	0	0	1	1	1
Absence of colors	0	0	0	0	1
Missing/ Injured body parts	0	1	0	1	0
Strong color contrast	0	0	1	1	0
Dark color	0	0	0	1	0
Results	2	2	4	5	3

The results of the study done by Baráth (2019) and Giordano (2017) show that semantic differential is a practical and realistic method in detecting trauma in children wartime drawings and that there is a correlation between trauma indicators in children's drawings and the degree that a child developed psychological trauma. Based on these studies, I have developed a scale (1-5) and associated the presence of trauma with (1) and the absence of trauma with (0). This table helped me in classifying the drawings into two categories: the high trauma-load ( $> 3$ ) and low trauma load ( $< 3$ ) (Baráth, Á, 2019).

**Table 2**  
*Detailed Drawing Comparison*

Members	Adam	Sara	Rana	Maria	Nisrine
	-12 years -Lives in Zak Blat -Goes to NPC (Kfarshima)	-11 years -Lives in Ashrafeye -Goes to College du Sacre Coeur (Gemayzeh)	-14 years -Lives in Ashrafeye -Goes to College du Sacre Coeur (Gemayzeh)	-13 years -Lives in Mar Mekhael -Goes to Grand Lycee Ashrafeye	-14 years -Lives in Gemayzeh -Goes to St.George School (Hadath)
House Drawings <b>before</b> the Explosion	- Use of colors - No members visible - Closed window and door	- Use of colors - Six members - Car outside the house with a closed window/door.	- Use of colors - No members visible - Closed window/door	- Use of one color - Two members - Drawing focused on inside of the house and not outside with little details → Display of insecurities/depression	- No colors used - Several Members in the building - Two trees
House Drawings <b>during</b> the Explosion	- Use of colors - No members - House collapse	- No colors - Two members = Decrease in the members - Blood on floor - Emptiness	- One color: Red - No members - Vague drawing → Instability	- Color Black → Fear - Two members - Blood	- No photo provided
House Drawings <b>after</b> the Explosion	- Grey Background - Destruction - No members - Shovel on floor	- Simple colors - Bigger house → Help by NGOS - Four members → Loss since she started with 6 members	- Colorful - Bigger house → Help by NGOS - No members	- Red color → Fear/Stuck in event - Emptiness - Two members - No expressions	- No colors → Fear - Cracked Building with "For Rent" Sign - One member → Loss

**Figure 3**  
*Sara's Drawing: Before, During, and After the Explosion*

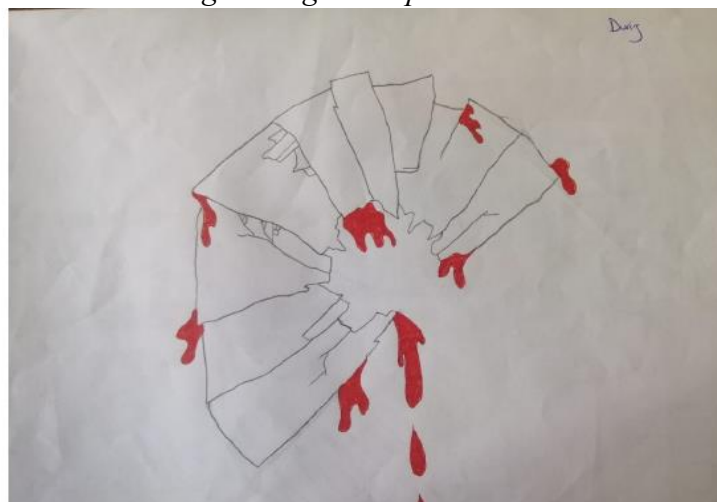


Sara, who had a low trauma score of 2, shared that an NGO rebuilt her house into her "dream house," acting as a protective factor against psychological trauma despite losing two family members in the explosion. Having her own room for the first time positively impacted Sara's emotional well-being and academic performance. Her teacher, Ms. Rola, noted that Sara became more engaged in online sessions and excelled in school, aided by the comfort of her own space.

Rana, a classmate of Sara, also received support from an NGO, but she displayed higher trauma indicators and was classified as having a high trauma load. Her drawings lacked family members, highlighting a key difference from Sara's experience. In her interview, Rana tearfully shared that her family was dismissive of her feelings, neglecting her emotional and academic well-being. This lack of support, coupled with her mother's disbelief in mental health importance, significantly contributed to her increased trauma. Despite being offered resources for free mental health clinics, her mother declined help, forcing Rana to rely on harmful coping mechanisms. Her shared information was kept confidential. The picture below demonstrated Rana's drawing during the explosion.

**Figure 4**

*Rana's Drawing During the Explosion*



Burns (1982) specified several variables that suggest the psychopathology or emotional disturbance on the person who drew the projective drawing such as compartmentalization (exclusion of members and isolation of the self) and the vagueness of the image which is sometimes an indicator of emotional instability. Moreover, Giordano (2017) explained in her study about detecting psychological trauma in children that empty space is an indication of how the past memory is inaccessible. Along this line of thought, Rana's drawing before the explosion had closed doors and windows which reinforces the idea of the "lack of access" (Giordano, 2017, p. 47).

Rana's Math teacher, Ms. Rita, explained in the interview how she realized a sudden drop in Rana's academic performance. When asked about the classroom strategies used to manage the students; Ms. Rita replied that there are no specific strategies because everything was online, noting that if she was to teach this year face-to-face, she would have been more compassionate. Ms. Rita believes that there should be a teachers preparedness program where teachers are given the right strategies to deal with such incidents.

Rana scored very closely in the trauma-indicators table to Maria, which appeared to have a high-trauma load. Maria's drawings were striking. They were so simple, yet so expressive. She lives with her younger brother and parents in Mar Mekhayel, which is a few kilometers away from the explosion site.

### Figure 5

*Maria's Drawing During the Explosion*

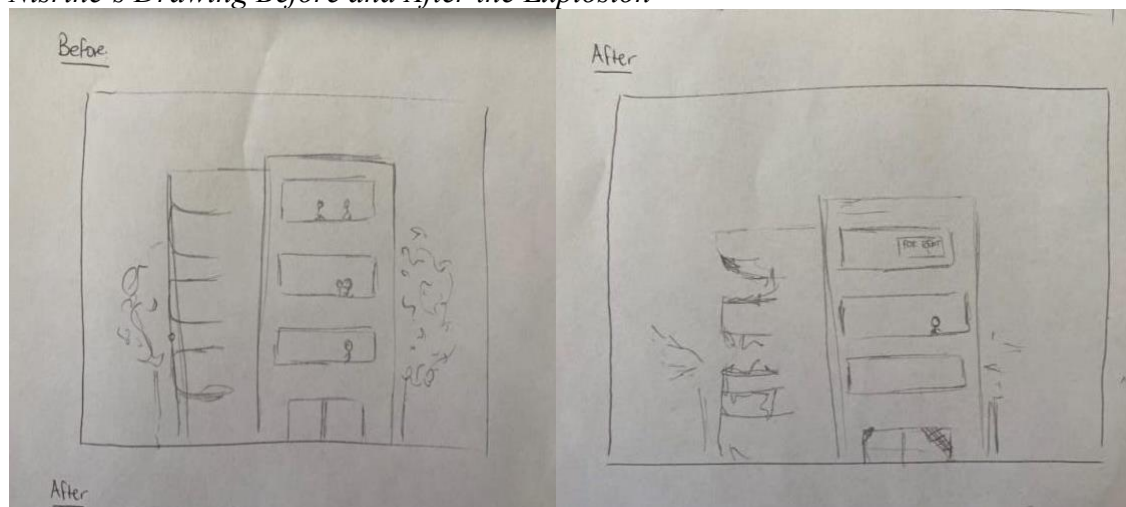


Maria's drawing during the explosion is notable for its striking use of black and red, which are often associated with trauma. Previous research suggests that elements like a dark background, sharp contrasts, and jagged lines can indicate distress (Baráth, Á, 2019). However, these signs should not be examined in isolation. Amod et al. (2013) emphasizes the importance of a holistic approach in interpreting projective drawings, integrating multiple sources such as background history, clinical interviews, and input from significant individuals like parents and teachers (p. 379).

Maria's drastic decline in academic performance and her interview answers were alarming. Her teacher, Ms. Celia, stated in the interview that "teaching students with trauma is tough especially because we have a curriculum to finish. Living in Lebanon, teachers are not taught to be emotionally invested in their students and we are not taught how to display emotional intelligence towards them. In addition, the curriculum here has too much focus on the cognitive aspect of the students so we tend to treat them like machines, disregarding their feelings".

Maria drawings are similar to Nisrine's in two ways: they both have symbols of death or destruction and they both display blurred drawings. Nisrine scored three in the trauma indicators table; however, looking at her results in a holistic context raises a lot of questions. To begin with, Nisrine did not use any color at all and her drawings were not very clear. In both of the pictures below, Nisrine only used a pencil to scribble a building with few people inside and a tree.



**Figure 6***Nisrine's Drawing Before and After the Explosion*

What is striking about the Nisrine's drawings is that she did not draw a picture during the explosion. The lack of the second drawing can be due to the fixation on the traumatic event which causes the children to be stuck in that event and unable to express it. In the interview, Nisrine stated that she is seeing a therapist and her therapist assessed her as having developed PTSD (Post-Traumatic Stress Disorder). Shockingly, Nisrine's academic performance did not decline. She was following her therapist's advice on keeping herself occupied.

Even though Nisrine had an average score of 3 in the trauma indicators, the interview with her proved that she has a high trauma load. Nisrine's case indicates a limitation to the projective drawing as a method for indicating trauma as not every child can express his/her self in drawing.

**Evaluation of the Findings**

Codes were developed from the interview transcripts and from the projective drawings. After identifying certain codes, patterns were discovered and grouped into categories. The categories were (1) creating a safe learning environment, (2) communication with teachers, (3) pedagogical practices, (4) trauma informed training needed, (5) self-efficacy, and (6) teachers' experience and degree achieved.

Next, the researcher developed themes from the categories that answer the research questions. The three major themes were:

- (1) Constructing a Positive Classroom Environment Built on Trust and Communication.
- (2) Improving the Learner's Performance and Conduct by Applying Trauma-Informed Practices.
- (3) Teachers' Educational Experience, Skills, and Background Knowledge.

**Research Question 1.**

The theme that aligned with this research question is "Improving the learner's Performance and Conduct by Applying Trauma-Informed Practices". All five teachers observed a decline in some students' academic engagement, with signs ranging from inattentiveness and silence to misbehavior aimed at gaining attention.

The categories that aligned to this theme are: pedagogical practices, trauma-informed training, self-efficacy, teachers' experience and degree achieved. The pedagogical practices include the teachers' approach and their methods in the classroom. If teachers were given trauma-informed practices in a teacher prep program or in their years of studying or if they have encountered children with trauma in their teaching experience, this would have had a good effect on the students' self-efficacy.

### ***Research Question 2.***

The theme that aligned with this question is "Teachers' Educational Experience, Skills, and Background Knowledge". The findings indicate that educators should be equipped with trauma-informed trainings to create a safe learning environment (Maslow). The data suggests that students with younger teachers tend to have a more positive classroom experience compared to those with older teachers.

### ***Research Question 3.***

The theme that aligned with this research question is also "Teachers' Educational Experience, Skills, and Background Knowledge" with the category of pedagogical practices, trauma-informed training, and creating a safe learning environment. The findings indicate that educators should be equipped with trauma-informed trainings in order to help their students improve in their overall school performance. Teachers should establish routines, ensure smooth transitions between activities, and offer students choices to enhance engagement (Dombo & Sabatino, 2019).

### ***Research Question 4.***

One theme emerged from this research question that is "Constructing a Positive Classroom Environment Built on Trust and Communication". Teachers play a crucial role in constructing a positive classroom environment that will help the student's mental health. Some of these strategies are listed in *Creating Trauma-Informed Schools: A Guide for School Social Workers and Educators* (Dombo & Sabatino, 2019).

## **Implications**

The implications of teachers and schools not meeting their students' security and emotional needs because of the lack of trauma-informed training can lead to continual emotional, mental, and academic regression. The exposure of trauma in childhood increases the likelihood of developing mental health disorders if not well-treated. Previous studies explain that these students are at a great risk of indulging in drinking, smoking, drugs, and sexual behaviors when they reach adolescence (Shin et al., 2009).

## **Recommendations for Practice**

Some recommendations for practice based on these themes from the book *Creating Trauma-Informed Schools* include:

- 1) Establishing Connection: Children who experienced trauma will learn that some adults cannot be trusted or counted on, especially children who are being exposed to a new teacher in class or to a new classroom setting. These children will start to look

for indicators to test if the adult can be trusted or not, so sometimes they are labeled as “hypervigilance” (Bath, 2008).

- 2) Regulation: Children who tend to have a lot of breakdowns in class are those who find it difficult to control their emotions. Teachers can help in this process by:
  - Identifying and naming the behavior that the child is doing.
  - Creating behavior charts and hanging them on classroom walls (Dombo & Sabatino, 2019).
  - Creating activities that encourage emotional expression like writing or drawing (Wolpow et al., 2016).
  - Approaching the child in a calm manner by focusing on their emotions instead of behavior (Bath, 2008).
  - Educating children about how their brain works so that can better understand what emotional dysregulation is like (Dombo & Sabatino, 2019).
- 3) Safety: Classrooms should feel safe for children who experienced a traumatic event.

Safety can be achieved by sticking to routines, giving children choices, and having teachers who are aware of traumatic triggers.

### **Recommendations for Future Research**

Future researchers could conduct this study using a quantitative design, which may yield different results in terms of the relationship between student’s academic performance and teachers’ preparedness in teaching kids with trauma. Moreover, due to COVID-19 and lockdown, this study was also limited to conducting interviews with the teachers online instead of face-to-face. Future research could conduct interviews face to-face and read body language. Furthermore, all teacher participants were female, which is a limitation since male teachers might have given different answers and offered a different perspective, and that could have affected the results of the study.

### **Conclusion**

This qualitative study aims to explore the school experiences of children affected by trauma following an explosion and examine the link between trauma and academic performance. After analyzing the experiences of five children from different schools and locations, findings reveal a lack of mental health awareness in schools and an absence of trauma-informed teacher training. The study aligns with its theoretical and conceptual framework, reinforcing the need for schools to implement trauma-informed practices to enhance the educational experience of affected children.

## References

- Al Masri, D. (2020). *A Walk in your Shoes*. Kidproof Safety.
- Amod, Z., Gericke, R., & Bain, K. (2013). Projective assessment using the Draw-A-Person Test and Kinetic Family Drawing in South Africa. In S. Laher & K. Cockcroft (Eds.), *Psychological Assessment in South Africa: Research and applications* (pp. 375–393). Wits University Press. <https://doi.org/10.18772/22013015782.31>
- Ardino, V. (2011). *Post-traumatic syndromes in childhood and adolescence: A handbook of research and practice*. Wiley-Blackwell.
- Baráth, Á. (2019). Creativity and Traces of Trauma in Children Wartime Drawings. *Journal of Psychiatry and Behavioral Health Forecast*, 2(1), 1010.
- Bath, H. (2008). The three pillars of trauma-informed care. *Reclaiming Children and Youth*, 17(3), 17–21.
- Blodgett, C., & Lanigan, J. D. (2018). The association between adverse childhood experience (ACE) and school success in elementary school children. *School Psychology Quarterly*, 33, 137–147. <https://doi.org/10.1037/spq0000256>
- Brunzell, T., Stokes, H., & Waters, L. (2015). Trauma-informed flexible learning: Classrooms that strength regulatory abilities. *International Journal of Child, Youth and Family Studies*, 7, 218–239. <https://doi.org/10.18357/ijcyfs72201615719>
- Burns, R. C. (1982). *Self-growth in families: A reinterpretation of children's drawings*. Brunner/Mazel.
- Charmandari, E., Kino, T., Souvatzoglou, E., & Chrousos, G. P. (2003). Pediatric stress: Hormonal mediators and human development. *Hormone Research in Paediatrics*, 59(4), 161–179. <https://doi.org/10.1159/000069325>
- Chimienti, G., Nasr, J., & Khalifeh, I. (1989). Children's reactions to war-related stress: Affective symptoms and behavior problems. *Social Psychiatry Epidemiology*, 24(6), 282–7.
- Cordahi, C., Karam, E., & Nehme, G. (2002). Les Orphelins De La Guerre Experience Libanaise et Méthodologie D'un Suivi Prospectif [War Orphans: The Lebanese Experience and Methodology of a Prospective Follow-Up]. *Stress et Trauma*, 2(4), 227–35.
- Creswell, J. W. (2013). *Qualitative inquiry & research design: Choosing among five approaches* (3rd ed.). SAGE.
- Crocq, L. (1999). Les traumatismes psychiques de guerre [Psychological Trauma of War]. 1er vol. Odile Jacob.

- Darves-Bornoz, J. M., Alonso, J., de Girolamo, G., de Graaf, R., Haro, J. M., Kovess-Masfety, V., Lepine, J. P., Nachbaur, G., Negre-Pages, L., Vilagut, G., Gasquet, I., & ESEMeD/MHEDEA 2000 Investigators. (2008). Main traumatic events in Europe: PTSD in the European study of the epidemiology of mental disorders survey. *Journal of Traumatic Stress, 21*(5), 455–462. <https://doi.org/10.1002/jts.20357>
- Dombo, E. A., & Sabatino, C. A. (2019). *Creating trauma-informed schools: A guide for school social workers and educators* (SSWAA Workshop Series). Oxford University Press.
- Embrace. (2020, September 1). *Mental Health Response Plan to the Beirut Explosion*. <https://embracelebanon.org/wp-content/uploads/2020/12/Embrace-Blast-Response-Report-September-2020-1.pdf>
- Esturgó-Deu, M. E., & Sala-Roca, J. (2010). Disruptive behaviour of students in primary education and emotional intelligence. *Teaching and Teacher Education, 26*(4), 830–837. <https://doi.org/10.1016/j.tate.2009.10.020>
- Ford, J. D., Fraleigh, L. A., & Connor, D. F. (2009; 2010). Child abuse and aggression among seriously emotionally disturbed children. *Journal of Clinical Child and Adolescent Psychology, 39*(1), 25–34. <https://doi.org/10.1080/15374410903401104>
- Giordano, F. (2017). A Qualitative Tool for Detecting and Approaching Psychological Trauma in Children Victims of the 2009 Italian Earthquake. *Child and Adolescent Mental Health* (pp. 41–57). Heidelberg University Press. <http://dx.doi.org/10.5772/67364>
- Holmes, C., Levy, M., Smith, A., Pinne, S., & Neese, P. (2015). A Model for Creating a Supportive Trauma-Informed Culture for Children in Preschool Settings. *Journal of child and family studies, 24*(6), 1650–1659. <https://doi.org/10.1007/s10826-014-9968-6>
- Itani, L., Haddad, Y. C., Fayyad, J., Karam, A., & Karam, E. (2014). Childhood adversities and traumata in Lebanon: A national study. *Clinical Practice and Epidemiology in Mental Health, 10*(1), 116–125. <https://doi.org/10.2174/1745017901410010116>
- Karam, E., Fayyad, J., & Salamoun, M. (2007). Assessment study of psychosocial status of children and adolescents in the south of Lebanon and southern suburbs of Beirut after the July 6 war. Beirut: HCC/HI/EU-ECHO/IDRAAC.
- Karam, E. G., Mneimneh, Z. N., Dimassi, H., Fayyad, J. A., Karam, A. N., Nasser, S. C., Chatterji, S., & Kessler, R. C. (2008). Lifetime prevalence of mental disorders in Lebanon: first onset, treatment, and exposure to war. *PLoS medicine, 5*(4), e61. <https://doi.org/10.1371/journal.pmed.0050061>
- Karam, E. G., Noujeim, J. C., Saliba, S. E., Chami, A. H., & Abi Rached, S. (1996). PTSD: how frequently should the symptoms occur? The effect on epidemiologic research. *Journal of Traumatic Stress, 9*(4), 899–905. <https://doi.org/10.1007/BF02104112>

- Kessler, R., McLaughlin, K., Green, J. (2010). Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. 378–85.
- Layne, C. M., Ippen, C. G., Strand, V., Stuber, M., Abramovitz, R., Reyes, G., Jackson, L. A., Ross, L., Curtis, A., Lipscomb, A., & Pynoos, R. (2011). The Core Curriculum on Childhood Trauma: A tool for training a trauma-informed workforce. *Psychological Trauma: Theory, Research, Practice, and Policy*, 3(3), 243–252. <https://doi.org/10.1037/a0025039>
- Maalouf, F. T., Ghandour, L. A., Halabi, F., Zeinoun, P., Shehab, A. A., & Tavitian, L. (2016). Psychiatric disorders among adolescents from Lebanon: Prevalence, correlates, and treatment gap. *Social Psychiatry and Psychiatric Epidemiology*, 51, 1105–1116. <https://doi.org/10.1007/s00127-016-1241-4>
- Maalouf, F. T., Alrojolah, L., Ghandour, L., Afifi, R., Dirani, L. A., Barrett, P., Nakkash, R., Shamseddeen, W., Tabaja, F., Yuen, C. M., & Becker, A. E. (2020). Building Emotional Resilience in Youth in Lebanon: a School-Based Randomized Controlled Trial of the FRIENDS Intervention. *Prevention science: the official journal of the Society for Prevention Research*, 21(5), 650–660. <https://doi.org/10.1007/s11121-020-01123-5>
- Machover, K. (1949). Personality projection in the drawing of the human figure. Charles C. Thomas.
- Maschi, T., Morgen, K., Hatcher, S. S., Rosato, N. S., & Violette, N. M. (2009). Maltreated children's thoughts and emotions as behavioral predictors: Evidence for social work action. *Social Work*, 54(2), 135–143. <https://doi.org/10.1093/sw/54.2.135>
- Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50, 370–396.
- Mendelson, T., Tandon, S. D., O'Brennan, L., Leaf, P. J., & Ialongo, N. S. (2015). Brief report: Moving prevention into schools: The impact of a trauma-informed school-based intervention. *Journal of Adolescence*, 43, 142–147. <https://doi.org/10.1016/j.adolescence.2015.05.017>
- Perfect, M. M., Turley, M. R., Carlson, J. S., Yohanna, J., & Gilles, M. P. S. (2016). School-related outcomes of traumatic event exposure and traumatic stress symptoms in students: A systematic review of research from 1990 to 2015. *School Mental Health*, 8(1), 7–43. <https://doi.org/10.1007/s12310-016-9175-2>
- Piaget, J. (1936). Cognitive development in children: Development and learning. *Journal of Research in Science Teaching*, 22, 176–186.
- Pritchard, M. E., Bowers, P. E., & Birdsall, B. (2009). Student trauma in the classroom. *Academic Exchange Quarterly*, 12(1), 153–158.
- Saigh, P. A. (1991). The development of posttraumatic stress disorder following four different types of traumatization. *Behavior research and therapy*, 29(3), 213–216. [https://doi.org/10.1016/0005-7967\(91\)90110-o](https://doi.org/10.1016/0005-7967(91)90110-o)

- Shin, S. H., Edwards, E. M., & Heeren, T. (2009). Child abuse and neglect: Relations to adolescent binge drinking in the National Longitudinal Study of Adolescent Health (AddHealth). *Addictive Behaviors*, 34(3), 277–280. <https://doi.org/10.1016/j.addbeh.2008.10.023>
- Simpson, R. L., Peterson, R. L., & Smith, C. R. (2011). Critical educational program. Components for students with emotional and behavioral disorders: Science, policy, and practice. *Remedial and Special Education*, 32(3), 230–242. <https://doi.org/10.1177/0741932510361269>
- Statman-Weil, K. (2015). Creating trauma sensitive classrooms. *YC Young Children*, 70(2), 72.
- Substance Abuse and Mental Health Services Administration. (2014). *SAMHAS's concept Of trauma and guidance for a trauma-informed approach* (HHS Pub. No. SMA 14-4884). <https://store.samhsa.gov/system/files/sma14-4884.pdf>
- Syed, Z., Saeed, A., Ali, M., & Batool, N. (2017). The effect of terrorist attack of December 16, 2014 on academic performance of school children of Peshawar. *Pakistan Journal of Social Sciences (PJSS)*, 37(1), 329–336.
- Theofanidis, D., & Fountouki, A. (2018). Limitations and delimitations in the research process. *Perioperative Nursing*, 7(3), 155–163.
- Usta, J., & Farver, J. (2010). Child sexual abuse in Lebanon during war and peace. *Child: care, health and development*, 36(3), 361–368. <https://doi.org/10.1111/j.1365-2214.2010.01082.x>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Wolpow, R., Johnson, M. M., Hertel, R., & Kincaid, S. (2016). *The heart of learning and teaching: Compassion, resiliency, and academic success* (3rd ed.). Office of Superintendent of Public Instruction, State of Washington.
- Yin, R. K. (2009). *Case Study Research Design and Methods* (4th ed.) [Kindle for Mac].
- Yin, R. K. (2016). *Qualitative research from start to finish*, 2nd ed. Guilford Press.
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6<sup>th</sup>. ed.). SAGE.





## **Contribution of Teachers' Self-Efficacy to Inclusive Education Practices in Schools**

Kiran Chalise, Mid-West University, Nepal

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Self-efficacy is essential for successful inclusion of students. Teachers are the key actors in imparting their knowledge and are the key facilitators in realizing, approaching, and ensuring the goals of inclusive education. Self-efficacy always boosts teachers' confidence and supports students' learning achievements. This paper reveals the contribution of teachers' self-efficacy to inclusive education practices. A binary logistic regression was applied to find out the contribution of the teachers' self-efficacy to different themes of the inclusive education practices. A sample (182 teachers) was taken from the schools of Nepal where children with hearing impairments are studying. The study reveals that teachers' self-efficacy is the main predictor of ensuring the availability of rights, roles and responsibilities and a learning environment in schools.

*Keywords:* self-efficacy, inclusive education practices, special need education, rights, learning environment

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Self-efficacy refers to an individual's belief in their capacity to take initiative and influence their actions, serving as a core component of human agency. According to Bandura and Locke (2003), self-efficacy is connected to other success factors such as motivation and self-regulation through cognitive processes. Bandura and Jourden (1991) further asserted that individuals with higher self-efficacy are more likely to set ambitious goals and remain committed to them. In educational settings, teachers' self-efficacy is a significant predictor of student motivation and achievement. It not only shapes their instructional behaviors but also affects classroom practices and the overall learning environment (Klassen et al., 2011).

Research indicates that teacher self-efficacy directly influences how teachers plan, instruct, and manage classrooms. Rowan et al. (1997) highlighted that such classroom environments have a notable impact on student outcomes. Furthermore, teacher quality plays a vital role in maintaining an effective learning environment that promotes student success.

Self-efficacy also plays a central role in student learning. As noted by Baron and Byrne (2004), self-efficacy impacts learning activities by enabling students to plan, execute tasks independently, and maintain motivation for academic achievement. In this context, teachers must feel competent and confident in their instructional decision-making, a view supported by Macmillan and Meyer (2006). Confidence in teaching is essential for effectively meeting students' needs and fulfilling school responsibilities.

Whalen (2009) emphasized that teacher self-efficacy is especially critical for integrating students with autism into general education classrooms. Instructors' beliefs in their ability to accommodate diverse needs affect their implementation of modifications and supports. Macmillan and Meyer (2006) similarly stressed that strengthening teacher self-efficacy helps policymakers design inclusive pathways that benefit all learners.

Simpson et al. (2003) identified five key areas necessary for successful inclusion: adaptation, educational techniques, commitment, ongoing evaluation, and multifaceted support. Moore and Esselman (1992) found that teacher self-efficacy was a substantial predictor of student accomplishment, reinforcing the idea that confident educators enhance educational outcomes.

In Asian contexts, environmental variables such as gender, age, and class size also influence teaching effectiveness in inclusive classrooms. Ahsan and Malak (2020) asserted that effective inclusive education requires a systemic approach to boost both teacher and professional efficacy.

A study by Ahmmed et al. (2013) in Bangladesh showed that in-service primary teachers' self-efficacy for inclusion was strongly linked to their perceptions of school support. When teachers felt supported, they expressed higher confidence in their inclusive teaching abilities. This reinforces the idea that institutional support plays a significant role in enhancing teacher self-efficacy and, consequently, the quality of inclusive practices.

Teachers are central actors in facilitating learning and implementing inclusive education. Their role is particularly vital when teaching children with disabilities. However, inclusive education remains a challenge when teachers lack the necessary knowledge, attitudes, and pedagogical skills. To achieve inclusion, teachers must develop not only technical skills but also a positive attitude and deep understanding of inclusive principles.

Teachers' attitudes toward the inclusion of students with disabilities have also received scholarly attention. Van Reusen et al. (2000) found that teacher attitudes significantly impact the classroom learning environment. Similarly, Hellmich et al. (2019) concluded that attitudes, knowledge, and self-efficacy are interrelated components that support the implementation of high-quality inclusive practices.

Yet, negative attitudes toward disability persist, influenced by sociocultural ideologies, curriculum limitations, and unclear policies (Thapaliya, 2018). Aryal (2013) identified factors affecting teacher attitudes toward inclusion, such as age, gender, type of teacher, education level, and location. Ahsan and Sharma (2018) reported that Bangladeshi pre-service teachers showed less favorable views toward including children with high support needs, including those requiring Braille, sign language, or individualized education programs.

In Japan, Yada and Savolainen (2017) observed that general attitudes toward inclusive education were slightly above neutral ( $M = 2.69$ ), with the most positive attitude found in personal engagement with persons with disabilities ( $M = 3.38$ ). However, attitudes toward including students with disabilities in general classrooms remained neutral ( $M = 2.58$ ), and concerns about potential challenges were the least acknowledged ( $M = 2.37$ ).

These studies collectively suggest that when teachers lack self-efficacy, knowledge, and a positive attitude toward children with hearing impairments, it negatively affects students' learning experiences. Furthermore, the overall quality of inclusive education practices becomes questionable. Low teacher self-efficacy often results in student demotivation, hindering educational attainment and achievement. Conversely, strong self-efficacy empowers teachers and improves student performance.

This study contributes to reveal the contribution of teachers' self-efficacy to inclusive education practices (roles and responsibilities of educational authority, important knowledge, availability of rights, participation, learning environment, equality and inclusiveness) in the context of Nepal.

## **Methodology**

The research design for the study is inferential with applying logistic regression methods. The study is a survey research design where the quantitative data were collected through a survey. This study generalizes the situation of the schools where children with hearing impairments survey in 20 districts of Nepal, based on the head teachers' and teachers' perceptions. It has used the quantitative method by applying binary logistic regression analysis.

## **Study Area, Population and Sampling**

The study area of the research is 20 districts of Nepal namely Jhapa, Morang, Sunsari, Rautahat, Bara, Saptari, Siraha, Kathmandu, Kavre, Sindhupalchowk, Sindhuli, Makwanpur, Kaski, Syanjha, Baglung, Gorkha, Rupendehi, Dang, Surkeht and Doti. The districts were selected where there were mostly the schools (special schools, integrated schools and resource classes) for CWHI. The districts were avoided where there were only resource classes as there were only one or two teachers available in the resource classes. To ensure maximum number of teachers and to gather data from the diverse school categories with diverse experiences of teachers in inclusive education, the districts were selected. I collected

a list of teachers in the available schools. The total teachers teaching in the schools were the population for this study.

Here in the study, special schools were also incorporated for the study purpose because of the fact that there is diversity in the special schools also in terms of linguistic, ethnicity, class, caste, age, gender, socio-economic background, levels/intensities of disabilities within similar category can be found in the special setting also. In special education also, particular category of disability will have also differences. When we talk about children with disabilities, among the similar category, there will also be undeniably diversity. We can take an example of children with hearing impairments. Hearing loss can range from mild to severe to profound. It can affect one or both ears, making it difficult to hear conversational speech or loud sounds (WHO, 2021). People who are “hard of hearing” have mild to severe hearing loss. Hard of hearing people typically communicate through spoken language and can benefit from hearing aids, cochlear implants, and other assistive technologies, as well as captioning. The majority of “deaf” persons have substantial hearing loss, which means they have little or no hearing. They frequently communicate through sign language (WHO, 2021).

Similarly, such categories will also be there in intellectual disability (ID) from severity classifications. To indicate the intensity of the disease, the phrases “mild,” “moderate,” “severe,” and “profound” have been employed. The vast majority of people with ID have modest intellectual disability (Sattler, 2002). In the same way, there is a wide range of vision impairments. The International Classification of Diseases 11 (2018) divides vision impairment into two categories: distance vision impairment and close vision impairment. Many distinct elements influence a person’s perception of vision impairment. This covers, for example, the availability of prevention and treatment treatments, access to vision rehabilitation (including assistive items such as spectacles or white canes), and whether the person has difficulty accessing buildings, transportation, and information (WHO, 2019).

The respondents were teachers and head teachers of the districts, on which male and female, including as much diversity, were maintained as far as possible. Here in the study, the population was teachers teaching children with hearing impairments in different districts of Nepal. In the study, the sample was the teachers teaching children with hearing impairments in different districts of Nepal.

As of a document in “Disabled Focus Inclusive Education Simplifier Book, 2018” published by Education and Human Resource Development Center, there are a total of 33 special schools, 23 integrated schools, and 380 resource classes for children with disabilities. Out of 290 teachers, I collected responses from 182 teachers. Thus, the total number, i.e., the population of teachers in selected schools was 290, from which a total of 182 responses were collected through the formula of Krejcie and Morgan (1970) because sample size was known.

$$n = \frac{\chi^2 N p (1 - p)}{e^2 (N - 1) + \chi^2 p (1 - p)} \quad (1)$$

Here,  $n$  = sample size  $N$  = population size = 290  $e$  = acceptable error = 0.05 of sample size  $\chi^2$  = Chi-square  $df = 1$  and reliability level 95% ( $\chi^2 = 3.841$ )  $p$  = the population proportions (Assumed to be 0.5). When the population is known, this formula is best suited that is why it the formula was chosen.

So, after using the formula as (2):

$$n = \frac{\chi^2 N p(1-p)}{e^2 (N-1) + \chi^2 p(1-p)} \quad (2)$$

$$n = 3.841 \times 290 \times 0.5(1-0.5) / 0.0025(290-1) + 3.841 \times 0.5(1-0.5)$$

$$n = 278.47 / 0.7225 + 0.96025$$

$$n = 278.47 / 1.68275$$

$$n = 165$$

Thus, the actual sample size for the study was 165. To reach the sample size, I clustered all the selected districts schools. By doing that I reached to 20 district's 40 schools. Clusters are natural groupings of people—for example, electoral wards, general practices, and schools. Cluster sampling involves obtaining a random sample of clusters from the population, with all members of each selected cluster invited to participate (Sedgwick, 2014). Thus, to ensure all teachers' representation in the clustered schools, I spent two days in the district. After visiting the 19<sup>th</sup> district as indicated in the Table 3 i.e Doti, the sample size reached to 162. There was a need of 165 samples as of the calculation, so I visited another district i.e Kathmandu then the sample size reached to 182. Then I stopped visiting another clustered districts namely Dhading, Humla and Jumla of Nepal to collect the data from the school.

Here,

Population: 290 teachers of 23 districts

Sampling Frame: List of teachers who were working in the schools

Sample needed size: 165 (As of Krejcie & Morgan, 1970)

Sample reached size: 182

(I used cluster sampling by visiting clustered districts' schools and collected data from each school and stopped collecting the data from the districts as soon as it reached to sample size).

Here, the binary logistic regression was applied to find out the contribution of the self-efficacy of teachers to different factors/themes (roles and responsibilities of educational authority, important knowledge, availability of rights, participation, learning environment, equality and inclusiveness) of the inclusive education practices in the schools. Here, the thematic area of inclusive education practices in the schools is applied through the theoretical backup of inclusive education and educational theory (Knight, 1999). For this, self-efficacy was the independent variable, whereas the different factors of inclusive education practices were the dependent variables.

For logistic regression analysis, first, the mean value of both independent and dependent variables was figured out. The mean value of self-efficacy (independent variable) was categorized into three categories as high (3), medium (2), and low (1), dividing the high Likert scale 5 by 3. Thus, the low level falls between 1-1.66, the medium level falls between 1.66-3.32 and the high level falls between 3.32-5. Then, the three categories were transferred to two categories, low/medium as the first category and high as the second category. Similarly, the mean values of the dependent variables (roles and responsibilities of educational authorities, important knowledge, availability of rights, participation, learning environment, equality and inclusiveness) were categorized into two categories. It was categorized that a scale of 1-3 falls under low-level (1), and a scale of 3-5 falls under high level (2). After doing all these, the binary logistic regression analysis was done through the

SPSS. Here, for determining the contribution of self-efficacy of the teachers to the inclusive education practices, integrated and resource class teachers' perceptions (Table 1) were taken into consideration removing the perceptions of special school teachers. And, the contribution of self-efficacy of the teachers to the practices was also figured out (Table 2) by considering integrated schools, resources classes and special schools' responses. The output of the logistic regression reveals accordingly.

## Results

**Table 1**

*Relationship Between Teachers' Self-Efficacy and Roles and Responsibilities of Educational Authority, Important Knowledge, Availability of Rights, Participation, Learning Environment, Equality and Inclusiveness (Considering Integrated Schools and Resource Classes)*

Dependent Variables	B	S.E.	Exp (B) (Odds Ratio)	Nagelkerke R Square
Roles and Responsibilities of Education Authority	-1.099	.720	.333**	.044
Important Knowledge	-.427	.699	.652**	.007
Availability of Rights	-1.897	.775	.150**	.129
Participation	-.495	.681	.610	.009
Learning Environment	-.999	.778	.368**	.034
Equality	-.833	.687	.435	.026
Inclusiveness	-.288	.736	1.333	.003

Table 1 shows the R Square value and the odds ratio value with its significance level. The R Square shows how much each predictor (self-efficacy) contributed to the dependent variables. The odds ratio value, which is also known as the binary logistic regression value.

The binary logistic regression analysis performed between different levels of self-efficacy of teachers and their level of roles and responsibilities of educational authority level reveals that teachers with low or medium level of self-efficacy are 0.333 times less likely to have high level of roles and responsibilities of educational authority on CWHI than those with a high level of self-efficacy. If teachers' self-efficacy is low/medium, their chances of contributing to roles and responsibilities are 0.333 times lower. In this case, the total contribution of the predictor (self-efficacy) is 4.4%.

The binary logistic regression analysis performed between different levels of self-efficacy of teachers and their level of important knowledge reveals that teachers with high levels of self-efficacy are 0.652 times less likely to have high levels of important knowledge on CWHI than teachers with low or medium levels of self-efficacy. That is, if teachers have low/medium self-efficacy, their chances of contributing to important knowledge are reduced by 0.652 times. In this case, the total contribution of the predictor (self-efficacy) is 0.7%.

The binary logistic regression analysis done between different levels of self-efficacy of teachers and the availability of rights level reveals that in comparison to teachers with low or medium level of self-efficacy to those of having high level of self-efficacy are 0.150 times less likely to have high level of availability of rights in the schools. That means, if teachers' self-efficacy is low/medium, the chances of contribution to the availability of rights are less likely to 0.150 times. Here, the total contribution of the predictor (self-efficacy) is 12.9%.

The binary logistic regression analysis done between different levels of self-efficacy of teachers and the participation level reveals that in comparison to teachers with a low or medium level of self-efficacy, those having a high level of self-efficacy are 0.610 times less likely to have a high level of participation in the schools. That means if teachers' self-efficacy is low/medium, the chances of contribution to the participation are less likely to be 0.610 times. Here, the total contribution of the predictor (self-efficacy) is 0.9%. The binary logistic regression analysis done between different levels of self-efficacy of teachers and the learning environment level reveals that in comparison to teachers with low or medium level of self-efficacy to those of having high level of self-efficacy are 0.368 times less likely to have high level of learning environment in the schools. That means, if teachers' self-efficacy is low/medium, the chances of contributors to the learning environment are less likely to 0.368 times. Here, the total contribution of the predictor (self-efficacy) is 3.4%.

The binary logistic regression analysis done between different levels of self-efficacy of teachers and the equality level reveals that in comparison to teachers with low or medium level of self-efficacy to those of having high level of self-efficacy are 0.435 times less likely to have high level of equality in the schools. That means, if teachers' self-efficacy is low/medium, the chances of contribution to the equality in the schools are less likely to 0.435 times. Here, the total contribution of the predictor (self-efficacy) is 2.6%.

The binary logistic regression analysis done between different levels of self-efficacy of teachers and the inclusiveness level reveals that in comparison to teachers with a low or medium level of self-efficacy, those having a high level of self-efficacy are 1.333 times less likely to have a high level of inclusiveness in the schools. It means if teachers' self-efficacy is low/medium, the chances of contributing to the inclusiveness are 1.333 times less. Here, the total contribution of the predictor (self-efficacy) is 0.3%.

The contribution of teachers' self-efficacy to the inclusive practices was also figured out by considering all types of available schools (Integrated, resource classes and special schools) for children with hearing impairments. The relationship reveals accordingly.

**Table 2**

*Relationship Between Teachers' Self-Efficacy and Roles and Responsibilities of Educational Authority, Important Knowledge, Availability of Rights, Participation, Learning Environment, Equality and Inclusiveness (Considering Integrated Schools Resource Classes and Special Schools)*

Dependent Variables	B	S.E.	Exp (B) (Odds Ratio)	Nagelkerke R Square
Roles and Responsibilities of Education Authority	-1.193	.594	.303**	.034
Important Knowledge	-1.289	.548	.276**	.043
Availability of Rights	-1.959	.630	.141**	.098
Participation	-.712	.542	.491	.013
Learning Environment	-1.698	.615	.183**	.072
Equality	-.746	.582	.474	.013
Inclusiveness	-.274	.574	.760	.002

Here, the above table shows the binary logistic regression analysis performed between different levels of self-efficacy of teachers and their level of roles and responsibilities of educational authority level reveals that teachers with low or medium level of self-efficacy are 0.303 times less likely to have high level of roles and responsibilities of educational authority on CWHI than those with a high level of self-efficacy. If teachers' self-efficacy is low/medium, their chances of contributing to roles and responsibilities are 0.303 times lower. In this case, the total contribution of the predictor (self-efficacy) is 3.4%.

In case of self-efficacy and important knowledge, if teachers have low/medium self-efficacy, their chances of contributing to important knowledge are reduced by 0.276 times. In this case, the total contribution of the predictor (self-efficacy) is 4.3 %. In case of teachers' self-efficacy and availability of rights, if teachers' self-efficacy is low/medium, the chances of contribution to the availability of rights are less likely to 0.141 times. Here, the total contribution of the predictor (self-efficacy) is 9.8%. Similarly, if teachers' self-efficacy is low/medium, the chances of contribution to the participation are less likely to be 0.491 times. Here, the total contribution of the predictor (self-efficacy) is 1.3%.

In case of teachers' self-efficacy and learning environment, if teachers' self-efficacy is low/medium, the chances of contributors to the learning environment are less likely to 0.183 times. Here, the total contribution of the predictor (self-efficacy) is 7.2%. Further in case of teachers' self-efficacy and equality, if teachers' self-efficacy is low/medium, the chances of contribution to the equality in the schools are less likely to 0.474 times. Here, the total contribution of the predictor (self-efficacy) is 1.3%. Finally, in case of teachers' self-efficacy and inclusiveness, if teachers' self-efficacy is low/medium, the chances of contributing to the inclusiveness are 0.760 times less. Here, the total contribution of the predictor (self-efficacy) is 0.2%.

It is found that when special schools' responses are incorporated, teachers' self-efficacy appears influential in facilitating rights availability (9.8%) and nurturing conducive learning environments (7.2%). Conversely, without special schools' responses, the emphasis shifts slightly, with teachers' self-efficacy being attributed greater significance in fostering rights availability (12.9%). Additionally, its role extends to delineating the roles and responsibilities of educational authorities (4.4%), alongside its continued influence on optimizing learning environments (3.4%).

## Discussion

When examining the contribution of teachers' self-efficacy to the different factors/themes relating to inclusive education practices indicated that the contributions of predictors ranged differently. The contribution of low or medium levels of self-efficacy of the teachers was less likely to have a high level of contribution to the factors/themes of inclusive education practices. It means if the teachers have a low or medium level of self-efficacy, there is less chance of contribution to the inclusive education practices in CWHI focus schools in Nepal. The study revealed that in comparison to teachers with a low or medium level of self-efficacy to those of having a high level of self-efficacy are 0.333 times less likely to have a high level of roles and responsibilities of educational authority on CWHI, 0.652 times less likely to have a high level of important knowledge; 0.150 times less likely to have a high level of availability of rights; 0.610 times less likely to have a high level of participation; 0.368 times less likely to have a high level of the learning environment; 0.435 times less likely to have a high level of equality; and 1.333 times less likely to have a high level of inclusiveness in the



schools. The total contribution of self-efficacy seemed high in the theme “availability of rights (12.9%)” and “roles and responsibilities of educational authority (4.4%)” and “learning environment (3.4%)” of inclusive education practices than others (Important knowledge (0.7%), participation (0.9%), equality (2.6%) and inclusiveness (0.3%)). It means if teachers’ self-efficacy can be enriched, it will contribute highly to the availability of rights of the schools ensuring roles and responsibilities of educational authorities and learning environment of the schools.

The study revealed that the contribution of teachers’ self-efficacy to inclusiveness, participation, equality and important knowledge was very low compared to other factors. It was found that if teachers’ self-efficacy is low/medium, the chances of contributions to inclusiveness, participation, equality and important knowledge are less likely to a maximum percentage (133.3, 61, 43.5 and 65.2), respectively. The total contribution of the predictor (self-efficacy) is found very low than the other in these factors. The meaning of these findings is that teachers’ self-efficacy has a minimum level of contribution to inclusiveness, participation, equality and important knowledge in the children with hearing impairment (CWHI) focused schools than other factors/themes.

The study contributed to exploring the contribution of teachers’ self-efficacy to different factors/themes of inclusive education practices. In general, it is found that self-efficacy is the strongest contributor to upgrade inclusive education practices in the CWHI-focused schools in Nepal though the contribution to different factors differs. The study found that the contribution of self-efficacy to the availability of rights in the schools, roles and responsibilities of educational authority and learning environment seems high. That means if teachers’ self-efficacy is high, the chances of contribution to ensure the availability of rights in the schools and enriching learning environment and ensuring roles and responsibilities of educational authorities for CWHI students is possible significantly. So, it can be concluded that it is better to ensure teachers’ self-efficacy to enrich the quality of CWHI schools to ensure the availability of rights, a learning environment and roles and responsibilities of educational authorities.

In supporting to the findings on teachers’ self-efficacy and its contribution to inclusive education practices, compared to teachers with lower self-efficacy for implementing inclusive practices in the classroom, Sharma et al. (2012) found that teachers with higher self-efficacy for implementing inclusive practices are more likely to engage in teaching-learning practices that ensure effective learning of students with additional learning needs. Ahmed et al. (2012) found that perceived school support for implementing inclusive practices is a strong predictor of teachers’ self-efficacy for inclusion in a large sample of in-service primary school teachers in Bangladesh.

According to Ashton and Webb (1986), teachers with high levels of efficacy are more likely to have high expectations of learning and success, while teachers with low levels of effectiveness are more likely to have high expectations of failure. Self-efficacy is related to a person’s evaluations of his or her abilities and what can be accomplished, according to Bandura (1977). Self-efficacy beliefs influence behaviors, according to research on efficacy beliefs. Teachers’ decisions and classroom instructions are influenced by their efficacy beliefs (Brophy, 1986; Hunt, 1976; Kagan, 1992; Nussbaum, 1992; Rowan et al., 1997). Furthermore, efficacy belief is situation-specific (Bandura, 1977). As a result, teachers’ self-efficacy views had a significant impact on their ability to meet the challenges of implementing inclusive practices (Bandura, 1977).

Teachers with high self-efficacy are thought to be more likely than teachers with low self-efficacy to apply educational innovations in the classroom, use classroom management strategies, and employ appropriate teaching methods (Chacon, 2005; Korevaar, 1990). Through all these study findings, we can say that self-efficacy seems to be the strongest predictor to ensure better inclusive education practices in schools.

The self-efficacy of teachers is also influenced by their knowledge. The mastery of teaching and learning is also influenced by factors related to motivation, attitudes, and skills. In their 2012 model, Blomeke and Delaney identified cognitive skills and affective-motivational traits as the two primary elements of teachers' professional competence. Cognitive ability includes professional knowledge, general pedagogical knowledge, content knowledge, and pedagogical content knowledge. The affective and motivational characteristics include motivation, self-regulation, professional beliefs about teaching and learning, and the subject content (Blomeke & Delaney, 2012). As revealed by Hill et al. (2005), Baumert et al. (2010), and Voss et al. (2011), pedagogical content knowledge has more impact on student achievement than content knowledge. Similarly, higher general pedagogical/psychological knowledge will have an impact on higher cognitive activation, better instructional pacing and better student-teacher relationships.

Through this study, it is established that the learning environment and availability of rights in terms of inclusive education practices are more influenced by the level of self-efficacy of the teachers. When we talk about inclusive education practices, it is undoubtedly the constructivism-based inclusive education practices as angled by inclusive education and educational theory.

According to Hulgín and Drake (2011), inclusive education requires a constructivist approach to teaching and learning. They mentioned that constructivism rejects the notion that there are instructional strategies, and it acknowledges and respects the comprehensiveness and particularity of learning as contextually constructed. An example of constructivism-based inclusive education practices is active learning (Steele, 2005). Steele suggested that practices such as "teaching students to summarize, paraphrase, predict, and use visual images, helps students with learning disabilities understand and remember" (2005, p. 2). Some practices, such as summarizing, predicting, and using visuals, have also been found to have high to medium effects on students with special needs (Hattie, 2008).

In the constructive inclusive classroom, the belief is that students learn from experience and real-life application. The students will benefit most from following best practices, as reported by Hattie (2008), such as peer tutoring and cooperative learning.

The constructivist approach aligns closely with the social model of disability, which frames disability as a result of social arrangements and culturally constructed norms (Vehmas & Mäkelä, 2009). This model promotes a holistic view of children with special educational needs (SEN), emphasizing emotional, behavioral, physical, and social factors rather than medical diagnoses. It asserts that all teachers should be prepared to teach special education needs (SEN) children and that all schools should be inclusive of students regardless of background or ability. In this context, teacher self-efficacy becomes essential for implementing inclusive practices.

Analyzing the study's findings through this theoretical lens, it becomes evident that while self-efficacy is a strong predictor of inclusive education, its influence varies across different

dimensions. The most significant contributions are seen in enhancing the learning environment and ensuring the availability of rights. These findings reinforce the idea that strengthening teachers' self-efficacy is key to fostering inclusive education. This conclusion aligns with prior literatures and is substantiated by the study's empirical evidences.

This study is grounded in the theory of inclusive education and democratic educational theory, emphasizing seven thematic areas that contribute to effective inclusive practices. It also draws on the theory of self-efficacy and the theory of planned behavior to examine how these frameworks influence inclusive education in schools. From a quantitative perspective, the study emphasizes objectivity and measurable analysis, highlighting the role of teacher self-efficacy in shaping inclusive learning environments.

The findings align with the theoretical framework, confirming that self-efficacy significantly enhances the educational experience in schools. Baron and Byrne (2004) argued that self-efficacy plays a vital role in learning activities, helping teachers fulfill their responsibilities effectively. Similarly, Whalen (2009) found that understanding and supporting teacher self-efficacy is essential for integrating students with autism into mainstream classrooms. Ahsan and Malak (2020) further emphasized the need for systemic support to strengthen professional efficacy for inclusive practices. Recent research by Chen et al. (2022) during the COVID-19 pandemic found that self-efficacy was the strongest predictor of English language learning outcomes in blended learning contexts, demonstrating its continued relevance and importance.

These studies collectively show that teacher self-efficacy is not only linked to improved learning environments but also plays a crucial role in upholding educational rights and responsibilities in schools. It is a key predictor of student performance and a vital cognitive factor in achieving inclusive education goals. Therefore, teachers with high self-efficacy are more likely to contribute meaningfully to the educational environment, particularly in schools focused on CWHI, by enhancing learning conditions, advocating for rights, and supporting institutional responsibilities.

## **Conclusion**

At the heart of every inclusive classroom is a teacher whose self-belief can shape the learning experiences of all children, especially those with hearing impairments. This study affirms that teachers' self-efficacy is not merely a psychological trait—it is a driving force behind inclusive practices. When teachers believe in their ability to reach every learner, they are more likely to foster classrooms where all students feel respected, valued, and understood.

Inclusive education is not achieved solely through policies or frameworks; it is realized through the confidence, care, and commitment of educators. Teachers with strong self-efficacy are more inclined to advocate for student rights, create accessible learning environments, and lead transformative change. Conversely, when teachers lack confidence, this hesitation can limit both their own growth and their students' opportunities.

Supporting inclusive schools begins with supporting teachers. Their self-efficacy is nurtured not just through training but also through trust, mentorship, and a collaborative culture. Inclusion becomes a shared endeavor—rooted in the collective belief in every child's potential. By investing in teachers' confidence, we invest in a future where every child, regardless of ability, has the opportunity to belong, learn, and thrive.

### **Acknowledgements**

I would like to acknowledge Mid-West University (MU Institute of Cooperation and Development), Nepal Kathmandu University, School of Education, Nepal and IAFOR, Japan.

## References

- Ahmmed, M., Sharma, U., & Deppeler, J. M. (2012). Variables affecting teachers' attitudes towards inclusive education in Bangladesh. *Journal of Research in Special Educational Needs*, 12(3), 132–140.
- Ahmmed, M., Sharma, U., & Deppeler, J. M. (2013). Impact of demographic variables and school support on teacher efficacy in inclusive classrooms in Bangladesh. *The International Journal of Diversity in Education*, 12(2), 1–14.
- Ahsan, M., & Malak, M. (2020). Teaching efficacy and inclusive practices in Asian countries. In *The Oxford Encyclopedia of Inclusive and Special Education*. Oxford University Press.
- Ahsan, M. T., & Sharma, U. (2018). Pre-service teachers' attitudes toward inclusion of students with high support needs in regular classrooms in Bangladesh. *British Journal of Special Education*, 45(1), 81–97.
- Aryal, S. (2013). *Teachers' attitude towards inclusive education in Nepal* [Doctoral dissertation, Daegu University].
- Ashton, P., & Webb, R. B. (1986). Teachers' sense of efficacy, classroom behaviour, and student achievement. In P. Ashton & R. B. Webb (Eds.), *Teachers' sense of efficacy and student achievement* (pp. 125–144).
- Bandura, A. (1977). *Social learning theory*. Prentice-Hall.
- Bandura, A., & Jourden, F. J. (1991). Self-regulatory mechanisms governing the impact of social comparison on complex decision-making. *Journal of Personality and Social Psychology*, 60, 941–951.
- Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology*, 88(1), 87–99.
- Baron, R. S., & Byrne. (2004). *Social psychology*. Erlangga.
- Baumert, J., Kunter, M., Blum, W., Brunner, M., Voss, T., Jordan, A., Klusmann, U., Krauss, S., Neubrand, M., & Tsai, Y-M. (2010). Teachers' mathematical knowledge, cognitive activation in the classroom, and student progress. *American Educational Research Journal*, 47(1), 133–180.
- Blomeke, S., & Delaney, S. (2012). Assessment of teacher knowledge across countries: A review of the state of research. *ZDM Mathematics Education*, 44, 223–247.
- Brophy, J. (1986). Teacher influences on student achievement. *American Psychologist*, 41(10), 1069–1077.
- Chacon, C. T. (2005). Teachers' perceived efficacy among English as a foreign language teachers in middle schools in Venezuela. *Teaching and Teacher Education*, 21, 257–272. <http://dx.doi.org/10.1016/j.tate.2005.01.001>

- Chen, R., Iqbal, J., Liu, Y., Zhu, M., & Xie, Y. (2022). Impact of self-concept, self-imagination, and self-efficacy on English language learning outcomes among blended learning students during COVID-19. *Frontiers in Psychology*, 13. <http://dx.doi.org/10.3389/fpsyg.2022.784444>
- Hattie, J. (2008). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
- Hellmich, F., Loeper, M., & Gorel, G. (2019). The role of primary school teachers' attitudes and self-efficacy beliefs for everyday practices in inclusive classrooms: A study on the verification of the 'Theory of Planned Behaviour'. *Journal of Research in Special Educational Needs*, 19(S1), 36–48.
- Hill, H. C., Rowan, B., & Ball, D. L. (2005). Effects of teachers' mathematical knowledge for teaching on student achievement. *American Educational Research Journal*, 42(2), 371–406.
- Hulgin, K. M., & Drake, B. M. (2011). Inclusive education and the No Child Left Behind Act: Resisting entrenchment. *International Journal of Inclusive Education*, 15(4), 389–404.
- Hunt, D. E. (1976). Teachers are psychologists, too: On the application of psychology to education. *Canadian Psychological Review/Psychologie Canadienne*, 17(3), 210–218.
- Kagan, D. M. (1992). Implication of research on teacher belief. *Educational Psychologist*, 27(1), 65–78.
- Klassen, R. M., Tze, V. M. C., Betts, S. M., & Gordon, K. A. (2011). Teacher efficacy research 1998–2009: Signs of progress or unfulfilled promise? *Educational Psychology Review*, 23(1), 21–43.
- Knight, T. (1999). Inclusive education and educational theory, inclusive for what? [Paper presentation]. *British Educational Research Association Conference, University of Sussex, Brighton*.
- Korevaar, G. (1990). Secondary school teachers' courses of action in relation to experience and sense of self-efficacy [Paper presentation]. *Annual Meeting of the American Educational Research Association*, Boston.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30, 607–610.
- Macmillan, R., & Meyer, M. J. (2006). Inclusion and guilt: The emotional fallout for teachers. *Exceptionality Education*.
- Moore, W. P., & Esselman, M. E. (1992). Teacher efficacy, empowerment, and a focused instructional climate: Does student achievement benefit? <https://files.eric.ed.gov/fulltext/ED350252.pdf>

- Nussbaum, J. F. (1992). Effective teacher behaviors. *Communication Education*, 41(2), 167–180.
- Rowan, B., Chiang, F. S., & Miller, R. J. (1997). Using research on employees' performance to study the effects of teachers on students' achievement. *Sociology of Education*, 256–284.
- S. Vehmas, & T. Shakespeare (Eds.), *Arguing about disability: Philosophical perspectives*. Routledge.
- Sattler, J. M. (2002). *Assessment of children: Behavioral and clinical applications*. San Diego.
- Sharma, U., Loreman, T., & Forlin, C. (2012). Measuring teacher efficacy to implement inclusive practices. *Journal of Research in Special Educational Needs*, 12(1), 12–21.
- Simpson, R. L., de Boer-Ott, S. R., & Smith-Myles, B. (2003). Inclusion of learners with autism spectrum disorders in general education settings. *Topics in Language Disorders*, 23(2), 116–133.
- Steele, M. M. (2005). Teaching students with learning disabilities: Constructivism or behaviorism? *Current Issues in Education*, 8(10), 1–5.
- Thapaliya, M. P. (2018). *Moving towards inclusive education: How inclusive education is understood, experienced and enacted in Nepali higher secondary schools* [Doctoral dissertation, University of Canterbury].
- Van Reusen, A. K., Shoho, A. R., & Barker, K. S. (2000). High school teacher attitudes toward inclusion. *The High School Journal*, 84(2), 7–20.
- Vehmas, S., & Makela, P. (2009). The ontology of disability and impairment. In K. Kristiansen.
- Voss, T., Kunter, M., & Baumert, J. (2011). Assessing teacher candidates' general pedagogical/psychological knowledge: Test construction and validation. *Journal of Educational Psychology*, 103(4), 952–969.
- Whalen, C. (2009). *Real life, real progress for children with autism spectrum disorders: Strategies for successful generalization in natural environments*. Brookes Publishing Company.
- World Health Organization. (2019). *World report on vision*. <https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment>
- World Health Organization. (2021). *World report on hearing*. <https://www.who.int/publications/i/item/9789240020481>
- Yada, A., & Savolainen, H. (2017). Japanese in-service teachers' attitudes toward inclusive education and self-efficacy for inclusive practices. *Teaching and Teacher Education*, 64, 222–229.

**Contact email:** [kchalise@gmail.com](mailto:kchalise@gmail.com)



## **Voices of Value: A Sociopragmatic Analysis of Discourse Patterns in Student Evaluations of Teaching**

Yasmine Soheim, The American University in Cairo, Egypt

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Student Evaluations of Teaching (SETs) are widely used in higher education to assess teaching effectiveness, yet the rich qualitative feedback within them remains underexplored—particularly in cross-cultural and sociopragmatic contexts. This study examines how undergraduate students at the department of Rhetoric and Composition at the American University in Cairo use language to evaluate instructors, focusing on how praise and criticism are linguistically constructed in written SET comments. Grounded in Appraisal Theory, Politeness Theory, Cross-Cultural Pragmatics, and Biber's Stance Analysis, the research explores how students manage face-threatening acts and position themselves in relation to authority figures. Using a qualitative methodology, the study analyzes written comments from six semesters of SETs collected from eight instructors in the Department of Rhetoric and Composition, alongside semi-structured interviews with faculty and students. Key features examined include expressions of affect, judgment, appreciation, stance markers, engagement strategies, and linguistic intensification. Preliminary findings indicate that SET discourse is overwhelmingly positive, with students frequently using direct and intensified language to convey praise while softening or depersonalizing criticism. Cultural norms, particularly those aligned with collectivist values in the Egyptian context, influence students' preference for effusive praise and indirect critique. Gender-based patterns also emerge, with male instructors receiving more personal and emotive language, while feedback for female instructors tends to be more formal and professional. This study offers insights into the sociopragmatic dimensions of student feedback and underscores the importance of attending to language patterns when interpreting SETs. Findings aim to inform more equitable evaluation practices and improve the design and use of feedback mechanisms in higher education.

*Keywords:* student evaluations of teaching (SETs), sociopragmatics, appraisal theory, cross-cultural pragmatics, politeness theory, stance analysis, qualitative feedback, gender-based discourse analysis, higher education, linguistic patterns

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Student evaluations of teaching (SETs) have become a vital component of quality assurance and instructional improvement in higher education. While quantitative metrics such as Likert-scale ratings are widely analyzed and used for administrative decisions, the qualitative, open-ended comments students provide are often overlooked or underutilized. These comments, however, contain a wealth of information about teaching effectiveness, classroom dynamics, and the student experience. They also reflect broader social, cultural, and institutional factors that shape how students perceive and articulate their educational journeys. This study seeks to address this gap by examining the language and discourse strategies students use when providing written feedback on their instructors at the American University in Cairo. Drawing upon frameworks from applied linguistics, discourse analysis, and pragmatics, the research investigates how students construct praise and criticism, manage face-threatening acts, and position themselves in relation to their instructors and the institution. The aim is to uncover the sociopragmatic features of student feedback, offering insights into the attitudes, cultural norms, and power dynamics that underlie the evaluation process. This deeper understanding can inform more effective and equitable interpretation of SET data in higher education.

## Literature Review

### Theoretical Foundations

The analysis of qualitative student feedback in SETs is grounded in several interrelated theoretical frameworks. Politeness Theory, as articulated by Brown and Levinson (1987) and Grice's (1975) pragmatics provide a lens for understanding how students mitigate the interpersonal risks inherent in delivering criticism or praise. These theories posit that individuals employ various strategies to preserve social harmony and avoid conflict, particularly when providing negative feedback that could threaten the "face" of the recipient. Speech Act Theory, developed by Austin (1962) and Searle (1975), conceptualizes praise and criticism as social actions shaped by cultural norms and contextual expectations, as illustrated in the work of Holmes (1988) and Herbert (1986). In the context of SETs, student comments are not merely descriptive but performative, serving to affirm, challenge, or negotiate the roles and relationships between students and instructors. Systemic Functional Linguistics (SFL), particularly Halliday's (Halliday & Matthiessen, 2013) model, and Martin and White's (2005) Appraisal System frame language as a social semiotic system. The Appraisal System is especially useful for analyzing evaluative language, interpersonal positioning, and the strategies students use to amplify or soften their evaluations. This framework allows for a detailed examination of attitudinal, engagement, and graduation resources in student feedback. For example, Alhamdan (2023) used SFL to categorize student feedback into subtypes such as reaction quality and valuation relevance. Natural Semantic Metalanguage Theory, as proposed by Wierzbicka (1991), introduces a cross-cultural dimension to the analysis of evaluative language. By seeking universal patterns in the expression of praise and criticism, this approach enables the identification of culturally specific norms and the comparison of evaluative practices across different linguistic and cultural contexts, an approach used by Morozova et al. (2023) in their study of Russian students' feedback. Critical Discourse Analysis (CDA), as advanced by Fairclough (1995), provides tools for interrogating how evaluative language reflects and reproduces institutional power relations and ideologies. Through the analysis of discourse, researchers can uncover the ways in which student feedback both challenges and reinforces the authority of instructors and the values of the institution.

## Methodological Developments

Recent years have seen significant methodological advances in the study of qualitative feedback in SETs with Alhamdan (2023) applying the Appraisal System to identify affective and judgmental language, while Stewart (2015) examined how students moderate or intensify their tone in evaluative comments. Discourse analysis and stance analysis have become increasingly prominent, with frameworks such as Biber's (2006) stance analysis enabling the identification of grammatical markers that convey attitudes, certainty, and obligation. The integration of computational tools and corpus-based methods has facilitated the analysis of large datasets, allowing for the identification of patterns and trends that might otherwise go unnoticed (Morozova et al., 2023). Comparative studies have expanded the methodological landscape, enabling researchers to examine differences in evaluative language across disciplines, institutions, and cultural contexts (Young & Duncan, 2014). These studies have highlighted the influence of disciplinary norms, institutional policies, and cultural values on the ways in which students express praise and criticism.

## Key Themes and Gaps

The literature reveals several recurring themes in the analysis of qualitative SET data. One consistent finding is the dominance of positive feedback, with students frequently praising instructor enthusiasm, clarity, and approachability. Negative comments are less common and, when present, tend to focus on aspects of course structure or assessment rather than personal attributes of the instructor.

Cultural influences play a significant role in shaping the expression of praise and criticism. In collectivist cultures, for example, students are more likely to offer effusive praise and to soften or avoid criticism, reflecting broader social norms of respect for authority and the maintenance of harmonious relationships. In contrast, students in more individualistic cultures may feel more comfortable expressing direct criticism and challenging the authority of instructors.

Despite these insights, the literature also highlights persistent gaps. Most research continues to prioritize quantitative ratings over qualitative feedback, leaving the linguistic and discursive dimensions of student evaluations relatively neglected. There is a particular lack of longitudinal studies that track changes in evaluative language over time, as well as cross-cultural studies that compare practices across different institutional and national contexts. Furthermore, the influence of gender, language proficiency, and other demographic factors on evaluative language remains underexplored.

## Rationale and Research Questions

The rationale for this study is rooted in the recognition that qualitative feedback in SETs offers a unique window into the lived experiences, attitudes, and values of students. In the context of the American University in Cairo, where students and faculty navigate a complex interplay of cultural, linguistic, and institutional influences, understanding how students construct praise and criticism in their written comments is particularly salient. The study seeks to address several pressing questions:

1. How do undergraduate students in the Department of Rhetoric and Composition at the American University in Cairo use language to evaluate their professors in qualitative SET comments?

2. What linguistic patterns emerge in positive versus negative feedback, and how do these reflect cultural and academic expectations in an Egyptian context?
3. What role do gender and other demographic factors play in shaping the linguistic choices students make when providing feedback on their professors?
4. How can discourse analysis of qualitative SET feedback inform more equitable evaluation practices?

The research aims to inform more effective interpretation of qualitative feedback, address potential biases, and offer recommendations for improving SET instruments. By uncovering the sociopragmatic features of student comments, the study aspires to contribute to a more nuanced and inclusive approach to student evaluation in higher education.

## **Methodology**

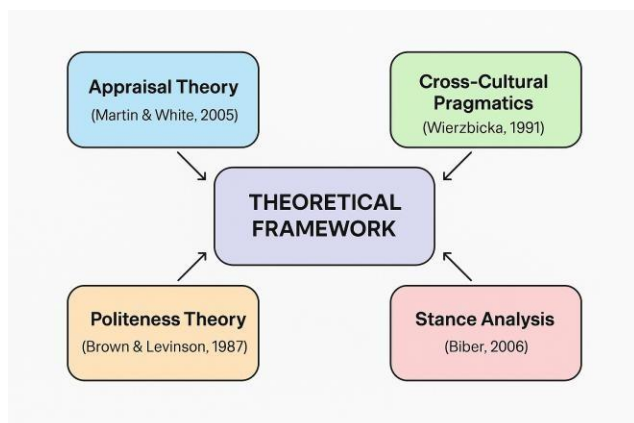
### **Study Design**

This research adopts an exploratory, qualitative approach, seeking to observe and identify linguistic features in student feedback from a sociopragmatic perspective. Rather than seeking to generalize findings, the goal is to deepen the understanding of human experiences (Creswell, 2007; Dörnyei, 2007). The primary data sources will include written comments from SETs collected over six semesters from eight instructors in the Department of Rhetoric and Composition at the American University in Cairo. To supplement the textual analysis, semi-structured interviews will be conducted with both faculty and students, providing deeper insight into the perspectives and intentions behind the feedback. All participants are assured confidentiality, and ethical approval has been obtained from the university's Institutional Review Board. The data collection process involved gathering SETs from a diverse group of instructors, balanced by gender and teaching experience, to ensure a representative sample. The focus group of undergraduate students will include individuals from various academic backgrounds and levels of English proficiency, reflecting the multilingual and multicultural context of the American University in Cairo. Thematic coding and analysis of linguistic patterns in feedback should follow.

### **Theoretical Framework**

The study integrates four complementary theoretical approaches to provide a comprehensive analysis of evaluative language in SETs. Appraisal Theory, as developed by Martin and White (2005), is employed to examine the attitudinal, engagement, and graduation resources that students use to express evaluation, amplify or soften their comments, and position themselves in relation to their instructors. Cross-Cultural Pragmatics (Wierzbicka, 1991) offers a lens for exploring culturally specific norms of expression, particularly in the domains of praise, criticism, and politeness. Politeness Theory (1987) is used to investigate the strategies students employ to manage face-threatening acts, especially when delivering negative feedback. Stance Analysis, drawing on Biber's (2006) framework, enables the identification of grammatical markers that convey certainty, affect, intention, and obligation, providing a nuanced understanding of how students construct their evaluative stance.

**Figure 1**  
*Suggested Theoretical Framework*



## Data Analysis

The analysis of the qualitative SET comments proceeded in several stages. First, the comments were coded for attitudinal resources, distinguishing between affect (emotional responses), judgment (moral or ethical evaluations), and appreciation (aesthetic or value-based assessments). Next, the comments were analyzed for engagement resources, identifying whether statements were presented as bare assertions (monoglossic) or as part of a broader dialogic context (heteroglossic). Graduation resources were then examined to assess the use of intensifiers, quantifiers, and other linguistic devices that amplify or downscale the force of the evaluation. The analysis also considered the use of face-saving strategies, such as hedging, depersonalization, and the use of passive voice, particularly in the expression of criticism. Patterns of stance were identified through the examination of grammatical markers, including modal verbs, adverbs, and evaluative adjectives. The data were further analyzed for the influence of gender, cultural background, and language proficiency on the expression of praise and criticism.

## Preliminary Findings

### Overview

The analysis of qualitative SET comments at the department of Rhetoric and Composition at the American University in Cairo reveals several key patterns that illuminate the sociopragmatic dimensions of student feedback. Positive feedback overwhelmingly dominates the dataset, with students using direct and intensified language to praise instructors. Criticism, when present, is often softened or depersonalized, reflecting a reluctance to threaten the face of instructors or disrupt the social harmony of the classroom. These patterns are shaped by cultural norms prevalent in the Egyptian context, where respect for authority and the maintenance of harmonious relationships are highly valued.

Gender differences also emerge in the analysis of feedback. Male instructors tend to receive more personal and emotive praise, with students emphasizing the transformative impact of their teaching. In contrast, feedback for female instructors is more formal and focused on professional qualities, such as organization, clarity, and subject-matter expertise. Criticism is more specific and slightly more frequent for female instructors, often relating to grading and clarity, whereas criticism for male instructors is rare and gently phrased.

**Sample Data: Female Instructor (Dr. Nadia)**

The analysis of SET comments for a female instructor, referred to here as Dr. Nadia, illustrates the dominance of positive feedback and the use of face-saving strategies in the expression of criticism. In the attitude domain, positive affect, judgment, and appreciation are the most prevalent categories. Negative comments are rare, accounting for a small percentage of the total. In terms of engagement, most comments are monoglossic, presented as bare assertions, while a minority are heteroglossic, indicating some degree of dialogic engagement. The use of graduation resources is notable, with frequent use of intensifiers and quantifiers to amplify praise. The language of the comments reflects a positive student-teacher relationship, with students positioning themselves as appreciative learners. Criticism, when present, is rare and softened through the use of hedging, depersonalization, and passive constructions.

**Sample Data: Male Instructor (Dr. Yassin)**

The analysis of SET comments for a male instructor, referred to as Dr. Yassin, reveals similar patterns of positive feedback, with some notable differences. In the attitude domain, positive affect, judgment, and appreciation are prevalent, while negative comments are minimal. Engagement resources show that most comments are monoglossic, and a smaller proportion are heteroglossic. The use of graduation resources is high, with students employing intensifiers and comprehensive quantifiers to amplify their praise. The feedback is highly effusive, aligning with cultural norms of respect and admiration for instructors. Criticism is rare and, when present, is gently expressed, often accompanied by mitigating language and expressions of gratitude.

**Linguistic Patterns in Praise and Criticism**

The analysis of linguistic patterns in SET comments reveals that praise is typically expressed through direct, personal, and intensified language. Students frequently use superlative adjectives, adverbs of degree, and personal pronouns to convey their appreciation and admiration for their instructors. Positive comments are often presented as bare assertions, with little need for justification or elaboration. In contrast, criticism is expressed indirectly, impersonally, and with considerable mitigation. Students are more likely to objectify criticism by focusing on course elements, such as assessment methods or course materials, rather than personal attributes of the instructor. The use of passive voice, hedging, and depersonalization serves to soften negative feedback and reduce the risk of offending the instructor.

Stance and engagement resources are also employed strategically in the expression of feedback. Positive comments are straightforward and assertive, while negative comments involve more complex positioning, including the use of modal verbs, conditional constructions, and expressions of uncertainty. The use of intensification is more common in praise, with students amplifying their positive evaluations through the use of adverbials and quantifiers. Criticism, when present, is downscaled or softened through the use of minimizers and mitigating language.

## **Gender-Based Comparison**

A comparison of feedback for male and female instructors reveals both similarities and differences in the expression of praise and criticism. Both groups receive overwhelmingly positive feedback on teaching style, organization, and supportiveness, with students frequently praising the classroom atmosphere and the effectiveness of teaching methods. However, feedback for female instructors is more formal and focused on professional qualities, such as clarity, organization, and subject-matter expertise. In contrast, male instructors receive more personal and emotive praise, with students emphasizing the personal impact and transformative experiences associated with their teaching.

Criticism is more specific and slightly more frequent for female instructors, often relating to grading practices and clarity of instruction. For male instructors, criticism is rare and gently phrased, often accompanied by expressions of gratitude and appreciation. These patterns suggest that gender norms and expectations may influence the ways in which students express praise and criticism, with potential implications for the interpretation and use of SET data in faculty evaluation and professional development.

## **Implications**

The findings of this study have significant implications for students, faculty, and higher education institutions. For students, understanding how praise is expressed can lead to improved feedback mechanisms, greater influence in shaping their educational experience, and heightened cultural awareness. The analysis of language use in SETs empowers students to reflect on their evaluative practices and to consider the impact of their feedback on instructors and the broader educational community. By highlighting the role of cultural norms and face-saving strategies in the expression of praise and criticism, the study fosters greater intercultural understanding and promotes more equitable learning environments.

For faculty, the findings offer deeper insights into how their teaching is perceived by students, supporting targeted professional development and the refinement of teaching practices. The semantic analysis of praise and criticism provides instructors with concrete examples of behaviors and approaches that resonate with students, enabling them to adapt their teaching methods to better meet student needs and expectations. By identifying patterns of bias and differential treatment in student feedback, the study also supports more fair and equitable evaluation processes, contributing to faculty well-being and career advancement.

For institutions, the study provides a foundation for the development of more nuanced interpretation frameworks for SET data, taking into account the linguistic, cultural, and demographic factors that shape student feedback. The findings can inform policy changes aimed at making evaluations more equitable and effective, as well as the design of more sophisticated evaluation surveys that capture the full range of student perspectives. By emphasizing the importance of qualitative feedback, the study encourages institutions to move beyond simplistic metrics and to engage in a more holistic and inclusive approach to faculty evaluation and instructional improvement.

## **Limitations**

Despite its contributions, this study acknowledges several limitations that must be considered in interpreting the findings. The qualitative nature of the analysis introduces potential

subjectivity and limits the generalizability of the results beyond the specific institutional and cultural context of the American University in Cairo. While efforts are made to ensure reliability through multiple coders and triangulation with interview data, the interpretation of linguistic and discursive features remains inherently subjective. Gender bias in evaluations, sample size constraints, and challenges in coding and categorization present additional hurdles that may affect the robustness of the findings.

Cultural and linguistic influences, particularly the use of English as a second language by Egyptian students, add complexity to the interpretation of discourse patterns. The transfer of cultural norms from students' first languages and the influence of institutional policies and expectations further complicate the analysis. The resource-intensive nature of qualitative analysis, including the time and expertise required for coding and interpretation, also limits the scalability of the approach.

### **Recommendations for Future Research**

Building on the findings and limitations of this study, several recommendations can be made for future research in the analysis of qualitative SET data. Cross-institutional studies applying the appraisal framework in different cultural and institutional contexts would allow for the identification of universal and context-specific patterns in evaluative language. Longitudinal research tracking changes in evaluative language over time could provide insights into the evolution of student feedback and the impact of institutional interventions.

Investigating the correlation between qualitative feedback and quantitative ratings would offer a more comprehensive understanding of the relationship between different forms of evaluation. Further exploration of survey design, including the phrasing of open-ended questions and the structure of evaluation instruments, could enhance the quality and interpretability of student feedback. Comparative studies examining differences between undergraduate and graduate feedback, as well as analyses of faculty responses to evaluative language, would deepen our understanding of the dynamics of evaluation in higher education.

### **Conclusion**

This research provides a comprehensive sociopragmatic analysis of student feedback in higher education, revealing the complex ways in which students in the department of Rhetoric and Composition at the American University in Cairo construct praise and criticism in SETs. The findings underscore the dominance of positive feedback, the influence of cultural and gender norms, and the strategic use of language to manage interpersonal dynamics. By highlighting the importance of linguistic patterns and cultural context, the study offers valuable insights for improving evaluation practices, addressing biases, and fostering more equitable and effective teaching and learning environments. The recommendations for future research point toward a more nuanced and inclusive approach to interpreting and utilizing student feedback in higher education.

In summary, the analysis of qualitative SET comments demonstrates that student feedback is a rich and multifaceted resource that, when properly understood and interpreted, can inform instructional improvement, faculty development, and institutional policy. By moving beyond quantitative metrics and engaging with the sociopragmatic dimensions of evaluation, higher education institutions can create more responsive, inclusive, and effective systems of teaching and learning assessment. This study contributes to the growing body of research



advocating for a more holistic and context-sensitive approach to student evaluation, one that recognizes the value of students' voices and the complexity of the educational experience.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

It is important to note that this study utilized *Perplexity.ai* to assist with the coding according to the theoretical framework of the Appraisal Theory in relation to sociopragmatic analysis of student evaluations.

## References

- Alhamdan, B. F. (2023). Students' Perceptions about Course Evaluation: A Discourse Analysis from the Perspective of the Appraisal System. *World Journal of English Language*, 13(2), 187-199.
- Austin, J. L. (1962). *How to do things with words*. Oxford University Press.
- Biber, D. (2006). Stance in spoken and written university registers. *Journal of English for Academic Purposes*, 5(2), 97–116.
- Brown, P., & Levinson, S. C. (1987). *Politeness: Some universals in language usage*. Cambridge University Press.
- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Sage Publications.
- Dörnyei, Z. (2007). *Research methods in applied linguistics*. Oxford University Press.
- Fairclough, N. (1995). *Critical discourse analysis: The critical study of language*. Longman.
- Grice, H. P. (1975). Logic and conversation. In P. Cole & J. Morgan (Eds.), *Syntax and semantics* (Vol. 3, pp. 41–58). Academic Press.
- Halliday, M. A. K., & Matthiessen, C. M. (2013). *Halliday's introduction to functional grammar*. Routledge.
- Herbert, R. K. (1986). Say “thank you”—or something. *American Speech*, 61(1), 76–88.
- Holmes, J. (1988). Paying compliments: A sex-preferential politeness strategy. *Journal of Pragmatics*, 12(4), 445–465.
- Martin, J. R., & White, P. R. R. (2005). *The language of evaluation: Appraisal in English*. Palgrave Macmillan.
- Morozova, Y., Rasskazova, O., & Tareva, E. (2023). Semantic analysis of student evaluations: Cultural dimensions in Russian academic feedback. *Journal of Language and Education*, 9(1), 12–24.
- Perplexity. (2025). *Perplexity.ai* [AI chatbot]. <https://www.perplexity.ai/>
- Searle, J. R. (1975). Indirect speech acts. In P. Cole & J. Morgan (Eds.), *Syntax and semantics* (Vol. 3, pp. 59–82). Academic Press.
- Stewart, M. (2015). The language of evaluation in student feedback: Appraisal and stance in university teaching evaluations. *Discourse Studies*, 17(5), 585–608.
- Wierzbicka, A. (1991). *Cross-cultural pragmatics: The semantics of human interaction*. Mouton de Gruyter.

Young, J. R., & Duncan, H. E. (2014). Online and face-to-face teaching evaluations: Are they equivalent? *Journal of Online Learning and Teaching*, 10(3), 489–503.

**Contact email:** soheim@aucegypt.edu



## **Civil Associations on Digital Platforms: Convergence Between Academic Knowledge and Society's Demands**

Jane Sara Freitas Lopes, Universidade do Estado da Bahia, Brazil  
Ana Maria Ferreira Menezes, Universidade do Estado da Bahia, Brazil

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Universities structure their Institutional Pedagogical Projects (PPI) by guiding their principles for Teaching, Research, and Extension, which consolidate in the process of knowledge creation in alignment with demands of society, fulfilling their social responsibility. Our aim is to investigate data and information on digital platforms of civil associations that enable convergence between university projects and social demands. We base our approach on dialectical epistemology, the theoretical foundations of the knowledge creation process: socialization, externalization, combination, internalization (SECI), and in the Ba context, referencing Nonaka and Takeuchi. A mapping of the associative world was carried out through exploratory research on the following platforms: Union of International Associations (UIA); Répertoire National des Associations (RNA) of France; and the Map of Civil Society Organizations (CSO MAP) in Brazil. The indicators Defense of rights, Education, Health, and Sustainability emerged from the purposes of the associations listed on the platforms, in accordance with the social objectives outlined in the IPP. The results showed that the platforms serve as an inductive context for interactions between teachers and students, whose divergent-convergent knowledge provides reinterpretation and insights from the specificities of the organizations and their multiple purposes; they are effective sources of explicit knowledge, manifested in the systematized data ready for dissemination, which, when incorporated into tacit knowledge, form the spiral, resulting in the conversion of knowledge. The platforms of the associations constitute a context capable of expressing social demands by composing the knowledge cycle in interaction with Teaching, Research and Extension, enabling projects focused on social responsibility.

*Keywords:* civil associations, digital platform, higher education, non-governmental organization (NGO)

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## **Introduction**

From the network society built around the flows, new socioeconomic relations driven by technologies that enable the construction of complex systems that include access and interference of people, things and organizations emerge. These technologies result in digital platforms, which represent a contemporary means of encouraging social interaction and intersectoral collaboration. In this context, the present study has as its object digital platforms that are nonprofit, publicly transparent, collaborative with data of civil society organizations.

The study of Civil Associations on digital platforms as a strategy for the convergence between academic knowledge and the demands of society requires understanding and exploring various areas and forms of knowledge. The theoretical concepts: the postmodern condition, the networked society, the social responsibility of the University and the potential of digital platforms in the creation of knowledge formed the theoretical basis for the research developed. Such conceptions facilitated access to the paths to be followed in deepening the object studied and achieving the intended objective: to investigate data and information on digital platforms of civil associations that enable convergence between university projects and social demands.

Specifically, the aim is to: Understand society as a flow based on the correlations between Information and Communication Technologies (ICT) and the postmodern condition; Analyze digital platforms as a source of dynamic data and information with the potential for knowledge creation, based on a critical understanding of their multiple dimensions; Map explicit knowledge about civil associations on the digital platforms of civil associations based on the selected indicators. This study considers the dynamics of updating the platforms in 2025, the period in which the research was carried out.

To meet an epistemological and methodological need, the research was developed in two stages. The first of theoretical foundation, based on the titles: Society: Flow Network; Digital Platforms; culminating in studies on The Necessary Convergence Between Social Demands, Sustainable Development Goals and Construction of Knowledge. The second moment concretizes the empirical part under the title: An Overview Of Civil Associations in Three Digital Platforms: Results and Discussions, in which it is presented the Union of International Associations (UIA); Répertoire National des Associations (RNA) of France; and the Map of Civil Society Organizations (CSO MAP) in Brazil. Demonstrating that data and information from digital platforms enable convergence between university projects and social demands.

## **Society: Flow Network**

Investigating the convergence between academic knowledge and society's demands implies understanding that ICT are imbricated in daily life. For some authors social, technological, economic and cultural changes that have happened since the middle of the 20<sup>th</sup> century impact all life in the planet shaping the postmodern condition (Harvey, 1989), originating the network society (Castells, 2021), and legitimating the dominance of knowledge because technoscience should be understood as part of the collective flow (Lévy, 1990). In this context, we present the digital platforms as a possible arena for the academic practice, that has among its goals the social responsibility based on the broad dimension summarized by the United Nations (UN) in Sustainable Development Goals (SDG). The convergence of academic knowledge and social demands may occur in a process of construction of

knowledge to be experimented in the SECI model, in an integration of the physical environment of the university and the virtual environment of the platforms.

The academic practice cannot renounce the systems of knowledge with their multiple narratives. To analyze the digital platforms as a dynamic source of data and information with potential to create knowledge demands visiting theories that understand the world from the intense flow of interactions and information in constant change. According to Pierre Lévy the great intellectual traditions have built hypertext libraries to which each generation added, dictated their knots and their links, consolidated collective intelligences where the universities sewed the centuries one to the other. The technologies of intelligence would boost the cyber culture whose “main operation would be connecting in the space, building and expanding the rhizome of senses” (Lévy, 2010a, p. 259). But the ICT in a highly integrated system make the creation of networks that penetrate all social structure possible, very distinctive feature of postmodern condition.

The categorization of knowledge in contemporary times can no longer consider the rigid distinction between modernism and post modernism. According to Harvey (2014), this distinction can be replaced by an analysis of the internal flow of relationships within capitalism as a whole, because the modernist condition is not homogenous, there are aspects that point to relative permanence, such as: “fixed capital, stable, standardized, and homogeneous markets, a fixed configuration of political-economic influence and power, an authority, easily identifiable metatheories, a solid foundation in materiality and technoscientific rationality [...]”, but the author warns us that “all this revolves around a social and economic project of becoming, of development and transformation of social relations, of auratic art and originality, of renewal and avant-gardism.” (Harvey, 2014, p. 303). On the other hand, the postmodern flexibility is: “dominated by the fiction, by the fantasy, by the immaterial (particularly money), by the fictitious capital, by the images, by the ephemerality, by the chance and by the flexibility in production techniques, labor market and consumer niches;” (Harvey, 2014, p. 305). However, it also demonstrates a concern about the being and the place, charismatic politics, worries about stable institutions and neoconservatism. Thus, the categories of modernism and postmodernism are seen as static reifications that are imposed to the fluid interpretations of dynamic oppositions. In the scope on this matrix of internal relationships there is no fixed configuration, it's preceded by a permanent oscillation between centralization and decentralization, between authority and deconstruction, between hierarchy and anarchy, between permanence and flexibility (Harvey, 2014, p. 305).

When he describes the way society operates, Manuel Castells (2021) informs that it is originated from a social structure in a network that involves all aspects of human activity, in multidimensional interdependence that depends on the values and the implicit interests in each country and organization, since “human beings live time in different ways, depending on how their lives are structured and practiced” (Castells, 2021, p. 31). This society is built around flows and these flows don't only represent a single element in the social organization, but rather “they are the expression of the processes that dominate our economic, political and symbolical life” (Castells, 2021, p. 494). From the features of network society it stands out: the subjection to sharing, their components can be part of multiple networks; the virtual dimension, which increasingly enables the transcendence of time-space; differentiated social experience, because the sharing of ideas, knowledge, information and concepts becomes easier and frequent through the web. Initially, the main particularity related to social practices is the overcoming of distance and time as defining elements of experiences, because at the

same time internet connects and separates users, but the digital platforms have intervened in a significant way in the social practices and diffusion of knowledge.

The context described above demonstrates that the ICT fomented studies about the potentials of cyber culture and of the construction of the collective intelligence that would end up in the democratization of knowledge and society. However, from the network society built around flows, new socioeconomic relations driven by technologies that enable the construction of complex systems that include access and interference of people, things and organizations emerge. Technologies such as cloud computation, metadata and artificial intelligence enable the creation of digital platforms that constitute part of the infrastructure of the network society. Investigating digital platforms makes it possible to identify their potential towards the construction of knowledge.

### **Digital Platforms**

Analyzing the digital platforms as dynamic source of data and information with potential to create knowledge demands critical understanding of their multiple dimensions, possibilities and limits. In this aspect, stands out: the conceptual dimension including the technological one; the optimization of the value expressed in the accessible and democratic potential of cyberspace (Lemos, 2021; Lévy, 2010b); the absence of objectiveness or neutrality in the initiatives of storing, interpreting and managing the social from structured data (D'Andréa, 2020; Lemos, 2021; Van Dijck, 2017) and the capacity of putting pressure on collective means and public services (Gawer & Srnicek, 2021; Helberger et al., 2017). These digital platforms operate in a variety of sectors, facilitate a variety of activities and offer different products, but they share common economic, commercial and governance features. The present study has as its object digital platforms that are nonprofit, publicly transparent, collaborative with data of civil society organizations.

In the network society there is a conceptual distinction between the place space – the time-space that is a support for face-to-face social practices – and the flow space. The flow space is made of electronic impulses, high-speed data transmission and transport systems that are interconnected by knots. These knots are strategic function and communication centers that build local activities and organizations around a key function of the network (Castells, 2021, p. 494). Another conceptual difference to be highlighted is the one between social networks – with greater emphasis in the interactional dimension – and the online platforms – whose exchanges are molded by computational, economic and political aspects of online connectivity (D'Andréa, 2020, p. 8).

What individualizes and consolidates the digital platform is the adoption of a computational architecture based on the connectivity and the exchange of data, supported by robust cloud server infrastructures, from a centralized model of informational and financial flows (D'Andréa, 2020, p. 14). These platforms use ICT to facilitate interactions among users, collecting and using data from these interactions, while they generate and take advantage of the so called network effects. These network effects exist when the use of the platforms by some users bring benefits to other users. From the interoperability between platforms emerges an ecosystem of platforms that are articulated in a distributed manner (D'Andréa, 2020; Gawer, 2021; Van Dijck, 2013).

It is important to highlight that there was a change in the perspective regarding the optimized values with the advancement of ICT. In the first moment, when internet appeared, the



expectation was a broad access to knowledge which would bring, as a consequence, the democratization of society and the promotion of people – optimization of social value. Nonetheless, the effective, current and potential economic exchanges are molded by the computational aspects and the online connectivity of the current times – optimization of economic value. According to Lemos (2021), with the purpose of monetization, the digital platforms monitor and control human actions in diverse domains through datafication – collection, processing and management of a great amount of data that demand specialized technology, storage and analysis –, it configures this way a sociotechnical regime that is developed in the social relationships in the scope of nature and knowledge control.

The use of digital platforms in public and private activities was necessary. It resulted in the streamlining of certain services, greater agility in documentation procedures, quick access to data leading to greater possibility of control upon certain routines. But, with the great involvement in many diverse activities, they started to play a role and influence public values and political objectives associated to those activities, such as freedom of expression, diversity, public safety, transparency and socioeconomic equality. The responsibility of the platforms for problems generated in online and offline environments, as well as the accountability of users has been discussed.

To discuss accountability, it is necessary to consider social differences at all levels, including among different countries, which result in imbalances of skills and power. Some questions are raised: Do the different citizens have the necessary knowledge and the skills to effectively assume responsibility? Can the users indirectly influence governments and online platforms through political parties and civil society organizations? Platforms and authorities need to create the necessary conditions, even taking into consideration technologies, so that users can be held accountable, however, are there really political-economic and socio-technical conditions that make alternatives possible? (Helberger et al., 2017).

In this panorama, in which the ICT are imbricated in everyday life, it is necessary to consider the importance of universities integrating into their graduate projects the preparation to enable people to understand their importance in the organization of public life in which they are placed as users. It's necessary to correlate the study of social contexts to the technologies in the search of extracting the potential from digital platforms keeping a critical view and understanding their complexity. Our aim is to investigate data and information on digital platforms of civil associations that enable convergence between university projects and social demands.

### **The Necessary Convergence Between Social Demands, Sustainable Development Goals and Construction of Knowledge**

The university as a place space immediately refers to the idea of knowledge construction. Currently, social responsibility is among the principles that guide its teaching, research and extension projects, it requires the understanding of social phenomena as resulting from the relationships among people and between people and the world. By approaching the realities of different social groups, demands to be integrated into university actions are identified. However, with the connection of spaces provided by technologies, local demands are expanded to a global dimension. The challenge is how to identify these demands and adapt them to the necessary actions to carry out university projects? The search for answers to this question led to the study presented here: An Overview of Civil Associations on Digital

## Platforms: Strategy for the Convergence Between Academic Knowledge and Demands of Society.

The topic of social responsibility of universities has been widely debated (Calderón, 2006; Kliksberg, 2006; Ribeiro & Magalhães, 2014; Vallaey, 2016). In the proposal presented here, the topic refers to building bridges between university community and society and to the realization of the university's social commitment, together with a permanent ethical reflection on the social dimension of teaching, research and extension. In this context, the proposal is committed to the perspective of building a society that is politically more democratic, economically more distributive and environmentally more sustainable.

The individual conduct – not lying, not attacking, being generous and solidary – will always be duties and moral guides of people's actions. These actions affect other people's attitudes and behaviors and the peers influence all community. But the virtue is the first little dimension of an ethically correct life, a life that needs to equate virtuous personal behavior with social justice and planetary sustainability, which can't be made in isolation and needs to consider the impact of everyone. So ethics demands three dimensions: Virtue, Justice and Sustainability. According to Vallaey (2016), practical action can be expedited from a theory of clear social responsibility that involves three actions: diagnosing and managing the negative impacts generated by organizations; creating a network of co-responsibility with everyone who can help; and eradicating negative impacts with the aim of building together a fairer and sustainable society. Thus, social responsibility must be thought in a way that is more socialized, politicized, shared among public and private sectors, balanced between the for-profit and nonprofit sectors, and focused on public policies for social justice and environmental sustainability. Taking as an example the UN's guiding principles on Business and Human Rights, which clearly state that companies are legally responsible for their supply chain and that their operations will not violate human or environmental rights throughout the whole value chain.

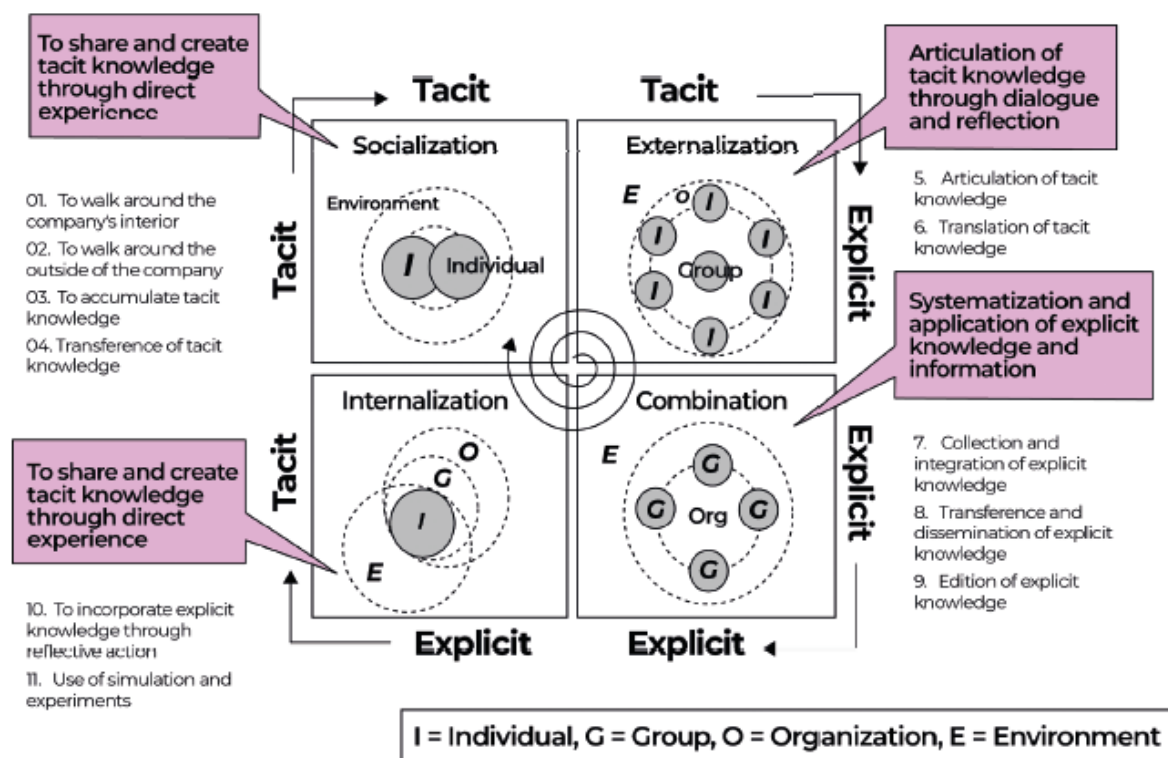
The ability to monitor climate conditions warns to the need for environmental conservation. Continuing the Millennium Development Goals (MDG) program, which already included ensuring environmental sustainability in its goal 7, governments, civil society, private initiative and research institutions contributed to discussions and suggestions in a co-participatory manner, building a new global agenda - the 2030 Agenda for Sustainable Development, which was adopted by 193 UN member states and covers topics related to the environmental, social, economic and institutional dimensions of development. It consists of 17 SDG, 169 targets, in addition to the Declaration (shared vision, principles and commitments). The monitoring and evaluation of its targets must be carried out at the global, regional and national levels (United Nations, 2015).

Higher education requires universities to structure their spaces and curricula to effect the dimensions of Teaching, Research and Extension. To this end, their didactic-pedagogical project considers different and multiple areas of scientific knowledge - health, biology, besides human, agricultural, exact and earth sciences, engineering, linguistics, arts, among others. The interconnection of this knowledge encourages a multidisciplinary view of the world, which helps its interpretation. Due to the organization and structuring of Universities, there is potential to contribute to the monitoring and implementation of SDG targets: in the dissemination of objectives, creating conditions for understanding of the potential and limits of their achievement; helping in the formulation of policies and developing social technologies for the implementation of the SDGs; critically contextualizing the meaning of

the call for action by all countries (despite their cultural and economic differences) in promoting prosperity and at the same time protecting the planet. Therefore, it's possible to see that the awareness about a sustainable development model for this and future generations offers the best way to reduce poverty and improve lives of people everywhere.

The knowledge construction process can occur in the integration between the physical environment of the university and the virtual environment of the platforms. The explicit knowledge made available on the digital platforms can be accessed and, in a shared interaction between professors and students in the academic environment, can provide reinterpretations and insights capable of creating other knowledge, according to SECI model. This approach refers to the theory of knowledge construction through the SECI process (Nonaka & Takeuchi, 2008) and the Ba theory (Nonaka & Toyama, 2008), influenced by dialectical reasoning and Eastern philosophy. Under this approach, four processes of knowledge conversion are considered in the creation of knowledge: socialization, externalization, combination and internalization. Knowledge occurs in a specific context in which information receives meaning, which can happen in a virtual environment. This cycle can be observed in Figure 1.

**Figure 1**  
*SECI Model of Knowledge Creation*



Source. Nonaka and Toyama (2008, p. 96)

## Methodology

The theoretical concepts presented facilitated the deepening and the achievement of the intended goal: To investigate data and information on digital platforms of civil associations that enable the convergence between university projects and social demands. This study considers the dynamics of updating the platforms in 2025, the period in which the research was carried out.

The analysis was carried out based on dialectical epistemology, the theoretical foundations of the knowledge creation process: socialization, externalization, combination, internalization (SECI) and in the Ba context (Nonaka & Takeuchi, 2008). A mapping of the associative world was carried out through exploratory research on the following platforms: Union of International Associations (UIA); Répertoire National des Associations (RNA) of France; and the Map of Civil Society Organizations (CSO MAP) in Brazil. The qualitative approach was chosen, characterized by studies with depth and complexity in which the researcher must face the ethics and politics of research, in this way the research is not the transmission of specialized data, but a catalyst for critical consciousness (Christians, 2006, p. 157).

The data collection and visualization were obtained from the selected digital platforms. D'Andrea (2020, p. 69) suggests considering platforms as unstable objects that transform different sectors and daily practices, but are also reconfigured by them. The research adopted the analysis of the profiles of the platforms and the data provided by them. Their multidimensionality and the reconfiguration of dynamic data were considered. The choice of platforms to be researched was motivated by the fact that they host non-profit associations, which express social demands and because their (original) data refer to the period before the network society.

### **An Overview of Civil Associations in Three Digital Platforms: Results and Discussions**

The movement for mobilizing civil society on issues of public interest is usually called NGO. Since it does not have a legally defined identity, the notion of non-governmental organization (NGO) is not exhaustive. However, it is a well-known entity, present in many parts of the world, with a vocation for international affairs and is characterized as a non-profit association. As for the term NGO, it originates from the United Nations Charter of 1945. For Erwan Queinnec (2007), the history and type of activity of many of them designates these organizations in scientific works, but more broadly they are called community groups or local solidarity associations. Thus, we can classify non-profit associations in a broad sense, which can be strictly called: Humanitarian associations; International non-governmental organizations (INGOs) and non-governmental organizations (NGOs); Civil associations.

The formalization of non-profit associations allowed their stories and existence to go beyond the place space and occupy the flow space. For different reasons, movements and collective actions chose to register themselves in accordance with institutional norms, which generated significant data organized in printed materials. This data, and much more, is currently available on digital platforms, which allow a broad view of non-profit associations, their fields of activity, purposes, permanence and their relations with public institution and other organizations, in addition to enabling access to members.

Digital platforms can provide an environment for identifying and addressing social demands from local to national level and also facilitate interactions between institutions and communities. For Logue and Grimes (2022), social mission platforms are unique because they provide technological architectures and governance standards that guide the loosely coupled interactions of network users towards the remediation of social problems and the creation of shared value. They warn, however, of the challenges of this objective because platforms often operate at the intersection of different sectors of society, where success requires the participation of highly diverse actors, including government, private companies, and the community.

**Table 1***Characterization of Selected Digital Platforms of Civil Associations*

	Union of International Associations (UIA)	National Directory of Associations Répertoire National des Associations (RNA)	Map of Civil Society Organizations in Brazil (CSO MAP)
Characteristics	Open (functionalities restricted to members), nonprofit, public transparency, collaborative	Open, nonprofit, public transparency, collaborative	Open, nonprofit, public transparency, collaborative
Organizations that comprise them	Global civil society since 1907 – NGOs e IGOs	Associations of France since 1901 – They have an RNA number	CSO of Brazil, They have a CNPJ number
Regulation Base (registration of associations, subsidy for the creation of platforms)	<ul style="list-style-type: none"> <li>- Belgian law of 1919 about Scientific International Associations</li> <li>- Law of 1954 - international associations</li> <li>- "Philanthropic, Religious, Scientific, Artistic or Educational objectives"</li> </ul>	<ul style="list-style-type: none"> <li>- Law 1901 – Public statistical system</li> <li>- associations created since 1901</li> <li>- 1980 – Implementation statistical observation for the private nonprofit actor.</li> <li>- Public statistical system - DIISES, SSM – INSEE</li> </ul>	<ul style="list-style-type: none"> <li>- Constitution of 1891, article 72, § 8</li> <li>- Constitution of 1934</li> <li>- Constitution of 1988, article 5</li> <li>- Civil Code of 2002, article 53</li> <li>- Law 6,015 of 1973</li> <li>- Decree 8,726/2016, which regulates Law 13,019/2014 – Regulatory Framework for CSOs</li> </ul>
Management	UIA	RNA and SIRENE Data-Asso and SIVA project	Institute of Applied Economic Research (IPEA)
Objectives	<ul style="list-style-type: none"> <li>- To enable networking between civil society actors and communication between associations and entities in the public and private sectors.</li> <li>- To make data available and promote research about organizations</li> <li>- To support public managers on public policies in conjunction with the organizations.</li> </ul>	<ul style="list-style-type: none"> <li>- To Support associations.</li> <li>- To give transparency to the activities of associations.</li> <li>- To make data available and promote research on associations.</li> <li>- Management of associative jobs.</li> </ul>	<ul style="list-style-type: none"> <li>- To give transparency to the work of CSOs</li> <li>- To inform about the importance and diversity of projects and activities of these organizations.</li> <li>- To make data available and promote research on CSOs.</li> <li>- To support public managers on public policies in conjunction with CSOs.</li> </ul>
Database (large volume, continuously updated and expanded, customizable)	Information sent directly by the Associations	The RNA - updated after filed with the public record of the creation, modification or dissolution of the association. Information sent directly by the Associations.	Official data - public and private sources. Information sent directly by CSOs and by federated entities, in collaboration.

Based on studies about digital platforms and with the aim of identifying the social demands in the purposes of civil associations, three platforms were selected to map the associative world. With similar histories, the three digital platforms accumulate information and produce research based on data that were initially originated in physical documents and migrated to digital databases. They are: UIA, located in Geneva and founded in 1907; RNA of France, a public record office that has organized the registry of civil associations since 1901; and CSO Map of Brazil, which uses public data on associations registered since 1973. In addition to their historical origins, the choice of these platforms was supported by the characteristics of these three organizations, summarized in Table 1.

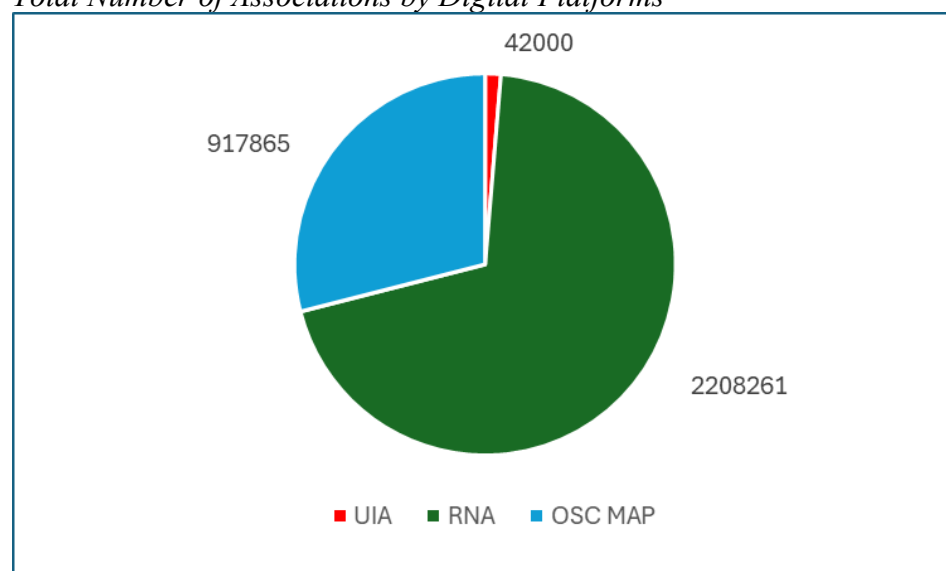
Table 1 shows that there are many common characteristics between the platforms studied. The main differences are highlighted below:

- UIA – Among the three, is the only one that exclusively includes international organizations. It collects, hosts and publishes information about international associations, mainly non-governmental organizations (INGOs) and intergovernmental organizations (IGOs). It is the UIA itself that seeks information that it considers reliable and impartial about global civil society actors from the past and present (UIA, 2025).
- RNA – Includes associations that have their headquarters or carry out permanent activities in France, regulated by the 1901 Law. They have an RNA number, which is the unique identification number for legal entities - similar to the CNPJ in Brazil.
- CSO Map - powered by data from CNPJ that contains registration information of associations called CSOs.
- In RNA and CSO Map, in addition to official data, users feed their own data, meaning that the intersectoral interactions necessary to address social problems are facilitated.

Figure 2 shows that the number of organizations in the UIA, although significant, is much smaller than that of the other two platforms. One of the reasons is that the organizations in the UIA are INGOs, while the other two platforms include all registered organizations from all over the country, including those with an international dimension.

**Figure 2**

*Total Number of Associations by Digital Platforms*

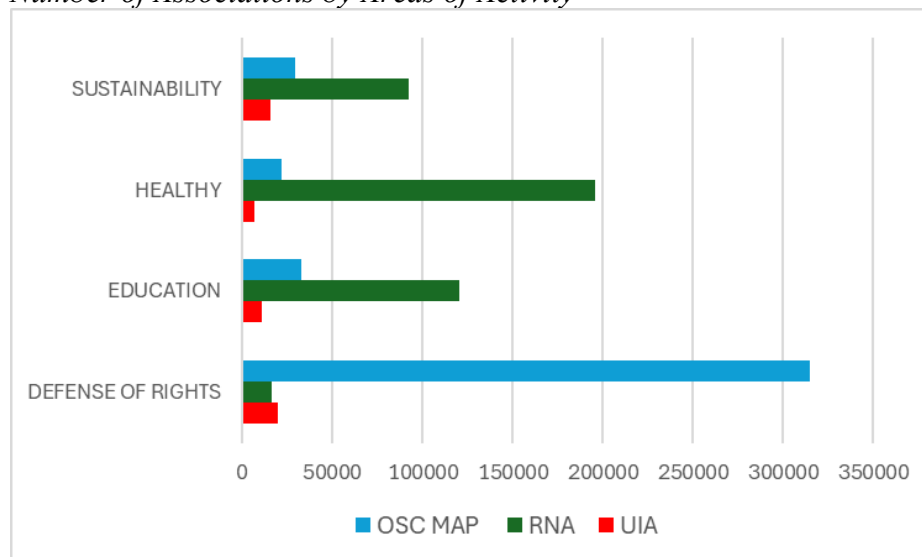


Source. Prepared by the author based on the studied digital platforms

The study sought to verify the social demands that were presented on the selected digital platforms, based on the organizations' purposes. The indicators defense of rights, education, health and sustainability emerged from the Universities' PPI in convergence with the associations' purposes. Figure 3 shows which activities have the highest concentration of organizations.

**Figure 3**

*Number of Associations by Areas of Activity*

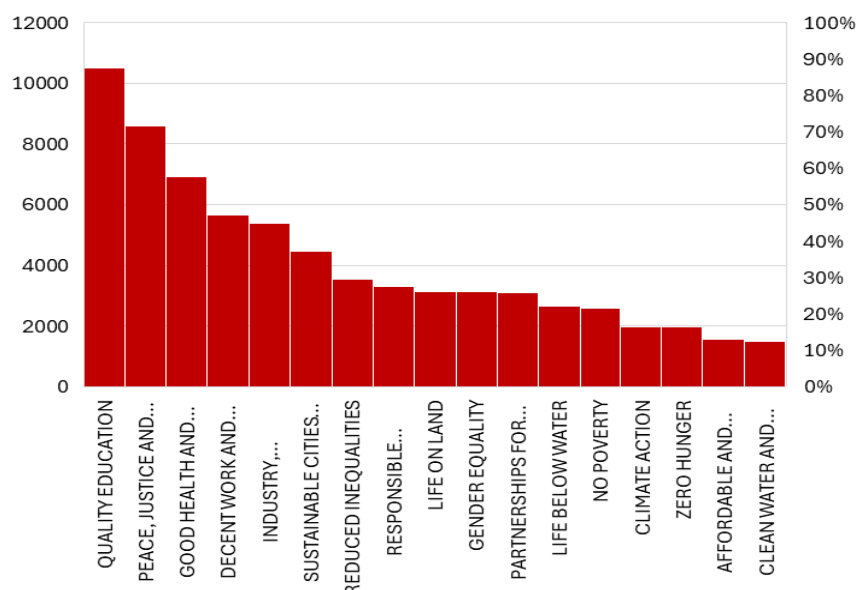


Source. Prepared by the author based on the studied digital platforms

It is important to inform that other associations related to other purposes were excluded from the data collection. The data about these associations refer to periods prior to the determination of the SDG and only the UIA includes organizations related to the SDG.

**Figure 4**

*Relationship Between INGOs and SDG on the UIA Platform*

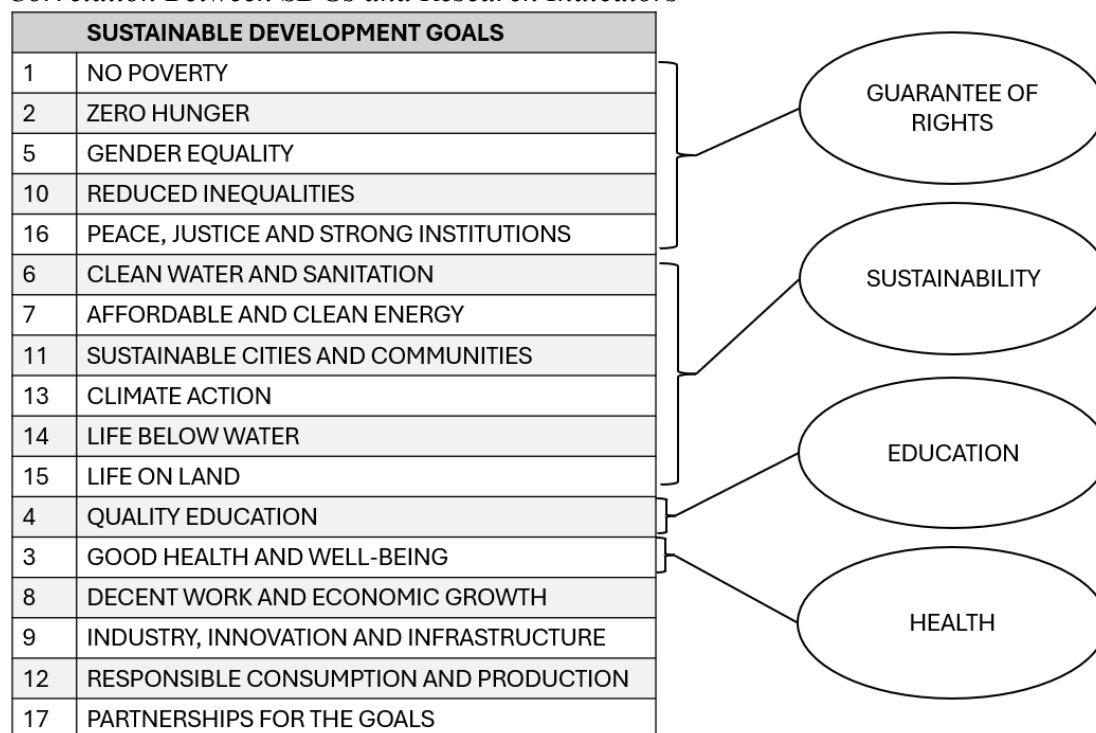


Source. Prepared by the author based on UIA

Considering the importance of the SDGs that are manifested in the University projects, a criterion was adopted to relate the SDG to the associations' purposes. In order to standardize the analyses and include all three platforms studied, the SDGs were selected and related to the indicators resulting in the following configuration.

**Figure 5**

*Correlation Between SDGs and Research Indicators*



Source. Prepared by the author based on information from UN

Regarding the creation of knowledge, it is suggested to know the synthesizing process of Nonaka and Toyama (2008, p. 96) and to adapt the educational action to each reality and context. Reflect upon the following:

- Socialization - can occur in person at the university, through direct individual/individual experiences, visits to digital platforms to perceive demands, shared experiences in everyday life.
- Externalization - tacit knowledge is articulated explicitly (concepts, images etc.) and can be shared with others.
- Combination - articulated with others, in person, so that knowledge is shared through discourse, dialogue, images or other resources, the relationship is individual/group and hypotheses are raised, contradictions become explicit and synthesized. In the combination, the relationship is between groups, using data from digital platforms to be combined, edited or processed to form a more complex and systematic set of explicit knowledge.
- Internalization - the practice where knowledge is applied and used in practical situations and becomes the basis for new routines, in university environments, in communities in interaction such as the online environments of platforms.

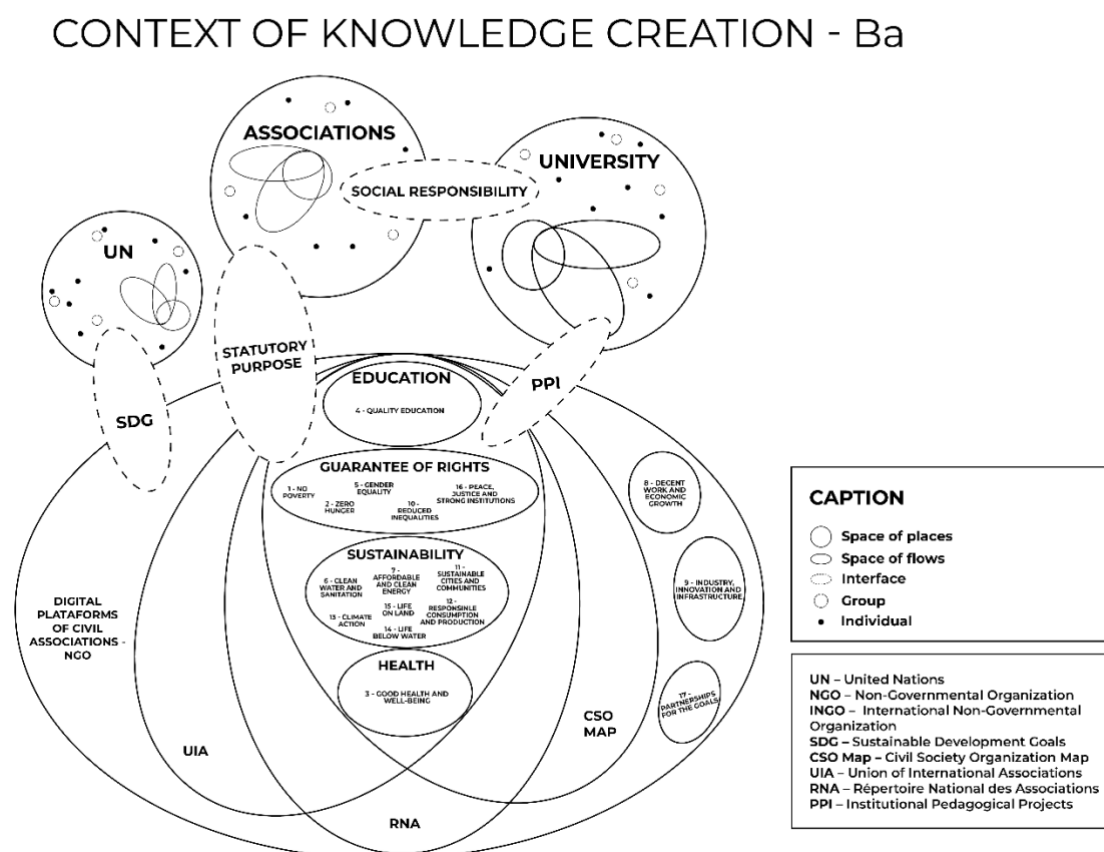
The Ba context, “Although it is easier to consider ba as a physical space such as a meeting room, it should be understood as interactions that occur in a specific time and place” (Nonaka & Toyama, 2008, p. 100). Another observation is that ba is not limited to a single



organization, it can be created across organizational boundaries. One ba in isolation is not enough in the process of knowledge creation, this creation “needs many ba, which exist at multiple levels and are connected to each other organically. Several ba at various ontological levels interact with each other and are connected to form a larger ba” (Nonaka & Toyama, 2008, p. 101).

**Figure 6**

*Summary of Interactions Between Civil Associations and Entities*



## Conclusion

Studies on digital platforms have highlighted their multiple dimensions and their potential for facilitating social actions. Furthermore, digital platforms are configured as a space for interaction with public bodies and other entities, in addition to enabling access to members. These spaces are conducive to the construction of knowledge in a shared context in movement called Ba – which can be both flow space and place space.

The results also showed that the platforms serve as an inductive context for interactions between teachers and students, whose divergent-convergent knowledge provides reinterpretation and insights from the specificities of the organizations and their multiple purposes; they are effective sources of explicit knowledge, manifested in the systematized data ready for dissemination, which, when incorporated into tacit knowledge, form the spiral, resulting in the conversion of knowledge. The platforms of the associations constitute a context capable of expressing social demands by composing the knowledge cycle in

interaction with Teaching, Research and Extension, enabling projects focused on social responsibility.

## References

- Calderón, A. I. (2006). Responsabilidade social universitária: Contribuições para o fortalecimento do debate no Brasil [University Social Responsibility: Contributions to Strengthening the Debate in Brazil]. *Revista da Associação Brasileira de Mantenedores de Ensino Superior*, 24(36), 8–2.
- Castells, M. (2021). *A sociedade em rede* [The network society] (R. V. Majer, Trans.). 23rd ed. Paz e Terra.
- Christians, C. G. (2006). A ética e a política na pesquisa qualitativa [Ethics and politics in qualitative research]. In *O Planejamento da Pesquisa Qualitativa: Teorias e abordagens* (S. R. Netz, Trans.). 2nd ed. Artmed. pp. 141–162.
- D'Andréa, C. (2020). *Pesquisando plataformas online: conceitos e métodos* [Researching online platforms: concepts and methods]. EDUFBA.  
<https://repositorio.ufba.br/ri/handle/ri/32043>
- Gawer, A. (2021). Digital platforms and ecosystems: remarks on the dominant organizational forms of the digital age. *Innovation*, 24(1), 110–124.  
<https://doi.org/10.1080/14479338.2021.1965888>
- Gawer, A., & Srnicek, N. (2021). *Online platforms: Economic and societal effects (Report for the European Parliament)*. Directorate-General for Parliamentary Research Services (EPRS).  
[https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS\\_STU\(2021\)656336](https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_STU(2021)656336)
- Harvey, D. (1989). *The condition of postmodernity: An Enquiry into the Origins of Cultural Change*. Wiley-Blackwell.
- Harvey, D. (2014). *Condição Pós-moderna. Uma pesquisa sobre as origens da Mudança Cultural* [The condition of postmodernity: An Enquiry into the Origins of Cultural Change] (A. U. Sobral & M. S. Gonçalves, Trans.). 25th ed. Edições Loyola.
- Helberger, N., Pierson, J., & Poell, T. (2017). Governing online platforms: From contested to cooperative responsibility. *The Information Society*, 34(1), 1–14.  
<https://doi.org/10.1080/01972243.2017.1391913>
- Institute of Applied Economic Research (IPEA). (2021). *Mapa das organizações da sociedade civil* [Map of civil society organizations]. <https://mapaosc.ipea.gov.br/>
- Kliksberg, B. (2006). Ética e responsabilidade social da universidade [Ethics and social responsibility of universities]. *Revista da Associação Brasileira de Mantenedores de Ensino Superior*, 24(36), 23–25.
- Lemos, A. (2021). The Future of the Platform Society in Brazil. *Revista Brasileira de Ciências da Comunicação*, [Brazilian Journal of Communication Sciences] 46.2023.  
<https://doi.org/10.1590/1809-58442023115en>

Lévy, P. (1990). *Les technologies de l'intelligence* [The Technologies of Intelligence] (C. I. Costa, Trans.). Le Découvert.

Lévy, P. (2010a). *Cibercultura* [Cyberculture] (C. I. Costa, Trans.). Editora 34.

Lévy, P. (2010b). *As tecnologias da inteligência: o futuro do pensamento na era da informática* [The Technologies of Intelligence: The Future of Thought in the Computer Age] (C. I. Costa, Trans.). Editora 34.

Logue, D., & Grimes, M. (2022). *Platforms for the people: enabling civic crowdfunding through the cultivation of institutional infrastructure*.  
<https://doi.org/10.17863/CAM.45846>

Nonaka, I., & Takeuchi, H. (2008). *Gestão do Conhecimento* [Knowledge Management] (A. Thorell, Trans.). Bookman.

Nonaka, I., & Toyama, R. (2008). Criação do conhecimento como processo sintetizador [Knowledge creation as a synthesizing process]. In Nonaka, I. & Takeuchi, H. *Gestão do Conhecimento* (A. Thorell, Trans.). Bookman.

Queinnec, E. (2007). La croissance des ONG humanitaires. Une innovation devenue institution [The growth of humanitarian NGOs: An innovation that has become an institution]. *Revue française de gestion*, n° 177, 83–94.

Ribeiro, R. C., & Magalhães, A. M. (2014). Política de responsabilidade social na universidade: Conceitos e desafios [Social responsibility policy at the university: Concepts and challenges]. *Educação, Sociedade & Culturas*, 42, 133–156.  
<https://doi.org/10.34626/esc.vi42.285>

Union of International Associations (UIA). (2014). <https://uia.org/>

United Nations (UN). *General Assembly. Resolution 70/1 on 25 September 2015. Transforming our World: the 2030 Agenda for Sustainable Development*.  
<https://docs.un.org/en/A/RES/70/1>

Vallaey, F. (2016). *Introducción a la Responsabilidad Social Universitaria RSU* [Introduction to University Social Responsibility RSU]. Ediciones Universidad Simón Bolívar.

**Contact email:** [jslopes@uneb.br](mailto:jslopes@uneb.br)

## Elevating Postgrad Learning: A New Chatbot Instructional Model

Ivy Chia, Singapore University of Social Sciences, Singapore  
June Tay, Singapore University of Social Sciences, Singapore  
Ma Nang Laik, Singapore University of Social Sciences, Singapore

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

This exploratory study examined the usability and pedagogical potential of STEP-AI, a text-based chatbot designed to scaffold student learning. Initial findings reveal consistently positive ratings for the chatbot in terms of accessibility, communication clarity, and educational support. STEP-AI also demonstrated alignment with key educational principles. These include structured progression, tailored feedback, active engagement and progressed learning. However, areas such as privacy communication and contextual adaptability are areas which could be strengthened for improvement. Limitations of the study include a small sample size, use of a pilot version, and the absence of multimedia features. As development continues, future research should include broader testing with diverse learners across authentic educational settings to evaluate STEP-AI's effectiveness, scalability, and relevance to evolving educational needs.

*Keywords:* GenAI, chatbot, instructional design, heuristic evaluation, user testing

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Recent advances in generative AI (GenAI) have expanded the role of chatbots in educational contexts, particularly in supporting learner engagement, guided thinking, and personalized learning pathways (Baidoo-Anu & Ansah, 2023; Ilieva et al., 2023). By offering immediate, judgment-free interactions, chatbots can function as accessible learning companions, especially for students who may lack confidence or hesitate to seek support through conventional academic services (Hirose et al., 2021; Kerly et al., 2006). This continuous availability allows learners to ask questions and receive clarification at their own pace, thereby fostering sustained, self-directed learning.

Chatbots have been explored across a range of domains, including cognitive behavioural therapy (Oh et al., 2020), mental health support (Eshghie & Eshghie, 2023; Joshi, 2023), healthcare education (Sallam, 2023), and psychiatric assistance (Cheng et al., 2023). While these applications demonstrate the versatility of conversational agents, their integration into higher education—particularly in the context of applied learning—remains underdeveloped. This project seeks to extend chatbot use into this area by exploring how conversational AI can be designed to support structured and pedagogically grounded learning experiences in tertiary education settings. Existing educational chatbots, including those based on models such as ChatGPT, present several limitations that constrain their effectiveness in academic contexts. These challenges include:

- **Reliance on Non-curated Sources:** Many chatbots generate responses based on large, unfiltered datasets from the internet, which may contain inaccuracies or reflect biased information.
- **Overly Generalized Knowledge:** Responses often lack subject-specific depth and are not aligned with curriculum requirements.
- **Insufficient Pedagogical Design:** Most available chatbots are not developed with explicit reference to educational theory, limiting their capacity to support structured learning processes.

## The STEP-AI Framework

A central aim of our project then was to design the chatbot not simply as a tool for delivering answers, but as a virtual tutor capable of supporting deeper learning through dialogue with student learning. To support these goals, we developed a chatbot known as STEP-AI. Its design was based on instructional design principles that support conversational learning. These principles include:

- **Structured Learning:** Chatbot introduces foundational concepts before guiding learners toward more complex thinking, following the hierarchical structure of Bloom's Taxonomy.
- **Tailored Support:** Chatbot aligns learning interaction and support with learners' ability, guided by Vygotsky's Zone of Proximal Development.
- **Engaged Interaction:** Chatbot promotes knowledge construction through meaningful dialogue and activities.
- **Progression:** Chatbot facilitates gradual, step-by-step learning through effective scaffolding.

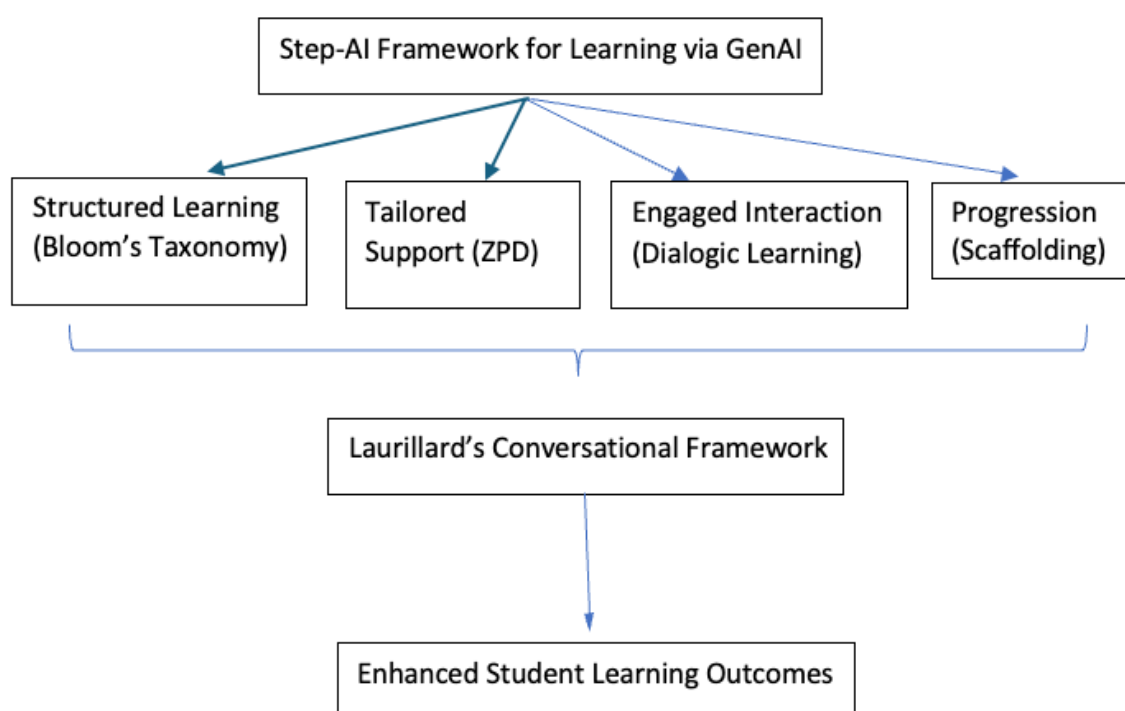
We term this integrated approach the STEP-AI Framework—Structured, Tailored, Engaged Progression for Learning—highlighting the key scaffolding pedagogical principles that prime the chatbot for effective teaching and learning. Our design aligns closely with Laurillard's

(2002) conversational framework. Laurillard emphasizes that interactive dialogue, iterative feedback, and adaptive learning processes are essential for facilitating meaningful learning experiences. This includes:

- **Two-Way Dialogue:** Chatbots' conversational capabilities make them ideally suited to facilitate the iterative teacher–student dialogue central to Laurillard's framework, encouraging students to question, explore, and co-construct knowledge.
- **Iterative Feedback and Adaptation:** Incorporating capabilities of cycles of feedback, reflection, and adaptation, chatbots can support by providing instant feedback, suggesting improvements, and tailoring responses based on user input.
- **Practical Applications:** Emphasizes bridging theoretical concepts with practical application, which a chatbot can facilitate through case-based scenarios and contextualized feedback.

**Figure 1**

*STEP-AI Framework*



Within this STEP-AI chatbot, we integrated case studies and domain-specific content for contextualised learning; these carefully curated to reflect authentic learning contexts. The incorporated learning materials and content allows for foundational knowledge building, complex problem-solving and critical analysis—ensuring that the chatbot is well-equipped to support a diverse spectrum of needs. Machine learning techniques are then applied, enabling the chatbot to process, interpret, and respond to student queries with contextual relevance and pedagogical appropriateness.

### Heuristic Evaluation and User Testing

To address technical and pedagogical robustness, our study adopts a two-stage evaluation process: heuristic evaluation and user experience survey. Expert reviewers conducted a heuristic evaluation to pinpoint how well the chatbot functions and where user experience could be improved. User testing, on the other hand, relies students' hands-on interaction with

the chatbot. We collected users' self-reported perceptions of their experience in learning, and these are aligned with key STEP-AI pedagogical constructs: structured learning, tailored support, and engaged interaction. Through integrating these two complementary evaluation methods, the study aims to provide a more comprehensive assessment of the chatbot's technical robustness and its capacity to facilitate meaningful learning experiences.

Heuristic evaluation, originally developed by Nielsen, is a widely used usability method that applies standard heuristics to identify design issues in user interfaces (Nielsen, 1994). The process typically involves multiple evaluators independently interacting with a system to detect usability problems, assign severity ratings, and suggest improvements. Among the most frequently cited frameworks are Nielsen's 10 usability heuristics (Nielsen, 1994a), which address broad interface design principles applicable across a wide range of systems.

While traditionally applied to websites and software applications, heuristic evaluation is increasingly relevant for conversational AI systems, such as ChatGPT, due to the complexity and variability of language-based interactions. In this study, we adopted the heuristic framework proposed by Höhn and Bongard-Blanchy (2021), which is specifically tailored to conversational interfaces. This model was selected for its ability to account for the dynamic, dialogic nature of chatbot interactions.

To evaluate both usability and pedagogical effectiveness, we extended the framework to include key learning design principles embedded in the STEP-AI model—namely, structured progression, personalized scaffolding, and interactive engagement. These were integrated into criteria 13 to 15 in the evaluation matrix (see Appendix 1).

For this study, we invited five subject matter experts to carry out a heuristic evaluation of the chatbot. As noted by Nielsen (1994a), three to five independent evaluators are typically sufficient to identify approximately 75% of usability issues in a given design. The experts tested the application across multiple platforms—including Internet Explorer, Chrome, and Firefox—and on various devices such as laptops, tablets, and smartphones. Table 2 outlines the evaluated heuristics and sub-heuristics, along with sample guiding questions and the grading scale used during the evaluation. Issues found were rectified in the Chatbot.

**Table 1**  
*Examples of Chatbot Heuristic Problems*

Heuristic	Sub-Heuristic	Problems
1. Visibility of system status	1.1 Presence of information	Lack of clear indication that the chatbot is processing (e.g. no typing indicator).
	1.2 Immediate feedback	Bot responses are delayed or not acknowledged; users feel stuck.
	1.3 Compel user action	Users unsure how to proceed; no clear next steps after a response
2. User control and freedom	2.1 Undo/redo	Users cannot undo or correct a previous input.
	2.2 Permanent menu	No easy way to return to main options or start over.
	2.3 Navigation options	Users can't skip sections or jump to specific features.
	2.4 Repair initiations	Chatbot fails to understand when users try to correct a misunderstanding.



## User Testing

Seven student volunteers were recruited in this chatbot for a user experience survey, from the broader cohort of tertiary students. Previous studies suggest that a sample of four to five user testers can uncover approximately 85% of usability issues (Virzi, 1992), supporting the use of a smaller sample for initial testing, using the User Experience Questionnaire (UEQ) adapting key dimensions from the UEQ (Borsci et al., 2021),<sup>1</sup> and integrating learning design elements such as structured learning, tailored support, engaged interaction and progression (see page 2) grounded in Bloom's Taxonomy, Zone of Proximal Development (ZPD), and scaffolding principles (see Appendix 2). This combination enables us to assess both the chatbot's usability and its educational effectiveness, which informed the development of a Likert-scale questionnaire (see Appendix 3). This user testing questionnaire was then administered to evaluate user perceptions of the chatbot's performance across multiple dimensions, including accessibility, functional quality, conversation clarity, privacy and security, response time, pedagogical features (STEP-AI components), and overall satisfaction. Twenty-four items were rated on a 5-point scale (1 = Strongly Disagree to 5 = Strongly Agree). See Appendix 3. The summarised results are presented below.

**Table 2**  
*Result Summary*

	Factor	Mean (Average)	SD (Average)	Key Observations
1.	Perceived Accessibility (Item 1-2)	4.2	0.6	High accessibility with easily detectable and findable chatbot.
2.	Perceived Quality of Functions (Item 3-9)	4.1	0.65	Good communication clarity, but context handling could be strengthened further.
3.	Perceived Quality of Conversation and Information Provided (Item 10-13)	4.1	0.6	Accurate and appropriate amount of information were given.
4.	Perceived Privacy and Security (Item 14)	3.9	0.8	Concerns about privacy communication.
5.	Time Response (Item 15)	4.2	0.6	Wait time was short.
6.	Structured Learning (Bloom's Taxonomy) (Item 16-17)	4.3	0.5	Strong progression from simple recall to higher-order thinking skills.
7.	Tailored Support (ZPD) (Item 18-19)	4.2	0.55	Effective scaffolding and adaptive prompts supported learning.
8.	Engaged Interaction (Item 20-21)	4.3	0.55	Active learning and reflection encouraged through interactive dialogues.
9.	Progression (Item 22-23)	4.2	0.6	Step-by-step learning progression effectively scaffolded learning experiences.
10.	Overall Satisfaction (Item 24)	4.5	0.4	High overall satisfaction and consistent positive experience.

<sup>1</sup> The scale was designed to check the quality of a chatbots based on the principles of interactive quality found within chatbot literature in the field. It has an estimated reliability between 0.76 and 0.87 distributed over 15 items.

The chatbot was generally rated relatively high across most areas, indicating relatively good usability and engagement. More specifically, users expressed strong satisfaction with the chatbot overall (Overall Satisfaction, Mean = 4.5, SD = 0.4), indicating that the platform met expectations and provided some positive experience. The chatbot's clarity of communication (Perceived Quality of Functions, Mean = 4.1, SD = 0.65) and the quality of information provided (Perceived Quality of Conversation and Information Provided, Mean = 4.1, SD = 0.6) were also highlighted as key strengths. Users found the chatbot accessible, with reasonably higher ratings for its detectability and ease of discovery (Perceived Accessibility, Mean = 4.2, SD = 0.6).

We also observed some reasonably strong alignment with established learning principles. Structured learning (Mean = 4.3, SD = 0.5) reflected the chatbot's effective progression from basic recall to higher-order thinking, aligning with Bloom's taxonomy. Tailored support (Mean = 4.2, SD = 0.55) suggested the chatbot successfully adapted to learners' needs and readiness through effective scaffolding. The pedagogical component of the questionnaire, consisting of four dimensions based on learning theories (Bloom's Taxonomy, ZPD, engagement, and progression), showed generally positive responses (M = 4.2 to 4.3, SD = 0.5–0.6). The pedagogical component showed a Cronbach's alpha of 0.70, indicating preliminary internal consistency for this exploratory study. However, given the small number of respondents, this value may not be stable and should be interpreted with caution. Further reliability testing with a larger sample is recommended. Given the early-stage status of the instrument, this serves as a diagnostic tool to guide refinement rather than a strict measure of psychometric adequacy.

Some areas emerged as areas to be strengthened. For example, the lower rating on perceived privacy and security (Mean = 3.9, SD = 0.8) suggested a need for clearer communication about data use and privacy policies. On the whole, the chatbot generally performed effectively, with particular strengths observed in facilitating step-by-step concept development, offering responsive support aligned with learner ability, and promoting active engagement through interactive dialogue. Additional testing with a larger, more diverse student participant base, along with higher order tasks and interactive media, will be needed to validate the chatbot's effectiveness across different contexts and learner needs.

### **Limitations of the Study**

Our study has a few limitations. Firstly, the small sample size, although aligned with standard heuristic evaluation practices (Virzi, 1992), limits the generalizability of the findings across all users. Secondly, the evaluation focused on a pilot version of the chatbot, which may not fully reflect the performance or usability of a more mature system. Future studies could expand testing with higher order tasks, with dynamic scaffolding in different learning scenarios, and in authentic educational settings to ensure its relevance and effectiveness. Also, the study focused solely on text-based interactions and did not include multimedia features.

### **Recommendations and Next Steps**

This study was largely exploratory and preliminary in nature, focusing on the development of the chatbot and gathering early user feedback. Future development could address the weak areas, such as enhancing privacy communication by integrating clearer messaging about data use and security. Future studies could build on exploratory findings and expand testing to include larger, more diverse participant samples. Going forward, the testing could also incorporate diverse learning scenarios, and evaluating the chatbot in authentic educational

settings to ensure its relevance and effectiveness. Collecting further data, such as performance metrics can guide further refinement of our Chatbot's design.

### **Conclusion**

To conclude, the integration of questioning techniques into ChatGPT for scaffolding learning, supported by educational theories, showed some potential. The initial user testing with the very small number of students indicated that they are generally satisfied with the quality of the interactions. The favourable outcomes suggest a potential for use and supports broader expansion of topics with further testing. The project represents a modest effort on our part to explore and experiment with chatbot, which we hope will benefit our students in the long run.

## References

- Araujo, T. (2018). Living up to the chatbot hype: The influence of anthropomorphic design cues and communicative agency framing on conversational agent and company perceptions. *Computers in Human Behavior*, 85, 183–189. <https://doi.org/10.1016/j.chb.2018.03.051>
- Baidoo-Anu, D., & Ansah, L. (2023). Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in Promoting Teaching and Learning. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4337484>
- Bastien, J. M. C. (2010). Usability testing: A review of some methodological and technical aspects of the method. *International Journal of Medical Informatics*, 79(4), 18–23. <https://doi.org/10.1016/j.ijmedinf.2008.12.004>
- Bloom, B. S. (Ed.). (1956). Taxonomy of educational objectives: The classification of educational goals. *Handbook I: Cognitive domain*. Longmans, Green.
- Borsci, S., Malizia, A., Schmettow, M., Velde, F., Tariverdiyeva, G., Balaji, D., & Chamberlain, A. (2021). The Chatbot Usability Scale: The design and pilot of a usability scale for interaction with AI-Based Conversational Agents. *Personal and Ubiquitous Computing*, 26, 95–119. <https://doi.org/10.1007/s00779-021-01582-9>
- Cheng, S., Chang, C., Chang, W., Wang, H., Liang, C., Kishimoto, T., Chang, J., Kuo, J., & Su, K. (2023). The now and future of ChatGPT and GPT in psychiatry. *Psychiatry and Clinical Neurosciences*, 77. <https://doi.org/10.1111/pcn.13588>
- Eshghie, M., & Eshghie, M. (2023). ChatGPT as a Therapist Assistant: A Suitability Study. *arXiv*. <https://doi.org/10.48550/arXiv.2304.09873>
- Feine, J., Morana, S., & Maedche, A. (2019). Designing a chatbot social cue configuration system. In *Proceedings of the 40th International Conference on Information Systems (ICIS)*. Association for Information Systems. AISel.
- Hirose, N., Shiramatsu, S., & Okuhara, S. (2021). Development of chatbot to support student learning strategies in design education. In *2021 IEEE International Conference on Agents (ICA)* (pp. 1–6). <https://doi.org/10.1109/ICA54137.2021.00007>
- Hobert S., & Berens, F. (2019). Small talk conversations and the long-term use of chatbots in educational settings—experiences from a field study. In: *Chatbot research and design. Third international workshop CONVERSATIONS 2019*. Springer, Cham, pp. 260–272.
- Höhn, S., & Bongard-Blanchy, K. (2021). Heuristic Evaluation of COVID-19 Chatbots. In Følstad, A., et al. *Chatbot Research and Design. CONVERSATIONS 2020. Lecture Notes in Computer Science*, vol 12604. Springer, Cham. [https://doi.org/10.1007/978-3-030-68288-0\\_9](https://doi.org/10.1007/978-3-030-68288-0_9)

- Ilieva, G., Yankova, T., Klisarova-Belcheva, S., Dimitrov, A., Bratkov, M., & Angelov, D. (2023). Effects of Generative Chatbots in Higher Education. *Information*, 14(9), Article 492. <https://doi.org/10.3390/info14090492>
- Joshi, K. (2023). AI Mental Health Therapist Chatbot. *International Journal for Research in Applied Science and Engineering Technology*. <https://doi.org/10.22214/ijraset.2023.56393>
- Kerly, A., Hall, P., & Bull, S. (2006). Bringing chatbots into education: Towards natural language negotiation of open learner models. *Knowledge-Based Systems*, 20(2), 177–185. <https://doi.org/10.1016/j.knosys.2006.11.014>
- Laurillard, D. (2002). Rethinking university teaching: *A conversational framework for the effective use of learning technologies (2nd ed.)*. RoutledgeFalmer.
- Nielsen, J. (1994). *Usability engineering*. Academic Press.
- Oh, J., Jang, S., Kim, H., & Kim, J. (2020). Efficacy of mobile app-based interactive cognitive behavioral therapy using a chatbot for panic disorder. *International Journal of Medical Informatics*, 140, 104171. <https://doi.org/10.1016/j.ijmedinf.2020.104171>
- Sallam, M. (2023). ChatGPT Utility in Healthcare Education, Research, and Practice: Systematic Review on the Promising Perspectives and Valid Concerns. *Healthcare*, 11(6), 887. <https://doi.org/10.3390/healthcare11060887>
- Tanana, M., Soma, C., Srikumar, V., Atkins, D., & Imel, Z. (2018). Development and evaluation of ClientBot: Patient-like conversational agent to train basic counseling skills. *Journal of Medical Internet Research*, 21(7), e12529. <https://doi.org/10.2196/12529>
- Virzi, R. A. (1992). Refining the test phase of usability evaluation: How many subjects is enough? *Human Factors*, 34(4), 457–468. <https://doi.org/10.1177/001872089203400407>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

## Appendices

### Appendix 1

#### *Heuristics for Chatbot Conversational Interface (Höhn & Bongard- Blanchy 2021) – for Expert Evaluation*

Heuristics	Sub Heuristics
1. Visibility of system status	1.1 Presence of information about the chatbot's state in the entire process 1.2 Immediate feedback (did the last user action work?) 1.3 Compel user action (what does the chatbot think the user will do next?)
2. Match between system and the real world	2.1 Chatbot uses the language familiar to the target users 2.2 Visual components (emojis, GIFs, icons) are linked to real- world objects 2.3 If metaphors are used, they are understandable for the user
3. User control and freedom	3.1 Chatbot supports undo/redo of actions 3.2 Chatbot offers a permanent menu 3.3 Chatbot provides navigation options 3.4 Chatbot understands repair initiations
4. Consistency and standards	4.1 Chatbot uses the domain model from the user perspective 4.2 Chatbot has a personality, consistency in language and style
5. Error prevention	5.1 Chatbot prevents unconscious slips by meaningful constraints 5.2 Chatbot prevents unconscious slips by spelling error detection 5.3 Chatbot requests confirmation before actions with significant implications 5.4 Chatbot explains consequences of the user actions
6. Recognition rather than recall	6.1 Chatbot makes the options clear through descriptive visual elements and explicit instructions 6.2 Chatbot shows summary of the collected information before transactions 6.3 Chatbot offers a permanent menu and help option
7. Flexibility and efficiency of use	7.1 Chatbot understands not only special instructions but also synonyms 7.2 Chatbot can deal with different formulations 7.3 Chatbot offers multiple ways to achieve the same goal
8. Aesthetic and minimalist design	8.1 Chatbot dialogues are concise, only contain relevant information 8.2 Chatbot uses visual information in a personality-consistent manner to support the user, not just random decoration
9. Help users recognize, diagnose, and recover from Errors	9.1 Chatbot clearly indicates that an error has occurred 9.2 Chatbot uses plain language to explain the error 9.3 Chatbot explains the actions needed for recovery 9.4 Chatbot offers shortcuts to fix errors quickly
10. Help and documentation	10.1 Chatbot provides a clear description of its capabilities 10.2 Chatbot offers keyword search 10.3 Chatbot focuses its help on the user task 10.4 Chatbot explains concrete steps to be carried out for a task
11. Context understanding	11.1 Chatbot understands the context within one turn 11.2 Chatbot understands the context within a small number of turns (usually 2-3 user-bot turn pairs) 11.3 Chatbot understands the context of a multi-turn conversation
12. Interaction management capabilities	12.1 Chatbot understands conversation openings and closings (e.g., 'hello') 12.2 Chatbot understands sequence closings (e.g., 'ok' and 'thank you') 12.3 Chatbot understands repair initiations and replies with repairs 12.4 Chatbot initiates repair to handle potential user errors
13. Progressive Learning	13.1 Chatbot questions in a way for knowledge to build on each other, increasing in complexity and depth according to Bloom's hierarchical structure. 13.2 Chatbot includes engaging questions that promote various cognitive skills from recalling facts to creating new ideas 13.1 Chatbot engagement allows for clear progression from simpler to more complex thinking
14. Personalised Scaffolding	14.1 Chatbot personalises content based on learners' input or profile 14.2 Chatbot provides hints, prompts, feedback, and other forms of support to guide learners through challenging tasks. 14.3 Chatbot adjusts the level of support based on the learner's prior knowledge, skill level, or progress.
15. Interactive Engagement	15.1 Chatbot require learners to interact with the content rather than passively consume it. 15.2 Chatbot's adapts its responses based on the learner's input to guide progress and personalize the experience. 15.3 Chatbot engage through dialogue, questions, simulations, or scenario- based tasks.

## Appendix 2

### *Items and Factors in the Chatbot Experience (adapted from Borsci et al., 2021)*

Item	Factors	Statements
1.	Perceived Accessibility	The chatbot function was easily detectable.
2.		It was easy to find the chatbot.
3.	Perceived Quality of Functions	Communicating with the chatbot was clear.
4.		I was immediately made aware of what information the chatbot can provide.
5.		The interaction with the chatbot felt like an ongoing conversation.
6.		The chatbot was able to keep track of context.
7.		The chatbot could make references to the website or service when appropriate.
8.		The chatbot could handle situations where the conversation line was not clear.
9.		The chatbot's responses were easy to understand.
10.	Perceived Quality of Conversation and Information Provided	I feel the chatbot understands what I want and helps me achieve my goal.
11.		The chatbot gives me the appropriate amount of information.
12.		The chatbot only gives me the information I need.
13.		I feel the chatbot's responses were accurate.
14.	Perceived Privacy and Security	I believe the chatbot informs me of any possible privacy issues.
15.	Time Response	My waiting time for a response from the chatbot was short.
16.	Structured Learning	The chatbot's questions progressed from simple recall to more challenging tasks.
17.		The chatbot included opportunities to apply, analyze, and evaluate information.
18.	Tailored Support	The chatbot adjusted its guidance based on my progress and understanding.
19.		The chatbot provided hints or prompts when I was unsure.
20.	Engaged Interaction	The chatbot encouraged me to reflect on my answers.
21.		The chatbot asked follow-up questions that deepened my understanding.
22.	Progression	The chatbot broke learning into small, manageable steps.
23.		The chatbot provided a sense of progression from simpler to more complex ideas.
24.	Overall Satisfaction	Overall, I am satisfied with my experience using the chatbot.

## Appendix 3

### *Chatbot Usability Questionnaire (Adapted from Borsci et al., 2021)*

Item	Statement	1	2	3	4	5
1	The chatbot function was easily detectable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	It was easy to find the chatbot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Communicating with the chatbot was clear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	I was immediately made aware of what information the chatbot can provide.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5	The interaction with the chatbot felt like an ongoing conversation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6	The chatbot was able to keep track of context.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7	The chatbot could make references to the website or service when appropriate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8	The chatbot could handle situations where the conversation line was not clear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9	The chatbot's responses were easy to understand.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10	I feel the chatbot understands what I want and helps me achieve my goal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11	The chatbot gives me the appropriate amount of information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12	The chatbot only gives me the information I need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13	I feel the chatbot's responses were accurate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14	I believe the chatbot informs me of any possible privacy issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15	My waiting time for a response from the chatbot was short.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16	The chatbot's questions progressed from simple recall to more challenging tasks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17	The chatbot included opportunities to apply, analyze, and evaluate information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18	The chatbot adjusted its guidance based on my progress and understanding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19	The chatbot provided hints or prompts when I was unsure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20	The chatbot encouraged me to reflect on my answers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21	The chatbot asked follow-up questions that deepened my understanding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22	The chatbot broke learning into small, manageable steps.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23	The chatbot provided a sense of progression from simpler to more complex ideas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24	Overall, I am satisfied with my experience using the chatbot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments: \_\_\_\_\_





## **Curricular Structure From Educational Policy in Colombia: The Case of the Doctorate in Administration at the University of Cartagena**

Maria Eugenia Navas Rios, University of Cartagena, Colombia  
Emperatriz Londoño Aldana, University of Cartagena, Colombia  
Daniel Ruiz Navas, Institución Universitaria Mayor de Bolívar, Colombia

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Educational policy in Colombia has undergone a significant transformation since the 1991 Constitution, granting universities autonomy to design, implement, and evaluate their programs, while the State maintains its role in supervision and quality control. At the doctoral level, this oversight is exercised through the National Intersectoral Commission for Quality Assurance in Higher Education (CONACES), which grants the "Qualified Registration", based on Decree 1330 of 2019. This decree establishes nine quality conditions for programs: Denomination, Program Justification, Curricular Aspects, Organization of Academic Activities and Formative Process, Research, Innovation and/or Artistic and Cultural Creation, Relationship with the External Sector, Faculty, Educational Resources, and Physical and Technological Infrastructure. This study analyzes the curricular design of doctoral programs in Colombia, drawing on the experience of the Doctorate in Administration at the University of Cartagena. It examines each of the aforementioned conditions, which methodologically guided a documentary analysis of regulations, institutional guidelines, and accreditation processes. This was complemented by interviews with key stakeholders involved in curricular design. Findings indicate that curricular design is based on learning outcomes and necessitates the integration of pedagogical, disciplinary, and contextual research at local, national, and international levels. Furthermore, challenges were identified in aligning programs with environmental demands and curricular flexibility, emphasizing the importance of a research-based design and academic and social relevance.

*Keywords:* higher education, public policies, doctorate, curriculum design

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The quality of higher education has been a growing concern in Colombia, especially at advanced training levels such as doctoral programs. The Political Constitution of 1991 consolidated university autonomy, delegating to institutions the responsibility for designing their academic programs. However, it also strengthened the State's role as a guarantor of quality through the Higher Education Quality Assurance System (SACES).

This study aims to analyze the curricular structure of a doctoral program within the framework of current public policy, taking the Doctorate in Administration at the University of Cartagena as a case study. The research is based on an analysis of applicable regulations and is developed from a critical and contextualized perspective of doctoral-level curricular design.

Initially, a country contextualization is presented, highlighting its different regions and the high concentration of doctoral programs in the central region, known as the Andean Region. Subsequently, the functioning of the Colombian education system and the higher education quality assurance system are explained.

The second section is dedicated to analyzing the case of the Doctorate in Administration, designed under the guidelines established by the State through Decree 1330 of 2019, which regulates the qualified registration of higher education programs. Finally, the study's findings, discussion, expected impacts, and conclusions are presented.

## Literature Review

SACES is the body created by the Ministry of National Education (MEN) to guarantee the quality of Higher Education. This was a response to the need to regulate the expansion of higher education, following Law 30 of 1992, which granted autonomy and self-regulation to Higher Education Institutions (HEIs), giving them responsibility for the offerings and relevance of their programs, but without including effective control mechanisms.

Consequently, the State issued regulations to control the quality of programs and institutions, such as: Decree 2904 of 1994, related to the voluntary accreditation of programs and institutions and the process to acquire it; Law 1188 of 2008, which regulates and makes mandatory the obtaining of the "Qualified Registration" for higher education programs; and Decree 1295 of 2010, which regulates and explicitly states the quality conditions for obtaining it and its temporary validity.

The effectiveness of compliance with the issued regulations, and subsequent ones, regarding this topic as improvement processes, based on experience (such as Decree 1330 of 2019, currently in force), is overseen by SACES, which is structured as follows:

- Information: Systems such as the National Higher Education Information System (SNIES), the System for the Prevention of Higher Education Desertion (SPADIES), and the Labor Observatory for Education support informed decision-making.
- Evaluation: This includes processes for verifying minimum conditions (qualified registration overseen by the National Intersectoral Commission for Quality Assurance in Higher Education – CONACES) and excellence (accreditation overseen by the National Accreditation Council – CNA).

- Promotion: Strategies for institutional strengthening and support for continuous improvement.

This system allows the State to maintain active supervision without encroaching on institutional autonomy, promoting quality from a perspective of shared responsibility. Regarding this assertion, which is the system's *raison d'être*, there have been academic discussions from its inception about regulation versus autonomy. For instance, Forero et al. (2004) referred to State interference through the creation of various governmental councils to supervise and control quality and the constitutional principle of university autonomy. Along similar lines, Ordóñez and Salazar (2013); Gil et al. (2017); and Fontalvo et al. (2021) refer to centralized processes and homogenized and standardized institutional inputs for verifying and evaluating results, which, according to Velásquez et al. (2022) and Matos et al. (2022), are requirements for both the mandatory Qualified Registration and the voluntary high-quality accreditation of programs and institutions.

### Methodology

This study adopted a qualitative, interpretive, and critical approach based on the documentary analysis of laws, decrees, resolutions, institutional policies of the University of Cartagena, and relevant Colombian scientific literature. This followed the methodological steps recommended by Quintana and Montgomery (2006), which include stages of tracing, inventorying, classifying by relevance, in-depth reading, and cross-reading of findings. This was complemented by semi-structured interviews with members of the program's design committee and the curricular expert who led the process. Content analysis, following the approach of Arbeláez and Onrubia (2014), was applied to both documents and interviews. Validity and reliability were ensured through the triangulation of data sources.

### Case Study: Doctorate in Administration – University of Cartagena

Doctoral programs in Colombia are relatively recent due to their slow development. The first doctoral program was created in 1978 by the National University of Colombia, with a pedagogical and research focus (Agreement 46 of May 9) (Arenis & Pinilla, 2016). Between 1986 and 1987, this same university offered four additional programs, and by the early 1990s, according to Soto (2009), 31 new programs were offered by universities such as Antioquia, Andes, Industrial de Santander, and Valle. By 2020, the number of doctoral programs had risen to 394, of which 60 had high-quality accreditation.

Since their inception, the offering of doctoral programs in Colombia has been concentrated in the country's main cities, especially in the Andean region. Bogotá leads with 106 programs, followed by Medellín (76), Cali (33), Manizales (26), and Pereira (9). The remaining programs are distributed among the Caribbean, Pacific, Orinoquía, and Amazonian regions. Specifically, in the Caribbean region, the Doctorate in Administration at the University of Cartagena is the only one offered by a public institution. There are three other programs in this area, all located in Barranquilla and offered by private institutions.

The design, construction, dissemination, and approval of the Doctorate in Administration at the University of Cartagena emerged from various academic activities. The first was an internship undertaken by Dr. María Eugenia Navas Ríos at the Complutense University of Madrid, Spain, in November 2018, funded by the University of Cartagena. During this stay, the first draft of the program was developed, and letters of commitment were obtained from

Spanish faculty members, who expressed their willingness to support the program through course development, internships, advisory roles, thesis co-authorship, participation as jurors, joint scientific publications, and the possibility of double degrees.

In the same year, during the Educa AL 2018 Congress held in Cartagena and led by the Business Administration program's Trade and Consumer Behavior Group, South American doctors—mostly Argentinians from the marketing area—were gathered and also signed similar letters of commitment.

Internally, meetings were held with full-time faculty and research group leaders from the Faculty of Economic Sciences with doctoral degrees, during which a more advanced version of the program was presented. In these sessions, recommendations for improvement were received, the research emphases for the specific training component were defined, and advanced courses were proposed based on the research strengths of the academic groups.

To ensure the program's relevance, business guilds such as ACOPI, FENALCO, and the Cartagena Chamber of Commerce were involved. These organizations actively participated in curriculum construction, made suggestions on topics to include, and expressed their support for the program through institutional commitment letters.

The final document complies with the requirements established by Decree 1330 of 2019 and other national and institutional regulations. In addition to the support from guilds and faculty members of the Faculty of Economic Sciences, the program has a large group of national and international collaborators from countries such as Spain, Argentina, Brazil, Canada, Japan, Peru, and the United States, as well as the support of various academic networks.

Decree 1330 of 2019 establishes nine quality conditions for academic programs, which are particularly rigorous for doctorates due to their investigative nature and their impact on knowledge production:

- Program Denomination
- Program Justification
- Curricular Aspects
- Organization of Academic Activities and Formative Process
- Research, Innovation, and/or Artistic and Cultural Creation
- Relationship with the External Sector
- Faculty
- Educational Resources
- Physical and Technological Infrastructure

The conditions of denomination and justification ensure the program's coherence with local, regional, and international demands, highlighting its curricular relevance and the expected social, economic, and environmental impact. These conditions correspond to the contextualization stage within curricular design.

Conditions 3 to 6 (curricular aspects, organization of academic activities, research and innovation, and relationship with the external sector) belong to the structure and organization stage of the curriculum, aimed at achieving the proposed learning outcomes.

**Table 1**  
*Curriculum Correspondence Matrix*

<b>GRADUATE PROFILE</b>	<b>GRADUATE COMPETENCIES</b>	<b>PROGRAM LEARNING OUTCOMES</b>	<b>COURSES</b>
<p>Upon graduation and obtaining the PhD in Administration, with the corresponding certification of emphasis from the University of Cartagena, the candidate's training will be evidenced by the following abilities:</p> <p>1. Design, develop, and undertake novel and innovative projects in the business, academic, private, and public sectors, civil organizations, and/or specific to the chosen emphasis.</p> <p>2. Integrate knowledge to address the complexity of business and/or institutional problems or situations and formulate judgments based on available information that enables the solution or improvement of the situation under study, from the implementation itself, or through advisory and</p>	<p>C1. Appropriate theoretical developments, methodologies, methods, procedures, techniques and qualitative-quantitative tools to carry out scientific research.</p>	<p>RAP1: Prepare article(s) to communicate advances in knowledge and the state of the art in the topic selected for the thesis, from any of the chosen emphases, gathering information regarding the results obtained, methods, methodologies, procedures, and tools used in its development.</p>	<p>Economic Globalization and Regional Development Theories Trends in Knowledge Management, Innovation, and Entrepreneurship Strategic Marketing</p>
	<p>C2. Understand and implement public, economic, business, and educational policy, as well as management-related aspects of each of the aforementioned areas.</p>	<p>RAP2: Develop models, prototypes, and procedures, from the management and transfer of knowledge in the administrative field, that can be intellectually protected, supporting business start-ups and/or improvements and growth in existing ones.</p>	<p>Strategic Management Project Formulation and Evaluation</p>
	<p>C3. Design and develop applied scientific research in the field of administrative sciences that impact the improvement and transformation of the business community, contributing to the economic development of the Department, the Region, and, consequently, the Country.</p>	<p>RAP3: Solve real-life cases and problems within the business and/or educational institution, based on professional ethics, social responsibility, and the country's public, economic, business, and educational policies.</p>	<p>Public Management and Governance Educational Policy and Management</p>
	<p>C4: Argue based on scientific evidence and communicate, in national and international contexts,</p>	<p>RAP4: Design, plan, implement, and evaluate research projects in the field of administrative sciences, both</p>	

consulting services to those seeking it. 3. Communicate orally and in writing the results of novel and innovative scientific research specific to the administrative sciences to the scientific, academic, business, and institutional communities in their native language and a second language, using the various existing media approved for this purpose by the academic community of the discipline.	their position on business events and situations that require solutions.	individually and in collaboration with other individuals or organizations.	
	C5. Argue based on scientific evidence and communicate, in national and international contexts, their position on business events and situations that require solutions. Act with intellectual autonomy and social sensitivity in the design and development of investigative processes, demonstrating their knowledge and moral and ethical commitment as a person and as a professional for the benefit of companies and improving the quality of life of the community.	RAP5: Apply advances in knowledge to local businesses (context), concretized through models, strategies, procedures, tools, and the results of research processes that transform their actions in favor of continuous improvement.	Deepening I Deepening II Deepening III Deepening IV
	C6. Promote and propose the articulation of scientific and technical aspects with moral, ethical, and political aspects, contributing to nation-building through coexistence, pluralism, and recognition of others with a clear sense of democracy.	RAP6: Prepare and approve your final project, your doctoral thesis, in accordance with the requirements stipulated in the program.	Degree Seminar I Degree Seminar I Thesis
		RAP7: To proceed in all individual, collective, and collaborative actions with ethics and social responsibility, assuming the consequences of their	Ethics and Corporate Social Responsibility

---

actions within a  
framework of respect  
for differences, dissent,  
and human dignity,  
contributing from a  
reflective critical  
position to the  
construction of a nation  
that coexists in peace,  
with justice, and equity

---

*Source:* Educational Project Doctorate in Administration.

Finally, conditions 7 to 9 (faculty, educational resources, and infrastructure) guarantee the availability of essential human, technological, and physical resources for high-quality doctoral training, focused on the generation of frontier knowledge.

These conditions seek not only to ensure compliance with minimum standards but also to ensure comprehensive and contextualized quality, aligned with environmental needs.

## **Results and Discussion**

The main results obtained are as follows:

- The curricular design of the Doctorate in Administration is based on learning outcomes, ensuring coherence among the graduate profile, content, evaluation methods, and research processes.
- There is evidence of an effective integration of pedagogical, disciplinary, and contextual research approaches, articulated with local, national, and international realities.
- Significant challenges persist in aligning the curriculum with environmental demands, particularly concerning flexibility, social relevance, and internationalization.
- The articulation of research projects with institutional guidelines and recognized research groups, both nationally and internationally, constitutes a program strength. However, this articulation requires continuous consolidation through the strengthening of the academic communities formed within the doctoral framework.

Regarding the discussion, it's highlighted that Colombian quality assurance policy has established clear regulatory conditions for the design and implementation of doctoral programs. Nevertheless, true academic quality transcends regulatory compliance; it lies in the institutions' capacity to integrate research, contextual relevance, and innovative pedagogical approaches.

Tensions persist between state regulations and university autonomy, a situation addressed by academics such as Ordóñez and Salazar (2013), who state that “university autonomy has been restricted by the Ministry of Education, the creation of CESU, SUE, the National Accreditation Council (CONACES), and other governmental agencies”. Along the same lines, Forero et al. (2004) argue that “various efforts have been made to reduce this inherent quality of the university and disturb the necessary balance between the constitutional principle of university autonomy and the State's inspection and oversight function” (p. 295), especially concerning curricular innovation and adaptability.

Decree 1330 of 2019 represents both an opportunity and a challenge: while it introduces mechanisms for flexibility in curricular design, it also demands that institutions rigorously demonstrate the relevance and effectiveness of their programs. In this sense, the Doctorate in Administration contributes significantly to the Higher Education Quality Assurance System (SACES) in Colombia by articulating learning outcomes with pedagogical strategies, curricular structure, and concrete research products, with a particular focus on internationalization.

This alignment enhances key competencies in doctoral students, such as research capacity, critical thinking, and ethical commitment in the field of Administration. As Padrón (2014) points out, research is a systematic and ethical process aimed at generating new knowledge. The coherence between the graduate profile and expected outcomes demonstrates the program's intention to train researchers capable of critically analyzing organizational phenomena and generating contextualized knowledge.

The curriculum prioritizes research from the initial stages of the formative process, integrating solid theoretical, methodological, and ethical foundations. It includes modules on contemporary administrative theory, training for the execution of high-impact projects, and active participation in national and international academic networks. These components ensure compliance with the standards established by the Ministry of National Education and by peer academic evaluators.

Additionally, the program acts as a catalyst for the development of institutional research through the strengthening of research groups and the promotion of academic networks. Its objective is to form a critical mass of doctors capable of leading innovation processes, organizational transformation, and public policy formulation. This approach aligns with García-Peñalvo's (2017) stance, who argues that research must be articulated through lines, groups, and networks to promote knowledge production and dissemination.

Graduates of the program are expected to have a positive impact on the quality of higher education, both in research and teaching, by serving as trainers in undergraduate and postgraduate programs. In this regard, their work contributes to fulfilling the country's academic, institutional, and socioeconomic objectives.

Strategically, the doctoral program responds to the specific needs of the University of Cartagena and the Colombian Caribbean region. It is the first—and to date, only—Doctorate in Administration offered by a public university with national and international accreditation in that region. Its purposes include closing research gaps, promoting a strong scientific culture, and generating solutions to complex regional and national challenges from both local and global perspectives.

## Conclusions

The curricular design of postgraduate programs, particularly doctoral programs in Colombia, must adhere to a robust regulatory framework that, simultaneously, upholds and respects university autonomy.

The Doctorate in Administration at the University of Cartagena demonstrates that it is possible to build a coherent, research-oriented curriculum based on learning outcomes. It



addresses both local and global administrative and organizational challenges, ultimately benefiting the community at large and national development.

Moving forward, it is essential to strengthen the dialogue among public policies, the institutional context, and societal needs to consolidate relevant, sustainable, and high-quality academic doctoral programs.

## References

- Acuerdo 02 de 2020. (2020). *Por el cual se actualiza el Modelo de Acreditación en Alta Calidad* [By which the High-Quality Accreditation Model is updated]. Ministerio de Educación Nacional. [https://www.mineduacion.gov.co/1759/articles-393564\\_recurso\\_1.pdf](https://www.mineduacion.gov.co/1759/articles-393564_recurso_1.pdf)
- Arenis, J., & Pinilla, A. (2016). *La formación doctoral en Colombia: Un análisis histórico* [Doctoral education in Colombia: A historical analysis]. Editorial Universidad Nacional.
- Consejo Nacional de Acreditación. (2010). *Lineamientos para la acreditación de alta calidad de programas de maestría y doctorado* [Guidelines for high-quality accreditation of master's and doctoral programs]. [https://www.mineduacion.gov.co/CNA/1741/articles-187386\\_recurso\\_2.pdf](https://www.mineduacion.gov.co/CNA/1741/articles-187386_recurso_2.pdf)
- Consejo Nacional de Acreditación. (2013). *Lineamientos para la acreditación de alta calidad de programas de pregrado* [Guidelines for high-quality accreditation of undergraduate programs]. [https://www.mineduacion.gov.co/1621/articles-342684\\_recurso\\_1.pdf](https://www.mineduacion.gov.co/1621/articles-342684_recurso_1.pdf)
- Consejo Nacional de Acreditación (CNA). (2019). *Informe de procesos de acreditación de programas e instituciones* [Report on accreditation processes of programs and institutions]. <https://www.cna.gov.co/1741/article-186359.html>
- Consejo Superior de la Universidad de Cartagena. (2019, junio 21). *Acuerdo No. 15 del 21 de junio de 2019. Por medio del cual se actualiza el Proyecto Educativo Institucional* [Agreement No. 15 of June 21, 2019. By which the Institutional Educational Project is updated]. <https://drive.google.com/file/d/1wGHN9yrYnjY3r1Xwt7N8xPKSIT-XfGg2/view>
- Congreso de la República de Colombia. (1992, diciembre 28). *Ley 30 de 1992. Por la cual se organiza el servicio público de la educación superior* [Law 30 of 1992. By which the public service of higher education is organized]. Diario Oficial No. 40.700. [http://www.oas.org/juridico/spanish/mesicic2\\_col\\_ley\\_30\\_sp.pdf](http://www.oas.org/juridico/spanish/mesicic2_col_ley_30_sp.pdf)
- Congreso de la República de Colombia. (2008, abril 25). *Ley 1188 de 2008. Por la cual se regula el registro calificado de programas de educación superior* [Law 1188 of 2008. By which the qualified registration of higher education programs is regulated]. [https://www.mineduacion.gov.co/1621/articles-159149\\_archivo\\_pdf.pdf](https://www.mineduacion.gov.co/1621/articles-159149_archivo_pdf.pdf)
- Consejo Superior de la Universidad de Cartagena. (2020). *Acuerdo 20 del 2020. Por medio del cual se aprueba la Política Curricular en la Universidad de Cartagena* [Agreement 20 of 2020. By which the Curricular Policy at the University of Cartagena is approved].

- Fontalvo, T., Delahoz, E., & Morelos, J. (2021). Diseño de un sistema integrado de gestión de la calidad para programas académicos de educación superior en Colombia [Design of an integrated quality management system for higher education academic programs in Colombia]. *Formación Universitaria*, 14(1), 45–52. <https://doi.org/10.4067/S0718-50062021000100045>
- Forero, C. H., Zarur Miranda, X., & Malagón, J. C. (2004). Informe de relatoría en ASCUN [ASCUN summary report]. In *Calidad y aseguramiento de la educación superior en Colombia* [Quality and assurance of higher education in Colombia] (p. 295). Asociación Colombiana de Universidades.
- García-Peñalvo, J. F. (2017). Identidad digital del doctorando [The digital identity of the doctoral student]. *Education in the Knowledge Society*, 18(1), 7–20. <https://doi.org/10.5281/zenodo.438168>
- Gil, J., Morales, M., & Mesa, J. (2017). La evaluación educativa como proceso histórico social: Perspectivas para el mejoramiento de la calidad de los sistemas educativos [Educational evaluation as a socio-historical process: Perspectives for improving the quality of educational systems]. *Revista Universidad y Sociedad*, 9(4), 162–167.
- Matos de, P., Alves, H., & Leitão, J. (2022). In search of intangible connections: Intellectual capital, performance and quality of life in higher education institutions. *Higher Education*, 83(2), 243–260. <https://doi.org/10.1007/s10734-020-00653-9>
- Ministerio de Educación Nacional. (2013). *Lineamientos para la acreditación de programas de pregrado* [Guidelines for the accreditation of undergraduate programs]. [https://www.mineduacion.gov.co/1621/articles-342684\\_recurso\\_1.pdf](https://www.mineduacion.gov.co/1621/articles-342684_recurso_1.pdf)
- Ministerio de Educación Nacional. (2015, mayo 26). *Decreto 1075 de 2015. Por medio del cual se expide el Decreto Único Reglamentario del Sector Educación* [Decree 1075 of 2015. By which the Single Regulatory Decree of the Education Sector is issued]. [https://www.funcionpublica.gov.co/eva/gestornormativo/norma\\_pdf.php?i=77913](https://www.funcionpublica.gov.co/eva/gestornormativo/norma_pdf.php?i=77913)
- Ministerio de Educación Nacional. (2019a, julio 25). *Decreto 1330 de 2019. Por el cual se sustituye el Capítulo 2 y se suprime el Capítulo 7 del Título 3 de la Parte 5 del Libro 2 del Decreto 1075 de 2015* [Decree 1330 of 2019. By which Chapter 2 is replaced and Chapter 7 of Title 3, Part 5, Book 2 of Decree 1075 of 2015 is repealed]. [https://www.funcionpublica.gov.co/eva/gestornormativo/norma\\_pdf.php?i=98270](https://www.funcionpublica.gov.co/eva/gestornormativo/norma_pdf.php?i=98270)
- Ministerio de Educación Nacional. (2019b). *Sistema de aseguramiento de la calidad de la educación superior* [Quality assurance system for higher education]. <https://www.mineduacion.gov.co/1759/w3-article-235585.html?noredirect=1>
- Ministerio de Educación Nacional. (2019c). *Documento guía trámite de registro calificado* [Guide document for qualified registration process]. [https://www.usco.edu.co/contenido/acreditacion/documentos/d/Guia\\_Registro\\_Calificado\\_Ag5\\_2019.pdf](https://www.usco.edu.co/contenido/acreditacion/documentos/d/Guia_Registro_Calificado_Ag5_2019.pdf)

- Ministerio de Educación Nacional. (2023). *Ficha técnica matrículas instituciones de educación superior* [Technical report on higher education institution enrollments]. [https://snies.mineducacion.gov.co/1778/articles-416243\\_Nota\\_Tecnica\\_Matricula\\_ES.pdf](https://snies.mineducacion.gov.co/1778/articles-416243_Nota_Tecnica_Matricula_ES.pdf)
- Ordóñez, B. L., & Salazar, B. (2013). La autonomía universitaria y la reforma a la educación superior [University autonomy and the reform of higher education]. *Tendencias: Revista de la Facultad de Ciencias Económicas y Administrativas de la Universidad de Nariño*, 14(1), 160–186.
- Padrón, J. (2014). *Qué es la epistemología* [What is epistemology]. In Epistemología en DVD. La Universidad del Zulia.
- Soto, C. (2009). *La formación doctoral en Colombia: Avances, limitaciones y desafíos* [Doctoral education in Colombia: Advances, limitations and challenges]. Asociación Colombiana de Universidades – ASCUN.
- Torrado, M. C. (1998, marzo). *De la evaluación de aptitudes a la evaluación de competencias* [From aptitude assessment to competency assessment]. Serie Investigación y Evaluación Educativa. ICFES.
- Universidad de Cartagena. (s.f.). *Doctorado en Administración* [PhD in Administration]. <https://www.unicartagena.edu.co/estudia-con-nosotros/doctorado-en-administracion>
- Velásquez, J., Neira, D., Crissien, T., & Parody, A. (2022). Multidimensional indicator to measure quality in education. *International Journal of Educational Development*, 89, 102541. <https://doi.org/10.1016/j.ijedudev.2021.102541>

## **Ways of Removing Social Exclusion of Young Adults With Autism Spectrum Disorder: Educational and Workplace Behaviour Pathways**

Farmakopoulou I, University of Patras, Greece  
Papanikolaou A, National and Kapodistrian University of Athens, Greece  
Martinou M. M, American College of Greece, Greece  
Giannakopoulos G, National and Kapodistrian University of Athens, Greece

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Although public health policies emphasize the need for inclusive communities, the participation of young adults with autism spectrum disorder (ASD) in postsecondary education and work is particularly low. This study is funded by the Hellenic Foundation for Research and Innovation and aims to explore the educational and working experiences of young adults with ASD (age range:18-35 years) in Greece. Participants are selected from a cohort of 1220 individuals with a childhood diagnosis of ASD. This cohort was primarily assessed in the ASD focused clinic at Agia Sophia Children's Hospital. Longitudinal data derived from standardized instruments used for diagnostic purposes are available and will be used as prognostic variables in relation to outcomes. Quantitative outcomes are explored via the administration of parental and self-completed questionnaires. In the present paper qualitative outcomes are explored using 30 semi-structured interviews, where educational and working experiences are probed. The major themes of the semi-structured interviews that have emerged from the study are: (a) the absence of services and lack of proper dissemination with regards to already established initiatives/services, (b) the high level of parental involvement in job seeking practices, (c) the experience of bullying, especially during primary and secondary school. This is an ongoing study looking into the educational and working experiences of young adults with ASD in Greece. Preliminary results point to several barriers related to inclusion in work and educational settings and highlight the need for better dissemination of information regarding the available services.

*Keywords:* autism spectrum disorder, social inclusion of young adults

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

ASD is defined as a lifelong developmental disability that affects how a person communicates with, and relates to, other people and makes sense of the world around him (National Autistic Society, 2021). According to DSM-5, ASD is characterized by longstanding deficits in social communication along with stereotyped, restricted, and repetitive patterns of behavior and interests. ASD has great phenotypical diversity and considerable profile changes over the lifespan in comparison to other neurodevelopmental disorders (Lord et al., 2021). ASD is usually diagnosed during childhood and has had an increasing prevalence worldwide over the past two decades; prevalence estimates in most of the studies range between 0.8% to 1.5% (Fombonne, 2018; Helles et al., 2017; Lyall et al., 2017).

A recent study in Greece estimated overall prevalence to be 1.15% with a large variation between studied regions (0.59%-1.5%) (Thomaidis et al., 2020). The oft reported male to female ratio in ASD is 4:1 (Perez-Crespo et al., 2019; Theodoratou & Farmakopoulou, 2021). In adulthood the severity of symptoms and the level of functioning vary, ranging from autonomous young adults to individuals with restricted autonomy, Intellectual Disability (ID), and other comorbidities for whom continuous and substantial support is necessary. Between 73-81% of adults with ASD meet criteria for at least one co-occurring psychiatric disorder, the most common of which are depression, anxiety, obsessive compulsive disorder (OCD), attention deficit hyperactivity disorder (ADHD) and personality disorders (Hossain et al., 2020; Vohra et al., 2017). Multiple diagnoses are also common (Howlin & Magiati, 2017; Lugo-Marin et al., 2019). A more recent study by Pehlivanidis et al. (2020) 33.3% of newly diagnosed adults with ASD received an ADHD diagnosis. Research has repeatedly demonstrated how the added impact of comorbidities can affect subjective QOL outcomes (Helles et al., 2017).

## Social Inclusion in Post-secondary Education of ASD Transition-Aged Young Adults

One area where young adults with ASD lag in comparison to their typically developing peers and youth with other disabilities is post-secondary education (Griffiths et al., 2016; Lord et al., 2021). People with ASD and normal intellectual functioning face difficulties in degree completion, resulting in a high drop-out rate in this group (Helles et al., 2017). The postsecondary educational outcomes of young adults with ASD are worse than those of youth with other disabilities (Griffiths et al., 2016; Lord et al., 2021). The report commissioned by the US Department of Education found that students with ASD in the U.S. have one of the lowest rates of post-secondary education (44%) when compared to the general population (67%) and other disability groups (60%) (Newman et al., 2011). In a follow up study, Taylor et al. (2015) demonstrated the high risk of dropping out of university/college in this population with only 25% of young ASD adults maintaining their educational/occupational activities over a given period. Migliore et al., (2012) who examined the predictors of employment and post-secondary education outcomes for young adults with ASD found that high parental involvement during this transitional period and a higher socioeconomic status were positively associated with receiving college services and participating in post-secondary education.

The characteristics of post-secondary students with ASD are diverse and unique to everyone; they may possess significant strengths such as a superior memory, a detail focused processing bias, and a single minded and determined nature (Van Hees et al., 2015). Due to the repetitive

and restrictive nature of their interests, they may often have amassed an impressive amount of knowledge on a single topic (Drake, 2014). Some students made reference to their personal strengths to their academic success. (Van Hees et al., 2015) These included strong technology and self-advocacy skills, persistence, and an intense interest in the subject they were studying. Furthermore, students posited diligence and determination for degree completion related to and gaining future employment as important traits for academic success (Drake, 2014; Van Hees et al., 2015).

However, many students with ASD face difficulties within educational settings that relate to both academic and non-academic issues. For example, when posing a question in class, participation in group work, performing presentations, and understanding abstract or ambiguous concepts have all been reported as relevant issues by students with ASD. (Knott & Taylor, 2014) Moreover, challenges related to sensory overload and routine adherence tend to flare up in college/university where everything is novel and the individual is asked to make numerous choices (Van Hees et al., 2015) In addition, lectures are often held in auditoriums that can house many students, something that can prove very distracting for students with ASD. Finally, young adults with ASD report experiencing high levels of depression and anxiety during this period, which stems from the social demands placed upon them in this new setting.

### **Social Inclusion in the Workplace of ASD Transition-Aged Young Adults**

Employment is a basic human right. It is associated with improved physical, psychological and social wellbeing and contributes to financial independence, thereby increasing one's probability of independent living and reducing one's dependence on benefits (Anderson et al., 2021; Griffiths et al., 2016). Although, globally, numerous public policies highlight the necessity of moving towards inclusive societies and the importance of social inclusion of people with disabilities, unemployment statistics reported by the National Autistic Society (NAS) in 2021 are disheartening with only 15% of young adults with ASD reported as working, while, 69% are reported as having the ability and willingness to work (National Autistic Society, 2021). Studies of young adults with ASD have repeatedly shown that these individuals have much higher rates of unemployment than the general population and individuals with other disabilities (Krumpelman & Hord, 2021).

Additionally, a considerable number of young adults with ASD who are employed on a part-time basis, are underpaid compared to their peers without ASD, and experience ongoing problems with maintaining work. (Taylor et al., 2015) They are also more limited with regards to the types of work available to them (Griffiths et al., 2016; Nord et al., 2016).

In the words of young adults with ASD and their parents/carers, full time work is associated with meaningful experiences, higher self-esteem, the provision of a daily routine, financial independence and constitutes a valuable springboard for social interaction. (Anderson et al., 2021) Therefore, understanding the predictors that can lead to full time employment in this group, and designing practices that can build on their experiences and personal strengths is essential for promoting inclusive practices at work for young adults with ASD. Services that include job finding, job maintenance, and on-the-job support as well as internship placement services are associated with the best occupational outcomes (Migliore et al., 2012).

Many young adults with ASD report difficulties with respect to the performance of multiple duties/roles within the work setting seeing as it challenges their predilection for sameness and

routine. In terms of gaining employment, the interview process is stated as the biggest challenge for young adults with ASD as it partly revolves around an assessment of their social skills. Parental psychological and practical support during this time is reported to be of paramount importance for this population, mirroring results from the educational outcomes research (Lord et al., 2021). Parents of young adults with ASD have referenced the lack of careful matching between the job seeker's skill set and the offered position (e.g. placing young adults with ASD in front desk customer service positions).

## **Understanding the Facilitators and Barriers to the Development of Inclusionary Practices**

Throughout history, adults with ASD (and those with other disabilities) have been excluded from educational and working opportunities and, thus, fail to fully participate in their communities, make their own decisions, and influence the power structures designed to support them. In response to this social phenomenon, the inclusion of ASD young adults into society is increasingly the focus of research and policy making. Working organizations are beginning to introduce changes to their establishments to make them more inclusive. However, they often do not follow through with the appropriate workplace adaptations necessary for young employees with ASD to succeed.

To address the unique challenges facing this population, there is a need to document experiences as they relate to their successes and struggles at post-secondary education and working employment. Additionally, it is important to understand how individual (e.g. autism severity), family (e.g. maternal depression) and environmental (e.g. availability of transition services) factors affect the opportunity landscape for these young adults. In essence, what is needed is the creation of new tools that will be able to capitalize on our prior knowledge about the characteristics of ASD, e.g. known talents and weaknesses and match them to suitable degrees/jobs.

The next sections of this essay focus on an innovative research study which is funded by the Hellenic Foundation for Research and Innovation (ELIDEK) and aims to explore the educational and working experiences of young adults with ASD in Greece.

## **Mixed Methodology of the Research Study**

### ***Objectives of the Research Study***

One of the major aims of the current study is to record the views of young adults with ASD, their suggestions for changes to the current educational and working practices, which we are hoping will lead to the design of better inclusion practices. As part of our study we would also like to explore the participants' own views about where their strengths (and weaknesses) lie. Thus, instead of focusing solely on the exploration of environmental facilitators and barriers (social, attitudinal, and institutional factors) relevant to educational and work participation for transition-aged young adults with ASD, the present research study will also take into consideration the participants' unique talents and strengths. Some of these talents can become valuable assets in educational and working settings given a well-designed support system. In other words, typical characteristics of individuals with ASD such as their "detailed oriented processing style" could be transformed into an asset by enrolling them in suitable jobs.



Overall, the present research study has four main objectives:

- a) To identify early predictors of educational, employment and quality of life (QOL) outcomes in young adults with ASD (ages 18-35). This group can be rather heterogeneous with large variances in Intelligence Quotients and type of comorbidities.
- b) To explore the educational and working experiences of this population the research team utilized semi-structured interviews. With this work the research team intended to investigate the environmental factors that act as facilitators or barriers to the educational and working inclusion of this population. It is important to state that no such study has been conducted in Greece. This is particularly important since socio-ecological factors vary tremendously from country to country.
- c) Individuals with ASD regardless of cognitive ability often have particular strengths like paying attention to detail or rules following that are desirable in educational and workplace settings. Therefore, the research team included questionnaires that identified talents/strengths in the ascertained population to explore and promote the existence of different working profiles.
- d) To introduce recruited participants to a newly developed tool *Jobslink* (<https://asperger.gr/>), the only platform for seeking employment for adults with ASD.

In comparison with most published studies to this field that typically report on a small number of participants (Scott et al., 2019) with rare exceptions (N = 123; Lord et al., 2021), the current Greek ASD cohort (370 young adults, 18-35 years of age) is one of the largest. This fact allowed the research study to go into depth exploration of factors that affect employability, educational prospects and overall QOL. Also, the collaboration between the ASD outpatient clinic and the Adult Neurodevelopmental Unit of the 1st Department of Psychiatry of the National and Kapodistrian University of Athens (NKUA), housed at Eginition Hospital, is among the very few examples of continuity of care in health system in Greece. The inclusion of the recently developed job seeking platform (*Jobslink* (<https://asperger.gr/>) for individuals with ASD without ID (formerly classified as Asperger in DSM-IV) the research team expects to actively promote the employment of young adults with ASD. Results from this endeavor will help to redesign novel platform features with the aim of maximizing employability.

In the present paper, we are reporting on the qualitative outcomes from the semi-structured interviews focused on work and educational experiences. (Objective B).

### ***Study Sample***

Participants are selected from a cohort of 1220 individuals with a childhood diagnosis of ASD. This cohort has been assessed in the ASD focused clinic at the “Agia Sophia” Children’s hospital. Longitudinal data, and, in many cases repeated measurements are available including results from standardized instruments such as the ADOS2, the ADI-R, the Vineland Adaptive Behavioral Scales and the Wechsler Intelligence Scale for Children. The assessment protocol has been derived from the research protocol adopted by the *International Molecular Genetics of Autism Consortium*. Outcomes are explored via the administration of parental and adult questionnaires. Young adults (18-35 years old) who have a childhood diagnosis of ASD, including those with ID and other comorbidities were eligible to participate in the present study. Upon completion of parental questionnaires, young participants with ASD having prior or current postsecondary education and/or work experience were identified and contacted.

### ***Semi-structured Interviews***

The thirty (30) semi-structured interviews who were conducted with young adults with ASD were split into two main themes (education and employment experiences). Participants who agreed to take part were sent a zoom link and a time and day for the interview was set. A degree of thematic overlap was present in the two types of interviews, since to build up to one's working experiences, one must also interrogate broader educational experiences.

The main subthemes of the interview guide that focused on the educational experiences of the young participants with ASD were the documentation of their: a) experiences from their primary and secondary education, b) transitional period from school to postsecondary education, c) experiences from their student life, d) exploration of educational support systems, e) strengths, talents and gifts in education and f) proposals for more inclusive educational settings. Regarding the central subthemes of the interview guide of the working experiences of the interviewees, special emphasis was given to the reporting of their: a) schooling and studying experiences, b) transitional period from studying to job searching, c) documentation of their previous and current working experiences, d) inclusive practices of the working environment, d) exploration of strengths, talents and gifts in workplace, e) recommendations for more effective inclusiveness in working employment for young people with ASD. Participants were often asked to expand their answers by giving specific examples, which were proved to be very illuminating. Responses were transcribed automatically by the recording software and were then checked for consistency between the audio and the transcription. Analysis of the qualitative data used a narrative approach due to the opportunity that it offers to listen to the voice of young people with ASD documenting their experiences. As an approach it reinforces the concept of self-advocacy and active participation. Twelve young males and three females with ASD participated in the semi-structured interviews for the documentation of their educational experiences and similar number of males and females were interviewed to report their working experiences.

### **Findings From the Semi-structured Interviews With Young Adults With ASD**

As has already been mentioned due to the restricted extent of this paper, the focus is placed on the presentation of the findings of the qualitative data, which included thirty (30) semi-structured interviews with transition-aged young people with ASD. It is crucial to be mentioned that for first time in Greece it was given the opportunity to young people with ASD to express their views, concerns and recommendations for ameliorating their educational and working conditions.

Many of the findings of this research study are consistent with those of previous related studies. However, several unique results emerged, which are likely due to cultural issues and particularly the fact that in Greece informal networking is well developed and the families are child centered. Another important element that highlights the Greek reality is that stigmatization of people with disabilities continues to be apparent, especially to those who live in remote places such as provinces and islands. This unfavorable situation often leads to incidents of bullying during primary and secondary education of pupils with ASD as well as to adaptation and socialization difficulties during their education at colleges and universities. Also, the severe lack of services offered to young adults in general, and especially to people with disabilities and young people with ASD, seems to play an important role.

## Results Related to Educational Experiences of Young Persons With ASD

A finding that is consistent with previous research studies is that young people with ASD, even those with normal intellectual functioning, face various difficulties in completing their studies, resulting in a high drop-out rate in this group (Helles et al., 2017). Most participating young people with ASD reported several bullying episodes -particularly during their childhood- which decreased in intensity and frequency during their adolescence. Some participants explained that they had been or continue to be victims of school bullying during their studies period. Typically, one participant reported:

Nobody wanted to become my own friend at primary school. Some of my classmates called me 'crazy' and others 'stupid' because in the first grades I didn't speak clearly or because I had great difficulty in grammar and math's. I always felt like an outsider and this adverse situation continues at the university I attend, where no one is sitting next to me in the auditorium during lectures. (MEE12) (Male Educational Experiences, 12)

Most participants explained that they have not graduated for several reasons, mainly due to their lack of participation in the exams because of their fear of failure. Some other interviewees reported that although they took part in the exams on several occasions they indeed did not manage "to pass" the courses undertaken. One participant recounted his overall negative educational experiences saying:

I went to a mainstream school where I attended a special classroom for pupils with special educational needs for a few hours daily. My classmates constantly made fun of me for it and called me 'the retarded' or 'the weird one' and I recall that I often cried and being isolated in a corner in the school yard. Also, at the University period no one bothered to inform me that there was a Student Support Office and so several professor's slides seemed incomprehensible to me, and I felt embarrassed to ask for further explanation. Thus, during exam period I used not to learn adequately each subject and gradually to start having several courses that I have not passed it, and this situation discouraged me and made me to drop out from my studies. (FE2) (Female Educational Experiences, 2)

Another participant talked about the great difficulty he faced in his student life in establishing friendships with his fellow students:

I felt like I was invisible, professors asked us to split into groups for working on assignments and no one suggested to join their group and sometimes when I suggested going out for coffee with one or two of them they lied to me that they would not go out but it happened to meet them in a cafe nearby being together having fun. (ME4)

Of course, positive educational experiences were also recorded, especially regarding the student life of some young adults with ASD, where according to their reports they had no difficulty in establishing and maintaining friendships with 2-3 fellow students. A few participants stated that they found their studies very interesting and graduated in four years and carried on doing postgraduate studies which they have also successfully completed on time. Most young people with ASD claimed that they preferred studying at colleges to universities since it was less demanding and lasted for a shorter period (2 vs 4 years).

However, several interviewees reported that although they enjoyed their studying period, they considered their exams difficult and therefore they finally did not get the college certificate.

## **Results Related to Workplace Experiences of Young Persons With ASD**

As has already been analyzed in the first section, work is a fundamental right for every human being and is associated with improved physical health, contributes to the employees' mental health and self-esteem. It also increases the likelihood of independent living and promotes socialization and relationship building (Anderson et al., 2021; Griffiths et al., 2016). However, several research studies have found that young adults with ASD have much higher rates of unemployment than the general population (Krumpelman & Hord, 2021) and individuals with other disabilities (Wei et al., 2018). This study confirms the above-mentioned findings, since many of the participants stated that they have met a variety of obstacles both in managing to get a job but also to maintain it. An often complaint from the interviewees was the lack of support services for young people with ASD. Several participants mentioned active parental involvement, and one said:

I honestly don't know what I would have become if I hadn't had the constant help of my parents, especially my father's assistance. He showed me how to make a resume (CV), we did role plays where he asked me possible questions that employers would ask me in a job interview. I strongly believe that this is the State's role, but they do not seem to care about people with disabilities. (MWE1) (Male Workplace Experiences, 1)

An interesting comment that several participants have made is that even if there are a couple available Support Services for young people with ASD, they are not aware of them, or they learn about it by coincidence. For example:

A social worker recently informed my mother that there is a non-governmental organization called 'Asperger Association' that specializes in the needs of people like me, and it operates an employment platform called 'Jobslink' that helps you get a job matched to your own assets. I intend to get in touch with them, and I will try to get a better job. (FWE2)

Moreover, another interviewee explained that a neighbor informed him about another new non-governmental organization called "routes/diadromes" that is funded by a European Union Program (KISPE) which aims at helping young people with ASD to get a job. He said:

I will definitely address this service because I want to find a full-time job where I will be well-paid as my goal is to try to rent a flat and achieve eventually my independent living. (MWE3)

Previous research studies have also put emphasis on the type of jobs offered to young people with ASD and especially the fact that the transition-aged people with ASD are usually on a part-time basis and get low-paid jobs and rarely acquire jobs tailored to their strengths and capabilities. In addition, half of the interviewees claimed that in the provinces and islands that they live in most people tend to gossip, to have bias and stereotypes for people with disabilities like themselves. One male interviewee said:

Although I have tried hard to find a job that is related to my studies, since I have failed to find an appropriate one, I work at a part-time sales assistant post. If I dared to tell the truth about my disorder (ASD) I am certain that they would never have hired me. At my first job I made this 'silly' thing and talked to my employer about my disorder since we have had a very good relationship and he immediately changed his attitude towards me and within the end of that month he found an excuse and fired me. (MWE11)

On the other hand, a few participants stated that they were very satisfied with their current job, and they have found a workplace that matched their qualifications. However, even in these cases they explained that they got this job due to their parental involvement. Their father usually knew the employer and highlighted the strengths of the employment of their son/daughter such as that they are hardworking, they seldom make a complain and that they are devoted to their work, have exceptional ability to memorize and process numerical data.

An interesting quotation for a satisfying young female working person with an ASD is as follows:

I am very happy at my own job. When my employer or my colleagues are stuck at various job stages, they often call me to solve the various problems, and I always succeed in this. They often call me 'number magnet' because I am very good at math's. (MWE3)

However, when the same interviewee was asked about his socialization experience in her job she mentioned:

They often say that we will all go out together as a team to drink wine to celebrate our successful work outcomes, but so far, we have not been able to do it. I do not know if they go out by themselves and forget to tell me. I am thinking to ask a colleague to go to watch a movie together. (MWE3)

## Discussion

Several studies have found that the postsecondary educational outcomes of young adults with ASD are worse than those of youth with other disabilities (Griffiths et al., 2016; Nord et al., 2016). In addition, young adults with ASD and normal intellectual functioning face difficulties in degree completion, resulting in a high drop-out rate in this group (Helles et al., 2017). This research confirms these findings since many participants faced a variety of educational difficulties and have not graduated, even those who studied at college, mainly due to their exam related stress.

Moreover, several research studies have found that young adults with ASD have much lower rates of getting and maintaining a job compared to the general population (Krumpelman & Hord, 2021) and individuals with other disabilities (Wei et al., 2018). The present study confirms this trend. Previous research studies have also put an emphasis on the type of jobs offered to young people with ASD. Namely, they are usually employed on a part-time basis, have low-paid jobs. Similar conditions were reported in our cohort. Nevertheless, some of our participants reported feeling satisfied with their current position and working conditions since their strengths and talents were not only noticed by their employers and employees but have also been appreciated by them.

The lack of awareness about available services was a recurring theme when participants were asked about employment and educational resources. A specialized governmental platform that presents such information all in one place needs to be created and at the same time there is a need for awareness campaigns that can reach even those families that are not fluent in the use of technology. Many participants also alluded to the actual lack of services aimed at facilitating their inclusion in the workplace and educational settings. Parental association initiatives such as the one developed by the Hellenic Association of Asperger, whereby a mentor is assigned to each new person who signs up on their job seeking platform, are steps in the right direction. It is important that such initiatives are supported, advertised, and become inspiration for many more such endeavors.

As has been shown many of the findings of this research study are consistent with those of previously published studies. However, several unique results have emerged, which are likely the result of cultural differences between the various countries. One such difference is the level of parental involvement in the lives of young adults with ASD and their active role in job scouting and maintenance. Many participants reported that they found a job due to their parents using their personal connections (i.e. informal networking).

Another important finding is that our participants reported experiencing continued bullying, especially those who live in the province. Incidents of bullying during primary and secondary education were reported by most participants, which however, seemed to subside as they grew older. This may be partly the result of older children's ability to exercise more self-control and refrain from bullying someone else in comparison to younger children who cannot. Psychoeducation can play an important role in lowering bullying incidents and there are many such initiatives that Greek policy makers can take inspiration from. Wang and Susumu (2024) have argued for a zero-tolerance attitude with regards to bullying in schools and at the same time assessing teacher's and staff's beliefs on ASD and its characteristics.

### **Conclusion**

The thorough understanding of work-related challenges, environmental facilitators and barriers is expected to aid educators, clinicians, service-providers, employees, researchers, and policy makers as they develop interventions and improve systems designed for the educational and occupational inclusion of young people with ASD. The research team expects that this research will lead to designing a more inclusive educational and working model that addresses important flaws in the current system.

### **Acknowledgements**

This project is carried out within the framework of the National Recovery and Resilience Plan Greece 2.0, funded by the European Union – Next Generation EU (Implementation body: HFRI).

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

I declare that the research team has not used AI and AI-assisted Technologies in the Writing Process.

## References

- Anderson, C., Butt, C., & Sarsony, C. (2021). Young adults on the autism spectrum and early employment-related experiences: Aspirations and obstacles. *Journal of Autism and Developmental Disorders*, 51, 88–105. <https://doi.org/10.1007/s10803-020-04513-4>
- Baldwin, S., Costley, D., & Warren, A. (2014). Employment activities and experiences of adults with high-functioning autism and Asperger's disorder. *Journal of Autism and Developmental Disorders*, 44(10), 2440–2449. <https://doi.org/10.1007/s10803-014-2112-z>
- Drake, S. (2014). *Academic success experiences of individuals with autism spectrum disorder* (Publication No. 3615828) [Doctoral dissertation, Walden University]. ProQuest Dissertations Publishing.
- Fombonne, E. (2018). Editorial: The rising prevalence of autism. *Journal of Child Psychology and Psychiatry*, 59(7), 717–720. <https://doi.org/10.1111/jcpp.12941>
- Griffiths, A. J., Giannantonio, C., Hanson, A. E., & Cardinal, D. N. (2016). Autism in the workplace: Assessing the transition needs of young adults with autism spectrum disorder. *Education Faculty Articles and Research, Chapman University Digital Commons*, 5–22.
- Helles, A., Gillberg, I. C., Gillberg, C., & Billstedt, E. (2017). Asperger syndrome in males over two decades: Quality of life in relation to diagnostic stability and psychiatric comorbidity. *Autism*, 21(4), 458–469. <https://doi.org/10.1177/1362361316650090>
- Hossain, M. M., Khan, N., Sultana, A., Ping, M., McKyer, E. L. J., Ahmed, H. U., & Purohit, N. (2020). Prevalence of comorbid psychiatric disorders among people with autism spectrum disorder: An umbrella review of systematic reviews and meta-analyses. *Psychiatry Research*, 287, 112922. <https://doi.org/10.1016/j.psychres.2020.112922>
- Howlin, P., & Magiati, I. (2017). Autism spectrum disorder: Outcomes in adulthood. *Journal of Neurodevelopmental Disorders*, 9(2), 69–76.
- Knott, F., & Taylor, A. (2014). Life at university with Asperger syndrome: A comparison of student and staff perspectives. *International Journal of Inclusive Education*, 18(4), 411–426. <https://doi.org/10.1080/13603116.2013.781236>
- Krumpelman, L., & Hord, A. (2021). Experiences of young adults with autism without co-occurring intellectual disability: A review of the literature. *Education and Training in Autism and Developmental Disabilities*, 56(1), 70–82.
- Lord, C., McCauley, J. B., Pepa, L. A., Huerta, M., & Pickles, A. (2021). Work, living, and the pursuit of happiness: Vocational and psychosocial outcomes for young adults with autism. *Autism*, 24(7), 1691–1703.

- Lugo-Marin, J., Magan-Maganto, M., Rivero-Santana, A., Cuellar-Pompa, L., Alviani, M., Jenaro-Rio, C., Diez, E., & Canal-Bedia, R. (2019). Prevalence of psychiatric disorders in adults with autism spectrum disorder: A systematic review and meta-analysis. *Research in Autism Spectrum Disorders*, 59, 22–33.
- Lyall, K., Croen, L., Daniels, J., Fallin, M. D., Ladd-Acosta, C., Lee, B. K., Park, B. Y., Snyder, N. W., Schendel, D., Volk, H., Windham, G. C., & Newschaffer, C. (2017). The changing epidemiology of autism spectrum disorders. *Annual Review of Public Health*, 38, 81–102. <https://doi.org/10.1146/annurevpublhealth-031816-044318>
- Migliore, A., Timmons, J., Butterworth, J., & Lugas, J. (2012). Predictors of employment and postsecondary education of youth with autism. *Rehabilitation Counseling Bulletin*, 55(3), 176–184. <https://doi.org/10.1177/0034355212438943>
- National Autistic Society. (2021). *About the campaign*. <https://www.autism.org.uk>
- Newman, L., Wagner, M., Knokey, A.-M., Marder, C., Nagle, K., Shaver, D., & Wei, X. (2011). *The post-high school outcomes of young adults with disabilities up to 8 years after high school* (NSSER 2011-3005). SRI International.
- Nord, D., Stancliffe, R. J., Nye-Lengerman, K., & Hewitt, A. (2016). Employment in the community for people with and without autism: A comparative analysis. *Research in Autism Spectrum Disorders*, 24, 11–16.
- Perez-Crespo, L., Prats-Urbe, A., Tobias, A., Duran-Tauleria, E., Coronado, R., Hervás, A., & Guxens, M. (2019). Temporal and geographical variability of prevalence and incidence of autism spectrum disorder diagnoses in children in Catalonia, Spain. *Autism Research*, 12(11), 1693–1705.
- Pinder-Amaker, S. (2014). Identifying the unmet needs of college students on the autism spectrum. *Harvard Review of Psychiatry*, 22(2), 125–137. <https://doi.org/10.1097/HRP.0000000000000032>
- Scott, M., Milbourn, B., Falkmer, M., Black, M., Bölte, S., Halladay, A., Lerner, M., Taylor, J. L., Girdler, S., & Falkmer, T. (2019). Factors impacting employment for people with autism spectrum disorder: A scoping review. *Autism*, 23(4), 869–901. <https://doi.org/10.1177/1362361318787789>
- Shahin, S., Finch, L., & MacDonald, S. (2020). Environmental factors that impact the workplace participation of transition-aged young adults with brain-based disabilities: A scoping review. *International Journal of Environmental Research and Public Health*, 17(7), 2378. <https://doi.org/10.3390/ijerph17072378>
- Taylor, J. L., Henninger, N. A., & Mailick, M. R. (2015). Longitudinal patterns of employment and postsecondary education for adults with autism and average-range IQ. *Autism*, 19(7), 785–793.
- Theodoratou, M., & Farmakopoulou, I. (2021). Comorbidity issues between autism spectrum disorders and internet addiction: Diagnosis and treatment implications. *EC Neurology*, 13(10), 10–17.



- Thomaidis, L., Choleva, A., & Ralli, S. (2020). Autism spectrum disorders in Greece: Nationwide prevalence in 10–11-year-old children and regional disparities. *Journal of Clinical Medicine*, 9(7), 2163. <https://doi.org/10.3390/jcm9072163>
- Van Hees, V., Moyson, T., & Roeyers, H. (2015). Higher education experiences of students with autism spectrum disorder: Challenges, benefits and support needs. *Journal of Autism and Developmental Disorders*, 45(6), 1673–1688. <https://doi.org/10.1007/s10803-014-2324-2>
- Vohra, R., Madhavan, S., & Sambamoorthi, U. (2017). Comorbidity prevalence, healthcare utilization, and expenditures of Medicaid enrolled adults with autism spectrum disorders. *Autism*, 21(8), 995–1009. <https://doi.org/10.1177/1362361316665222>
- Wang, R., & Susumu, Y. (2024). Factors of bullying victimization among students on the autism spectrum: A systematic review. *Review Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s40489-024-00478-7>
- Weaver, T. D., Westlake, H., & Lu, W. (2021). What do we really mean by “inclusion”? The importance of terminology when discussing approaches to community engagement. *Autism*, 25(8), 2149–2151. <https://doi.org/10.1177/13623613211046688>
- Weber, T., Much, M., & Beck, J. (2021). Physical workplace adjustments to support neurodivergent workers: A systematic review. *Applied Psychology: Health and Well-Being*. <https://doi.org/10.1111/apps.12431>
- Wei, X., Wagner, M., Hudson, L., Yu, J. W., & Shattuck, P. (2018). Job searching, job duration, and job loss among young adults with autism spectrum disorder. *Journal of Vocational Rehabilitation*, 48(1), 1–10. <https://doi.org/10.3233/JVR-170922>

**Contact email:** ifarmakop@upatras.gr



## **Strategies and Outcomes of AI Adoption of Health Record Management Systems in Teaching Hospitals in Nigeria**

Richard Olalekan Arogunjo, Lagos State University, Nigeria  
Adeoye Augustine Bamgbose, Lagos State University, Nigeria

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Advancements in digital technology have transformed higher education and healthcare. Artificial intelligence (AI), which includes robotics, chatbots, and data analytics, is increasingly being integrated into health services within academic institutions. However, the adoption of AI in Nigerian teaching hospitals is still in its early stages compared to that in developed countries. This study examined AI adoption strategies in Nigerian teaching hospitals and their impact on healthcare delivery. Using a descriptive survey design with a quantitative approach, the study employed a structured questionnaire. The study population consisted of health workers at selected teaching hospitals in Nigeria. Four teaching hospitals were chosen by the researcher: two located in the north and two in the south. A total of 200 health workers were purposively selected, with 50 participants from each hospital. The study found that many health workers in teaching hospitals are quite familiar with various AI tools, such as ChatGPT, Copilot, chatbots, and others, which they sometimes use for research, medical diagnosis, and administrative workflow. The usage pattern indicated a low adoption rate among health workers in Nigerian teaching hospitals, particularly in the area of health record management. Consequently, this study highlights the importance of institutional support for AI and emphasizes the need to prioritize AI adoption in teaching hospitals. The study recommended that teaching hospitals in Nigeria establish clear policies and frameworks to guide AI adoption, particularly in health record management, among other areas.

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The adoption of digital technologies in healthcare has recently become a significant game changer. Digital technology has notably transformed and influenced healthcare operations, enhancing both service accessibility and optimization. This digital revolution has enabled the integration of electronic health record systems and telemedicine based on artificial intelligence technologies. With electronic health record management, automating data entry operations across all units and departments in teaching hospitals has become increasingly feasible. Records are crucial for effective healthcare delivery in teaching hospitals, and the use of digital technologies in record management has streamlined these routines.

An AI-powered health record system can detect sequences in medical histories, flag potential health risks, and simplify administrative tasks, allowing healthcare workers to focus more on patient care. However, the successful implementation of digital technologies in teaching hospitals relies on institutional readiness, including infrastructure and staff competence (Onyeabor et al., 2023). For instance, in Nigeria, studies indicate that while clinicians acknowledge the need for digital systems, low computer literacy remains a challenge (Morah & Brown, 2024).

The integration of Artificial Intelligence (AI) technologies into healthcare systems has become a transformative force worldwide, with the potential to greatly enhance the efficiency, accuracy, and accessibility of healthcare delivery (Ephraim et al., 2024; Roppelt et al., 2025). In sub-Saharan Africa, particularly Nigeria, the adoption of AI tools in health record management systems (HRMS) is gaining traction as part of extensive efforts to improve the quality and management of healthcare delivery, especially within public health facilities (Oladipo et al., 2024; Umar et al., 2024). Electronic Health Records (EHRs) provide a crucial platform for the adoption of AI technologies. These systems allow instantaneous access to patient data, streamline clinical workflows, and enable analytics with foresight and decision support systems that can significantly enhance patient outcomes (Babatope et al., 2024). Despite these benefits, the adoption and effective application of AI-driven EHRs in Nigerian teaching hospitals remain in their early stages and are fraught with numerous challenges.

Ogolodom et al. (2023) and other researchers contend that Nigeria continues to face significant health management challenges, including poor data quality, insufficient health infrastructure, inadequate digital skills among health workers, and cybersecurity issues (Alobo et al., 2020). These limitations have impeded the successful adoption of digital innovations in healthcare services, particularly within teaching hospitals, which serve as nerve centers of clinical care, research, and training. Several studies have reiterated the growing interest and awareness among healthcare professionals in Nigeria regarding the application of AI in health systems. For instance, Ogolodom et al. (2023) found that while there is moderate awareness of AI tools among health workers, there are also major concerns related to data privacy, ethical issues, and the risk of job displacement. Similarly, Babatope et al. (2024) highlighted operational and policy-level challenges, such as inconsistent power supply, weak institutional frameworks, and resistance to change, as significant impediments to EHR adoption.

Nonetheless, the potential of AI to enhance EHRs is immense. In a multicountry review by Ephraim et al. (2024), the study suggested that AI technologies, when properly contextualized and supported, can enable intelligent data mining, diagnostic support, patient

risk stratification, and remote patient monitoring, particularly in resource-limited settings. Additionally, Oladipo et al. (2024) highlighted specific strategies, such as staff retraining, phased implementation, and stakeholder engagement, as crucial for ensuring the sustainability and adaptability of AI integration in healthcare. Ye et al. (2024) identified numerous benefits of AI-driven electronic health records, including shared decision-making between patients and relatives, improved patient-provider relationships, reduced clinical appointment times, and cost-effectiveness.

### **Problem Statement**

Artificial Intelligence is recognized for its potential to revolutionize health record management. Nevertheless, its adoption and utility in Nigerian teaching hospitals remain limited and poorly documented. The successful implementation of AI-powered electronic health record systems largely depends on factors such as infrastructure readiness, human resource capacity, institutional policies, and strategic alignment with clinical goals (Babatope et al., 2024; Umar et al., 2024). Recent studies have explored the opinions and attitudes of health workers toward AI adoption (Fritsch et al., 2022; Habib et al., 2024; Ogolodom et al., 2023), the policy and technical challenges impeding EHR implementation (Alobo et al., 2020), and the associated benefits of AI in healthcare service delivery (Roppelt et al., 2025; Yusuf et al., 2022). However, there is a significant knowledge gap regarding the planned structure adopted by Nigerian teaching hospitals to implement AI-based health record systems, and how this translates into measurable operational outcomes.

Moreover, while some studies have confirmed the potential of AI in enhancing healthcare operations and medical diagnostics (Ephraim et al., 2024; Umar et al., 2024), there is limited empirical evidence regarding its direct impact on record management processes, such as data accuracy, retrieval efficiency, interoperability, and decision support functionalities within institutional contexts, such as teaching hospitals. This gap in the literature highlights the urgent need to further explore the adoption and use of AI tools in Nigerian teaching hospitals.

### **Objectives**

This study specifically aims to:

1. Identify the current state of AI adoption in Nigerian teaching hospitals.
2. Assess the strategies employed in the adoption of AI-driven HRMS in Nigerian teaching hospitals.
3. Examining the outcomes of AI adoption in HRMS in Nigerian teaching hospitals.
4. explored the challenges impeding the successful adoption of AI in HRMS in Nigerian teaching hospitals.

### **Research Questions**

This study addressed the following research questions:

1. What is the current level of AI adoption for HRMS in Nigerian teaching hospitals?
2. What strategies are employed for the adoption of AI in HRMS in Nigerian teaching hospitals?
3. What measurable outcomes can be observed from the adoption of AI in HRMS in teaching hospitals?
4. What challenges impede the successful adoption of AI in HRMS in teaching hospitals?

## Literature Review

Haenlein and Kaplan (2019) defined artificial intelligence (AI) as a system's capability to accurately interpret external data, learn from it, and utilize these insights to accomplish specific goals and tasks through adaptable methods (p. 5). Similarly, Mikalef and Gupta (2021) described AI as a system's ability to identify, interpret, infer, and learn from data to meet predetermined organizational and societal objectives (p. 3). AI is seen as a driving force of the digital revolution across various sectors, especially with the advent of large language models (LLM), that empower computer systems to undertake tasks that require human-like intelligence (Ilicki, 2023).

Numerous scholars have highlighted the importance of AI in healthcare, particularly in the realm of medical informatics (Dwivedi et al., 2021; Reddy et al., 2021). The emergence of new technologies that comprehend the intricacies of hospital operations, ensure necessary patient care, and address resource limitations is becoming increasingly crucial. Through deep learning, AI systems can discern patterns indicative of early disease stages, such as cancer, by analyzing available patient data (Mira et al., 2024). In the realm of biometric data analysis, AI systems facilitate the processing of data from wearable devices, enabling the monitoring of vital signs and detection of changes that may signal health concerns (Huang et al., 2022). AI holds significant promise for Nigeria's public health system for the management of infectious diseases. For example, AI-driven diagnostic tools have been tested in Lagos, where they have enhanced the early detection rates of tuberculosis compared to traditional methods (Alege et al., 2024).

The integration of AI into electronic health records is gaining traction in health centers worldwide. As noted by Ye et al. (2024), health records can harness AI technologies to enhance clinicians' diagnostic capabilities, assess patient-level risks using integrated data, and offer essential support to clinics and hospitals.

Babatope et al. (2024) examined the factors influencing the successful implementation of EHR in Nigeria, focusing on the University of Medical Sciences Teaching Hospital (UNIMEDTH). This study employed a descriptive cross-sectional design, targeting participants, such as doctors, nurses, health information managers, pharmacists, and medical laboratory scientists. The findings revealed a high level of awareness but a low utilization rate, highlighting a significant issue with technology implementation. Financial constraints and inadequate ICT resources were identified as the primary obstacles to effective EHR implementation. Additionally, factors such as poor internet connectivity and unreliable power supply showed a statistically significant positive association with effective EHR implementation. Under these circumstances, AI adoption in teaching hospitals is likely to face similar challenges.

Ye et al. (2024) conducted a systematic review of the impact of AI on electronic health records and found that it aids in cleaning and managing diverse or mixed datasets and enhances clinical care processes. The primary challenges identified were the vast amount of integrated data, data standards, data transfer and interoperability, security and privacy, data interpretation, and acceptable use of data.

maintained that the integration of AI into the healthcare system of Nigeria raises certain legal and ethical concerns such as the regulation of AI algorithms, ensuring accountability for AI-driven decisions, addressing algorithmic bias, and protection of data privacy. Therefore,

researchers have suggested that existing frameworks such as the National Health Act (NHA) and Nigerian Data Protection Act (NDPA) should be further strengthened to address these and other challenges (Azeez et al., 2021; Oladipo et al., 2024).

### **The Socio-Technical Systems (STS) Theory**

This study is grounded in socio-technical systems theory (STS), which was initially introduced by Eric Trist and his colleagues at the Tavistock Institute in the 1950s. This theory highlights the interaction between social and technical components within an organizational framework. It posits that for optimal performance, both social (human) and technical (machine) systems must be designed to function seamlessly and in harmony.

Initially, the socio-technical systems theory was developed for a large coal mine to restore efficiency in mining operations. Achieving this requires understanding the machinery and social structures of miners as cohesive units (Chen & Metcalf, 2024). However, since its inception, socio-technical systems theory has been widely applied across various disciplines and contexts to enhance operational efficiency, including fields such as cybersecurity (Malatji et al., 2019), manufacturing (Soliman & Saurin, 2017), ICTs (Jarrahi & Sawyer, 2015), and distributed knowledge systems such as Wikipedia (Damadi & Davoust, 2023). For example, management and organization researchers have employed this theory to illustrate how workplace organizational structures must integrate with technical and software systems to realize their full potential and better design information systems (Mumford, 2006). Similarly, in human-computer interaction (HCI), researchers have utilized STS theory to assess how effectively software or web platforms integrate with and adapt to the core needs of users and communities, who then redesign them based on specific requirements (Whitworth, 2009). These studies considered not only the function of each individual and piece of technology, but also all elements that constitute the social institution, such as “regulations and laws, the physical environment, ecosystems, software, hardware, networks, and data structures” (Chen & Metcalf, 2024, p. 4).

Research on the effective adoption of new technologies has shown that “AI interventions must always be thought of as socio-technical systems, in which social context, relationships, and power dynamics are central, not an afterthought” (Elish & Watkins, 2020). This socio-technical perspective is vital when discussing AI adoption in teaching hospitals, as it reflects a complex environment in which technology, healthcare professionals, patients, and administrative systems interact. AI can streamline administrative tasks and support personalized patient care. However, successful integration necessitates addressing challenges such as ethical concerns, staff training, and ensuring that AI systems complement rather than disrupt existing workflows (Holdsworth & Zaghloul, 2022, 2024). Common examples of AI applications in teaching hospitals include predictive analytics using patient data and automated scheduling systems. The sociotechnical approach ensures that digital technologies are employed in a manner that aligns with the hospital's culture, values, and operational needs (Chen & Metcalf, 2024).

### **Research Gaps**

In sub-Saharan Africa, including Nigeria, there is growing interest in adopting AI tools, particularly to enhance the health system, as highlighted in the literature. c Meanwhile, Oladipo et al. (2024) suggested that strategically implementing AI can resolve data management issues and optimize care delivery in health centers. Babatope et al. (2024)

specifically examined the factors hindering effective EHR implementation in Nigeria, identifying operational, infrastructural, and socio-technical barriers.

Despite growing global interest, significant gaps persist in the literature regarding the adoption of AI in health record management systems in Nigerian teaching hospitals. Empirical studies on the implementation of AI-enabled EHRs in Nigerian medical institutions are limited. Many existing Nigerian studies (Alobo et al., 2020; Babatope et al., 2024) have focused primarily on general healthcare settings without differentiating between hospital types or administrative complexities. Furthermore, the current literature inadequately addresses the institutional- and policy-level dynamics unique to teaching hospitals that influence AI adoption. Given these contextual gaps, it is essential to investigate the adoption of AI for health record management in Nigerian teaching hospitals.

### **Methodology**

The primary aim of this study was to evaluate the adoption of artificial intelligence (AI) technologies in Nigerian teaching hospitals. Employing a descriptive survey design with a quantitative approach, this study utilizes this design because of its effectiveness in gathering structured and measurable data from healthcare workers regarding their interaction with AI technologies (Creswell & Creswell, 2017).

### **Population and Sample**

The study population consisted of healthcare workers from selected teaching hospitals in Nigeria. These hospitals, which are responsible for healthcare delivery, medical education, and research, were deemed suitable settings for this study. Purposive sampling was employed to select four major teaching hospitals across northern and southern Nigeria: Lagos State University Teaching Hospital (LASUTH), Obafemi Awolowo University Teaching Hospital (OAUTH), Ahmadu Bello University Teaching Hospital (ABUTH), and Usman Danfodio University Teaching Hospital (UDUTH). A total of 200 healthcare workers were purposively sampled, with 50 participants from each hospital. The participants included consultants, health information officers, medical laboratory scientists, and medical record officers, to ensure diverse perspectives on AI adoption among professionals.

### **Data Collection and Analysis Techniques**

Data for the study were collected using a structured questionnaire specifically designed for this purpose. As noted by Saunders et al. (2019), questionnaires are an effective method for obtaining standardized responses suitable for quantitative analysis. The questionnaire aimed to evaluate familiarity with and usage of AI tools, AI adoption strategies, the impact of AI on health record management, and the challenges hindering successful AI adoption. Multiple expert reviews were conducted to ensure the instrument's validity. Furthermore, a pilot test involving 20 health workers was conducted to refine the clarity and relevance of the questionnaire items (Babbie, 2020).

The collected data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26. A comprehensive analysis of the four research questions was conducted using descriptive statistics, specifically frequencies and percentages, to summarize trends in the adoption of AI in healthcare centers.



## Ethical Considerations

The study rigorously followed ethical research principles and obtained informed consent from both participating institutions and individuals. This ensured the anonymity of the respondents to facilitate unbiased feedback. In compliance with the Data Protection Act of Nigeria (NDPA), the study safeguarded participants' data privacy and confidentiality, using all collected information solely for research purposes.

## Analysis and Results

The primary objective of this study was to investigate strategies for integrating AI with health workers in teaching hospitals. To achieve this goal, four research questions were formulated and analyzed in this section.

**Table 1**  
*Demographic Characteristics of Respondents*

Variable	Frequency	Percentage (%)
<b>Name of Teaching Hospital</b>		
ABUTH	29	21.0
LASUTH	39	28.3
OAUTH	48	34.8
UDUTH	22	15.9
<b>Total</b>	<b>138</b>	<b>100.0</b>
<b>Designation/Post</b>		
Consultant	43	31.2
Health Information Officer	53	38.4
Medical Laboratory Scientist	13	9.4
Medical Record Officer	29	21.0
<b>Total</b>	<b>138</b>	<b>100.0</b>
<b>Gender</b>		
Male	94	68.1
Female	44	31.9
<b>Total</b>	<b>138</b>	<b>100.0</b>
<b>Department/Unit</b>		
Community Health	3	2.8
General Outpatient Department	21	15.2
Health Information Management Dept	40	29.0
ICT Unit	20	14.5
Internal Medicine	10	7.2
Maxillofacial surgery	7	5.1
Medical Laboratory Unit	21	15.2
Records	18	13.0
<b>Total</b>	<b>138</b>	<b>100.0</b>

Table 1 presents the respondents' demographic distribution. The distribution by teaching hospital name indicated that 48 (34.8%) of the respondents were from the Obafemi Awolowo University Teaching Hospital, followed by 39 (28.3%) from the Lagos State University Teaching Hospital. Additionally, the results revealed that 53 (38.4%) were Health Information Officers, while 43 (31.2%) were consultants. Among the respondents, 94 (68.1%) were male and 44 (31.9%) were female. The respondents were distributed across

various departments and units within the teaching hospital, with 40 (29.0%) in the Health Information Management Department and 21 (15.2%) in both the General Outpatient Department and the Medical Laboratory Unit.

**Research Question 1:** What is the current level of AI adoption among HRMS in Nigerian teaching hospitals?

Some AI tools used by health workers in teaching hospitals are presented in Table 2.

**Table 2**

*Types of AI Tools Used by Health Workers*

S/N	Types of AI Used	Frequency	Percent
1	Robotics	12	8.7
2	ChatGPT	78	56.5
3	Bing AI	24	17.4
4	Copilot	57	41.3
5	Google Bard	14	10.1
6	Google Gemini	20	14.5
7	Chatbots	65	47.1
8	Never used any AI tool	11	8.0

As indicated in Table 2, ChatGPT was the most frequently used AI tool among health workers, with a usage rate of 56.5%, followed by chatbots at 47.1%, and copilot at 41.3%. Robotics was the least utilized, and approximately 8% of the health workers had never used any AI tools. These findings suggest that health workers in Nigerian teaching hospitals actively engage in AI technology.

Table 3 presents the different areas in which AI tools are used by health workers in teaching hospitals.

**Table 3**

*Areas of AI Adoption*

S/N	Use of AI	Always	Sometimes	Rarely	Never
1	Clinical documentation	11 (8.0%)	31 (22.5%)	59 (42.8%)	35 (25.4%)
2	Medical imaging	11 (8.0%)	33 (23.9%)	70 (50.7%)	24 (17.4%)
3	Patient monitoring	3 (2.2%)	41 (29.7%)	60 (43.5%)	34 (24.6%)
4	Research	23 (16.7%)	88 (63.8%)	15 (10.9%)	12 (8.7%)
5	Robotics	11 (8.0%)	8 (5.8%)	78 (56.5%)	41 (29.7%)
6	Electronic health records	38 (27.5%)	64 (46.4%)	9 (6.5%)	27 (19.6%)
7	Administrative workflow	3 (2.2%)	82 (59.4%)	26 (18.8%)	27 (19.6%)
8	Medical diagnosis	5 (3.6%)	86 (62.3%)	21 (15.2%)	26 (18.8%)

Table 3 indicates that only a small number of health workers in tertiary hospitals consistently used AI tools in their daily routines. In contrast, the majority occasionally employed AI tools for research (63.8%), medical diagnosis (62.3%), and administrative workflow (59.4%). The infrequent use of AI for various activities within teaching hospitals suggests a low level of AI adoption in Nigerian teaching hospitals. This finding highlights that health workers in these institutions do not heavily rely on AI tools and have yet to integrate this new technology into their health record management systems.

**Research Question 2:** What strategies are employed for the adoption of AI in HRMS in Nigerian teaching hospitals?

Table 4 presents some strategies currently employed, as well as potential strategies for the adoption of AI by health workers in Nigerian teaching hospitals.

**Table 4**

*AI Adoption Strategies by Health Workers*

S/N	AI Adoption Strategies	SA	A	D	SD
1	Allocation of adequate funding for AI adoption	112 (81.25)	2 (1.4%)	11 (8.0%)	13 (9.4%)
2	Management supports and prioritizes the adoption of AI.	79 (57.2%)	58 (42.1%)	1 (0.7%)	--
3	Regular training of staff on digital technologies.	43 (31.2%)	92 (66.7%)	1 (0.7%)	2 (1.4%)
4	Develop clear objectives and cases where AI can be used	79 (57.2%)	55 (39.9%)	2 (1.4%)	2 (1.4%)
5	Build a strong data foundation such as data accessibility, security and privacy	69 (50%)	65 (47.1%)	2 (1.4%)	2 (1.4%)
6	Foster an AI-ready culture like AI training, and collaboration	28 (20.3%)	106 (76.8%)	1 (0.7%)	3 (2.2%)
7	Establishing ethical guidelines and regulatory compliance	79 (57.2%)	46 (33.3%)	10 (7.2%)	3 (2.2%)
8	Leverage partnerships and expertise like AI vendors and research institutions	75 (54.3%)	50 (36.2%)	11 (8.0%)	2 (1.4%)
9	Continuous system monitoring and evaluation	78 (56.5%)	49 (35.5%)	13 (9.4%)	--

As illustrated in Table 4, several strategies can facilitate the adoption of AI in health record management. These include the necessity for management to support and prioritize AI adoption (137, 99.3%), establishing a robust data foundation encompassing data accessibility, security, and privacy (97.1%), and cultivating an AI-ready culture through AI training and collaboration (97.1%).

**Research Question 3:** What measurable outcomes can be observed following the adoption of AI in HRMS in teaching hospitals?

Table 5 presents the impact and outcomes of AI adoption in HRMS in teaching hospitals.

**Table 5***Impact of AI Adoption on Health Records Management*

S/N	Impact of AI Adoption	SA	A	D	SD
1	AI adoption improves the accuracy of health records.	30 (21.7%)	105 (76.1%)	2 (1.4%)	1 (0.7%)
2	Increase in the efficiency of health record management.	75 (54.3%)	51 (37.0%)	11 (8.0%)	1 (0.7%)
3	Reduction in the time required to retrieve patient records.	40 (29.0%)	94 (68.1%)	2 (1.4%)	2 (1.4%)
4	Enhanced data security in health records management.	83 (60.1%)	39 (28.3%)	13 (9.4%)	3 (2.2%)
5	Reduces errors in health record documentation.	80 (58.0%)	51 (37.0%)	3 (2.2%)	4 (2.9%)
6	Improves patient satisfaction with health records management	36 (26.1%)	97 (70.3%)	2 (1.4%)	3 (2.2%)
7	Streamlines the health record management processes.	73 (52.9%)	57 (41.3%)	3 (2.2%)	5 (3.6%)

Table 5 reveals that the majority of respondents concurred that, if implemented successfully, AI adoption holds the potential to enhance the accuracy of health records (97.8%), decrease the time needed to access patient records (97.1%), and optimize health record management processes (94.2%), among other advantages.

**Research Question 4:** What challenges impede the successful adoption of AI in HRMS in teaching hospitals?

Table 6 provides an analysis of the challenges hindering the adoption of AI in health record management in teaching hospitals.

**Table 6***Challenges of AI Adoption for Health Records Management*

S/N	Challenges	SA	A	D	SD
1	The use of AI is against the hospital ethics	10 (7.2%)	6 (4.3%)	112 (81.2%)	10 (7.2%)
2	There is resistance to change among staff regarding AI adoption.	24 (17.4%)	84 (60.9%)	21 (15.2%)	9 (6.5%)
3	The cost of implementing AI technologies is very high	79 (57.2%)	50 (36.2%)	6 (4.3%)	3 (2.2%)
4	Lack of technical expertise hinders AI adoption in health records management.	28 (20.3%)	93 (67.4%)	12 (8.7%)	5 (3.6%)
5	Difficulty in the integration of AI with existing health record systems	38 (27.5%)	92 (66.7%)	3 (2.2%)	5 (3.6%)
6	There are concerns regarding data privacy and security	40 (29.0%)	87 (63.0%)	10 (7.2%)	1 (0.7%)
7	Limited infrastructure to effectively adopt AI.	8 (5.8%)	121 (87.7%)	6 (4.5%)	3 (2.2%)
8	Poor awareness on the potentials of AI in health records	57 (41.3%)	67 (48.6%)	11 (8.0%)	3 (2.2%)
9	Lack of staff training to effectively use AI in health records management	53 (38.4%)	81 (56.7%)	1 (0.7%)	3 (2.2%)

Respondents identified several significant challenges to AI adoption in health record management in Nigerian teaching hospitals (Table 6). The chief among these is the lack of technical expertise, which poses the greatest obstacle at 94.2%. This was closely followed by inadequate infrastructure for effective AI implementation (93.5%) and concerns regarding data privacy and security (92%). Notably, respondents disagreed with the notion that AI use contradicts hospital ethics, suggesting that teaching hospitals recognize AI's potential and are inclined to support its integration into health record management.

## Discussion of Findings

This study examines the strategies that teaching hospitals in Nigeria can implement for utilizing AI in health records management, particularly in this digital age, where AI is revolutionizing every facet of work life, including healthcare. The findings revealed a significant gap in the use of AI tools by health workers in Nigerian teaching hospitals, with many familiar with ChatGPT, Chatbots, and Copilot. While the results show that health workers in these hospitals do not lag behind in adopting AI tools, only a few consistently use them in their daily routines. However, most occasionally employ AI tools for research, medical diagnoses, and administrative tasks. They seldom used AI for various activities within the teaching hospital, indicating a low level of AI adoption in Nigerian teaching hospitals. This outcome highlights that health workers in tertiary hospitals have not fully embraced the new technology in health record management systems. Babatope et al. (2024) supported these findings, noting that despite a high level of AI awareness among health workers at UNIMEDTH in Nigeria, there is a low rate of utilization, pointing to a significant issue with technology implementation.

This study identified strategies for adopting AI in health record management within teaching hospitals. These strategies include management's support and prioritization of AI adoption; establishing a robust data foundation encompassing data accessibility, security, and privacy; and cultivating an AI-ready culture through training and collaboration. Supporting these findings, Oladipo et al. (2024) highlighted similar strategies, such as staff retraining, phased implementation, and stakeholder engagement, as crucial for ensuring the sustainability and adaptability of AI integration in healthcare. Similarly, Ogundele et al. (2021) emphasized the role of institutional support in facilitating the use of new technologies for health records. This aligns with the importance of institutional readiness, including infrastructure and staff competence, in the successful application of digital technologies in teaching hospitals, as suggested by Onyeabor et al. (2023).

The findings indicate that adopting AI can enhance the accuracy of health records, reduce the time required to access patient records, and streamline health record management processes, thereby boosting the effectiveness and efficiency of health care delivery. This aligns with Ye et al. (2024), who assert that electronic health records can utilize AI technologies to “enhance clinicians’ abilities to diagnose patients’ health issues, classify risks at the patient level by harnessing the power of integrated data, and provide essential support to clinics and hospitals.”

In teaching hospitals in Nigeria, the adoption of AI in health record management faces significant challenges, including a lack of technical expertise, inadequate infrastructure, and concerns about data privacy and security. Respondents, however, disagreed with the notion that AI use contradicts hospital ethics, suggesting that these institutions recognize AI's potential and are open to its integration into health record management. Supporting these

findings, Babatope et al. (2024) identified financial constraints, insufficient ICT resources, poor Internet connectivity, and unreliable power supply as the primary obstacles to effective EHR implementation. Ye et al. (2024) highlighted issues related to security and privacy, data interpretation and analytics, and the acceptable use of data. This aligns with Umar et al. (2024), who pointed out certain legal and ethical concerns regarding AI's integration of AI into Nigeria's healthcare system. Therefore, addressing these challenges is crucial.

### **Conclusion**

The study highlights the increasing importance of adopting and utilizing Artificial Intelligence in teaching hospitals, emphasizing the necessity for Nigerian health workers to embrace this advancement. This reveals that many health workers in these institutions are already acquainted with various AI tools, such as ChatGPT, Copilot, chatbots, and others, which they occasionally employ for research, medical diagnosis, and administrative tasks. However, the usage pattern indicates a low adoption rate among health workers in Nigerian teaching hospitals, particularly in health record management. Consequently, this study underscores the significance of institutional support for AI and prioritizes its adoption in teaching hospitals. This approach aimed to address some of the identified barriers to AI adoption and foster its use among health workers in teaching hospitals throughout Nigeria.

### **Recommendations**

These recommendations were based on the findings of this study.

1. With the widespread integration of AI across various disciplines, it is essential for teaching hospitals in Nigeria to develop clear policies and frameworks to guide the adoption of AI in health record management. This initiative should also encompass ethical guidelines to address concerns related to AI in healthcare management.
2. State and federal governments, along with hospital management, should prioritize the integration of AI in teaching hospitals by ensuring that adequate funding and resources are allocated.
3. To enhance digital literacy and competency among healthcare workers, regular training programs, including workshops and AI certifications, should be organized.
4. Teaching hospital management should prioritize investing in a reliable digital infrastructure that includes stable Internet connectivity and an uninterrupted power supply. Additionally, robust cybersecurity measures must be implemented to safeguard patient data and ensure compliance with data privacy regulations.

## References

- Alege, A., Hashmi, S., & Eneogu, R. (2024). Effectiveness of using AI-driven hotspot mapping for active case finding of tuberculosis in Southwestern Nigeria. *Tropical Medicine and Infectious Disease*, 9(5), 99.
- Alobo, I. G., Soyannwo, T., Ukponwan, G., Akogu, S., Akpa, A. M., & Ayankola, K. (2020). Implementing an electronic health system in Nigeria: Perspective assessment in a specialist hospital. *African Health Sciences*, 20(2), 948–954.
- Azeez, N. A., Idiakose, S. O., & Onyema, C. J. (2021). Cyberbullying detection in social networks: Artificial intelligence approach. *Journal of Cyber Security and Mobility*, 745–774.
- Babatope, A. E., Adewumi, I. P., Ajisafe, D. O., Adepoju, K. O., & Babatope, A. R. (2024). Assessing the factors militating against the effective implementation of electronic health records (EHR) in Nigeria. *Scientific Reports*, 14(1), Article 31398. <https://doi.org/10.1038/s41598-024-83009-y>
- Babbie, E. R. (2020). *The practice of social research*. Cengage Au.
- Chen, B. J., & Metcalf, J. (2024). Explainer: A sociotechnical approach to AI policy. Data & Society. [https://datasociety.net/wp-content/uploads/2024/05/DS\\_Sociotechnical-Approach\\_to\\_AI\\_Policy.pdf](https://datasociety.net/wp-content/uploads/2024/05/DS_Sociotechnical-Approach_to_AI_Policy.pdf)
- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed-methods approaches* (5th ed.). Sage Publications.
- Damadi, M. S., & Davoust, A. (2023, August). Fairness in socio-technical systems: A case study of Wikipedia. In International Conference on Collaboration Technologies and Social Computing (pp. 84–100). Cham: Springer Nature Switzerland.
- Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., Cripps, H., Fletcher, G., Grover, P., Janssen, M., Jones, P., Kizgin, H., Kronemann, B., Lal, B., Lucini, B., Misra, S., Mogaji, E., Sharma, S. K., & Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice, and policy. *International Journal of Information Management*, 57, Article 101994. <https://doi.org/10.1016/j.ijinfomgt.2019.08.002>
- Elish, M. C., & Watkins, E. A. (2020, September). *Repairing innovation: A study of integrating AI in clinical care*. Data & Society. <https://search.issuelab.org/resource/repairing-innovation-a-study-of-integrating-ai-in-clinical-care.html>
- Ephraim, R. K. D., Kotam, G. P., Duah, E., Ghartey, F. N., Mathebula, E. M., & Mashamba-Thompson, T. P. (2024). Application of medical artificial intelligence technology in sub-Saharan Africa: Prospects for medical laboratories. *Smart Health*, Article 100505.

- Fritsch, S. J., Blankenheim, A., Wahl, A., Hetfeld, P., Maassen, O., Deffge, S., Krah, N., Cornelissen, C., Weitz, J., El Hindy, N., Neumuth, T., Wolf, L., Neunhoeffler, F., Wilhelm, D., Maron, R. C., Palm, C., Bertlich, M., Hennigs, A., Hatiboglu, M. A., & Bickenbach, J. (2022). Attitudes and perception of artificial intelligence in healthcare: A cross-sectional survey among patients. *Digital Health*, 8. <https://doi.org/10.1177/20552076221116772>
- Habib, M. M., Hoodbhoy, Z., & Siddiqui, M. R. (2024). Knowledge, attitudes, and perceptions of healthcare students and professionals on the use of artificial intelligence in healthcare in Pakistan. *PLOS Digital Health*, 3(5), Article e0000443. <https://doi.org/10.1371/journal.pdig.0000443>
- Haenlein, M., & Kaplan, A. (2019). A brief history of artificial intelligence: On the past, present, and future of artificial intelligence. *California Management Review*, 61(4), 5–14. <https://doi.org/10.1177/0008125619864925>
- Holdsworth, L., & Zaghoul, R. (2024). Integrating AI tools into healthcare systems: A patient-centered approach. *Health Technology Policy Journal*, 18(1), 45–60.
- Holdsworth, M., & Zaghoul, F. (2022, August). The impact of AI in the UK healthcare industry: A socio-technical system theory perspective. In STPIS (pp. 52–63).
- Huang, J.-D., Wang, J., & Ramsey, E. (2022). Applying artificial intelligence to wearable sensor data to diagnose and predict cardiovascular disease: A review. *Sensors*, 22(20), 8002. <https://doi.org/10.3390/s22208002>
- Ilicki, J. (2023). Framework for critically assessing chatgpt and other large-language artificial intelligence model applications in healthcare. *Mayo Clinic Proceedings: Digital Health*, 1(2), 185–188.
- Jarrahi, M. H., & Sawyer, S. (2015). Theorizing on the take-up of social technologies, organizational policies and norms, and consultants' knowledge-sharing practices. *Journal of the Association for Information Science and Technology*, 66(1), 162–179.
- Malatji, M., Von Solms, S., & Marnewick, A. (2019). Socio-technical systems cybersecurity framework. *Information & Computer Security*, 27(2), 233–272.
- Mikalef, P., & Gupta, M. (2021). Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study of its impact on organizational creativity and firm performance. *Information & Management*, 58(3), Article 103434. <https://doi.org/10.1016/j.im.2021.103434>
- Mira, E. S., Saaduddin, S. A. M., & Aljehani, R. F. (2024). Early diagnosis of oral cancer using image processing and artificial intelligence. *Fusion Practice Applications*, 14(1), 293–308.
- Morah, D. N., & Brown, G. N. B. (2024). Knowledge and Adoption of Artificial Intelligence for Effective Communication by Healthcare Providers in Nigerian Teaching Hospitals. *Pakistan Journal of Media Sciences*, 5(1), 1–17.



- Mumford, E. (2006). The story of socio-technical design: Reflections on its successes, failures and potential. *Information Systems Journal*, 16(4), 317–342.
- Ogolodom, M. P., Ochong, A. D., Egop, E. B., Jeremiah, C. U., Madume, A. K., Nyenke, C. U., Ekuma, A. E., Yacham, A. E., Nwankwo, O. U., Miebaka, A. D., Nte, A. R., Morka, A. C., Nwafor, J. E., Ajie, M. A., Okocha, A. N., Nlemadim, E. A., Achor, R. A., Orupabo, R. B., Ugochukwu, U. C., & Nwodo, V. K. (2023). Knowledge and perception of healthcare workers towards the adoption of artificial intelligence in healthcare service delivery in Nigeria. *AG Salud*, 1, 16–16.
- Ogundele, A. O., Ikonne, C. N., & Madukoma, E. (2021). Institutional support and use of electronic health records by medical doctors in teaching hospitals in South-West Nigeria. *International Journal of Academic Library and Information Science*, 9(4), 149.
- Oladipo, E. K., Adeyemo, S. F., Oluwasanya, G. J., Oyinloye, O. R., Oyeyiola, O. H., Akinrinmade, I. D., Bello, A. O., Eze, U. R., Yusuf, M. A., Adediran, A. A., Okonkwo, C. F., Ajibola, O. M., Balogun, T. A., Omotayo, A. E., Ilesanmi, A. O., Ogundipe, K. T., Umeh, C. C., Abiola, A. B., Okafor, P. N., & Nnaji, N. D. (2024). Impact and challenges of artificial intelligence integration in the African health sector: A review. *Trends in Medical Research*, 19(1), 220–235.
- Onyeabor, U. S., Ayoola, L. O., Okenwa, W. O., Onwuasoigwe, O., Schaaf, T., Pinkwart, N., & Balzer, F. (2023). Assessment of readiness across tertiary/university teaching hospitals in a developing country (Nigeria) to implement sustainable healthcare digital transformation programs and projects. <https://doi.org/10.21203/rs.3.rs-3293907/v1>
- Reddy, S., Rogers, W., Makinen, V. P., Coiera, E., Brown, P., Wenzel, M., Ghassemi, M., Matheny, M. E., Beam, A. L., Szolovits, P., Desai, S., Geva, A., Pfohl, S. R., Naumann, T., Obermeyer, Z., Finlayson, S. G., Blease, C., Cutler, D., & Kelly, B. (2021). Evaluation framework to guide the implementation of AI systems in healthcare settings. *BMJ Health & Care Informatics*, 28(1), e100256. <https://doi.org/10.1136/bmjhci-2020-100256>
- Roppelt, J. S., Jenkins, A., Kanbach, D. K., Kraus, S., & Jones, P. (2025). Effective adoption of artificial intelligence in healthcare: A multiple case study. *Journal of Decision Systems*, 34(1), Article 2458883. <https://doi.org/10.1080/12460125.2024.2458883>
- Saunders, M. N. K., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson.
- Soliman, M., & Saurin, T. A. (2017). Lean production in complex socio-technical systems: A systematic literature review. *Journal of Manufacturing Systems*, 45, 135–148.
- Umar, A. B., Sani, S. K., Aliyu, L. J., Hassan, M., Imam, M., Haruna, U. A., Ibrahim, A. M., & Lucero-Prisno III, D. E. (2024). Enhancing primary healthcare delivery in Nigeria through the adoption of advanced technologies. *Narra X*, 2(3), e180–e180.

- Whitworth, B. (2009). A brief introduction to sociotechnical systems. In *Encyclopedia of Information Science and Technology* (2nd ed., p. 394). IGI Global. <https://www.igi-global.com/chapter/brief-introduction-sociotechnical-systems/13604>
- Ye, J., Woods, D., Jordan, N., & Starren, J. (2024). Role of artificial intelligence in integrating electronic health records and patient-generated data in clinical decision support. *AMIA Joint Summits on Translational Science Proceedings*, 31, 459–467.
- Yusuf, T. I., Adebayo, O. A., Bello, L. A., & Kayode, J. O. (2022). Adoption of artificial intelligence for effective library service delivery in Nigerian academic libraries. *Library Philosophy and Practice (e-journal)*, 6804, 1–13.

## A Methodology for Curriculum Design in General High School in México

Alma Andrea Orozco Fierro, Dirección General del Bachillerato, México  
Oscar Mendoza Ruiz, Dirección General del Bachillerato, México

The Paris Conference on Education, 2025  
Official Conference Proceedings

### Abstract

The transition to the Common Curricular Framework for Upper Secondary Education (MCCEMS, as its acronym in Spanish) in Mexico, established in AGREEMENT number 09/08/23, emphasizes the use of Learning Progressions as a central element of curricular design. This research aimed to develop a methodology for constructing context-sensitive learning progressions aligned with the MCCEMS. A descriptive approach with a non-experimental design was employed, based on the analysis of the curricular model developed by the Undersecretariat of Upper Secondary Education (SEMS, as its acronym in Spanish). As a result of this research, a methodology structured into eight phases was developed, drawing from the artistic paradigm of curricular design. To date, this methodology has been implemented in 49 Curricular Learning Units (CLU) within the General High School curriculum, impacting more than 27,000 students in institutions coordinated by the General Directorate of Baccalaureate (DGB, as its acronym in Spanish). Future research should focus on evaluating its impact throughout the three years of student education in the General High School program.

*Keywords:* curriculum design, upper high school, learning progressions

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The upper secondary education system in Mexico, known as “*bachillerato*” in Spanish, is part of the broader framework of Upper Secondary Education and is aimed at students between the ages of 15 to 18, with an official duration of three years. This educational level is organized into various subsystems according to their formative approach. In the case of the General Upper Secondary Education, the main goal is to prepare students for higher education. Although upper secondary education is mandatory and regulated by the Ministry of Public Education (*Secretaría de Educación Pública*, SEP), there are also autonomous and private institutions that follow their own academic programs.

Within this context, Agreement number 09/08/23, published in the Official Journal of the Federation on August 25, 2023, establishes and regulates the adoption of the Common Curricular Framework for Upper Secondary Education (*MCCEMS*, as per its Spanish acronym) (*Secretaría de Educación Pública*, 2023). This framework is the result of a collective and collaborative project initiated in 2019, involving the participation of teachers, authorities, and experts who contributed to defining the principles of a comprehensive education for this educational level (*Subsecretaría de Educación Media Superior*, 2022, 2024).

The MCCEMS seeks to unify the fundamental learning outcomes across Upper Secondary Education, promoting greater equity and flexibility in student formation (*Subsecretaría de Educación Media Superior*, 2019). To this end, it sets forth the pedagogical principles, curricular structure, and graduate profile that guide the educational process. The fundamental curriculum is organized into 27 Curricular Learning Units (CLU), distributed across three Areas of Knowledge (Humanities; Social Sciences; and Natural, Experimental Sciences and Technology), as well as five Sociocognitive Resources (Mathematical Thinking; Language and Communication; Historical Awareness; Digital Culture; and English).

In addition, the MCCEMS highlights Learning Progressions as a central element of curricular design, enabling the structured, gradual development of knowledge and skills throughout upper secondary education. In accordance with the Fourth Transitory Article of Agreement 09/08/23—which assigns the Undersecretariat of Upper Secondary Education (SEMS) the responsibility of coordinating the necessary actions for the implementation of the framework in institutions under its jurisdiction—the General Directorate of Upper Secondary Education (DGB) entrusted the authors of this paper with the development of a key normative tool to facilitate the transition to the MCCEMS within the General Upper Secondary Education subsystem, ensuring the active participation of teaching staff (*Secretaría de Educación Pública*, 2023).

Beyond the required normative adjustments, this process raises both theoretical and practical questions regarding the articulation of academic programs with contemporary educational demands and the specific contextual characteristics of individual schools.

As a result of this work, the Psychopedagogical Guidelines for the Development of Study Programs and Learning Progression were created. This paper aims to present the methodology developed as a contribution to curriculum design from the perspective of learning progressions, with the objective of supporting the effective implementation of the MCCEMS in the General Upper Secondary Education.

## Literature Review

### Learning Progressions

Learning progressions are an educational model that describes the evolution of students' ideas and thinking processes regarding a concept or topic over time, offering a framework to understand how knowledge and skills gradually develop (Talanquer, 2013). In this sense, they are conceived as learning trajectories that reflect how students advance in their comprehension and abilities as they progress through their education (Heritage, 2008). Since learning is a continuous and dynamic process, it is crucial for educators to recognize these trajectories in order to support student growth more effectively. Consequently, Learning Progressions not only provide a solid foundation for instructional planning, but also serve as a central component of formative assessment, enabling teachers to design targeted strategies that foster more coherent and meaningful learning experiences.

Delving deeper into their theoretical foundation, from a cognitive perspective, Learning Progressions make it possible to map knowledge and practices across different levels of sophistication (Mohan & Plummer, 2012). In this regard, Fortus & Krajcik (2012) describe them as “increasingly sophisticated ways of thinking about how students develop key disciplinary ideas and practices across grade levels” (p. 792). That is, they do not merely define a content sequence but rather represent complex processes of cognitive development. In general terms, Learning Progressions exhibit three fundamental characteristics (Mohan & Plummer, 2012):

- Hypothetical learning models, which describe how students are expected to build knowledge in a specific domain.
- Upper and lower anchors, based on authentic disciplinary practices and students' prior ideas, including misconceptions that can be addressed through instruction.
- Developmental trajectories, which show how students can progress toward more complex ways of thinking with the support of appropriate teaching strategies.

This approach has been officially adopted by the Ministry of Public Education (SEP), which recognizes learning progressions as a central component for achieving the graduate profile in Upper Secondary Education (Educación Media Superior, EMS). In AGREEMENT number 09/08/23, Article 3, it is stated that these progressions enable the sequential organization of learning, facilitating not only the appropriation of cognitive, procedural, and attitudinal knowledge, but also its application to the resolution of personal and social problems. In the words of the agreement itself:

They are innovative and flexible didactic units for the sequential description of the learning outcomes associated with the understanding and resolution of personal and/or social needs and problems, as well as the concepts, categories, subcategories, and the relationships among these elements, which will enable students to gradually understand and develop increasingly complex cognitive, procedural, and attitudinal knowledge for their appropriation and application, thereby contributing to their comprehensive education and well-being, as well as to personal, community, and social transformation. (Secretaría de Educación Pública, 2023)

Following this logic, L. Sáez (2013, as cited in Subsecretaría de Educación Media Superior, 2022) notes that Learning Progressions chart the path along which students advance as they master a concept, process, practice, or skill. Consequently, they become an indispensable tool

for teachers, as they guide the development of essential knowledge within each Curricular Learning Unit (CLU).

In summary, learning progressions constitute a powerful model that promotes a comprehensive understanding of learning by establishing connections between ideas, representing trajectories of cognitive development, and fostering the formation of complex thinking. By enabling students to become aware of their own learning processes and use these connections to solve problems and better understand their environment, Learning Progressions make a decisive contribution to a more robust, inclusive, and transformative education (Fortus & Krajcik, 2012).

### **Curricular Design of Learning Progressions**

Curricular design based on Learning Progressions has been implemented in various countries with the purpose of structuring the gradual development of student knowledge. In nations such as Australia, Canada, China, Hong Kong, Korea, New Zealand, and Singapore, Learning Progressions have served as a key tool for organizing curricula (Hess, 2010). These approaches aim to establish a structured framework that facilitates both teaching and learning through a progressive sequence of knowledge and skills.

From a methodological standpoint, different approaches have been used in the development of Learning Progressions. Heritage (2008) identifies two predominant models: a *top-down* approach, in which experts in curriculum and subject-matter disciplines design the progressions based on research and specialized knowledge; and a *bottom-up* approach, where teachers and education specialists build the progressions from their teaching experience and direct observation of student learning.

A notable example of the *bottom-up* model is the Australian experience, developed in the 1990s through what were known as progress maps. This model originates in the practice of teachers, who identify how learning occurs in specific domains and establish indicators of progress. The resulting framework is subsequently validated based on criteria such as alignment with learning theory and practical utility. Over time, these maps are revised and refined using evidence gathered from student performance, allowing for adjustments in the sequencing of concepts to optimize the learning progression (Masters & Forster, 1996).

In contrast, the model adopted in Canada and the United States follows a *top-down* approach. In these contexts, progressions are designed by central decision-making bodies, with the involvement of subject-matter experts who define essential areas of learning and enduring understandings to be achieved at each educational stage. This model is exemplified in the development of the Common Core State Standards (CCSS), where expected outcomes are first defined for each grade band (K–4, 5–8, and 9–12), and then performance indicators are constructed to guide both instruction and assessment. While this approach promotes curricular coherence and facilitates the organization of learning, it tends to limit opportunities for local adaptation based on teachers' direct classroom experience (Hess, 2010; Lee & Jo, 2022).

In the Mexican context, curricular design has adopted a *bottom-up* perspective, prioritizing the active participation of teachers in the development of Learning Progressions. The General Directorate of Upper Secondary Education implemented a methodology that integrates teachers' disciplinary knowledge with their instructional experience, enabling the

construction of a curricular structure that supports continuity in learning. This methodology ensures that students progressively acquire key competencies necessary for their academic and professional development. In accordance with Article 90 of the General Education Law, teachers play a fundamental role in the educational process and in the adaptation of the curriculum to their specific contexts. Their involvement in curricular design not only strengthens ownership and commitment but also facilitates the effective implementation of educational programs by aligning curricular objectives with the realities of the classroom (Fullan, 1991; Voogt et al., 2019).

### **The Artistic Paradigm in Curriculum Design**

In this regard, the curriculum design methodology adopted by the General Directorate of Upper Secondary Education in Mexico is closely aligned with the artistic paradigm of curriculum design, as described by Visscher-Voerman and Gustafson (2004), who, after a detailed analysis of educational design practices, identified four paradigms that guide curriculum development processes: the instrumental, communicative, pragmatic, and artistic paradigms. The methodological approach presented in this paper is grounded in the latter.

The artistic paradigm is primarily based on the individual process of meaning-making, often supported by the experience and expertise of professionals—in this case, teachers. From this perspective, knowledge is not transmitted in a unidirectional manner, but rather constructed through social activities, context, and culture (Voogt et al., 2019). These elements are also considered essential in the present proposal to develop a meaningful and contextualized curricular structure.

Although the artistic paradigm shares core aspects of curriculum design with instrumental paradigms—such considerations of educational aims, the selection and organization of learning experiences, and mechanisms for evaluating effectiveness (Eisner, 1985; Tyler, 1949)—it differs in its conception of the design process. While the instrumental paradigm favors a linear and planned approach, the artistic paradigm views design as an open and flexible process in which means and ends are interdependent (Marsh & Willis, 2003; Visscher-Voerman & Gustafson, 2004). In this sense, the methodology employed by the General Directorate of Upper Secondary Education allows for dynamic adaptation to the needs of classrooms and students, incorporating the experience and professional judgment of teachers in the development of learning progressions that foster both continuity and relevance in learning. This approach also aligns with the principles of the artistic paradigm, acknowledging that teachers require a foundational understanding of the design and development process in order to ensure effective and context-sensitive implementation (McKenney et al., 2015).

### **Methodology**

This research was conducted using a descriptive approach and a non-experimental design, based on the analysis of the curriculum model proposed by the Subsecretariat of Upper Secondary Education (SEMS). The aim was to design a methodology for the development of Learning Progressions within the framework of the MCCEMS, ensuring its relevance across diverse educational contexts.

The study adopted a descriptive approach, as it sought to characterize and systematize the process of constructing Learning Progressions in the MCCEMS. A non-experimental design

was employed, as no variables were manipulated; instead, the existing curricular framework was analyzed and a methodology was proposed, grounded in theoretical principles and curricular practices.

The development of the methodology was structured in eight phases, taking the artistic paradigm of curriculum design as a reference. For its validation and refinement, an expert peer review was carried out, involving specialists in education and in the MCCEMS. Additionally, a pilot program was implemented with a group of teachers, who provided feedback on the process, allowing for the incorporation of improvements based on their professional experience.

Subsequently, the refined methodology was implemented in 49 Curricular Learning Units (UAC) of the General Upper Secondary Education program, reaching over 27,000 students in institutions coordinated by the DGB.

The data analysis focused on reviewing the MCCEMS curriculum model and systematizing the process of developing Learning Progressions. Document analysis techniques were used to examine the principles of the MCCEMS and to design the proposed methodology.

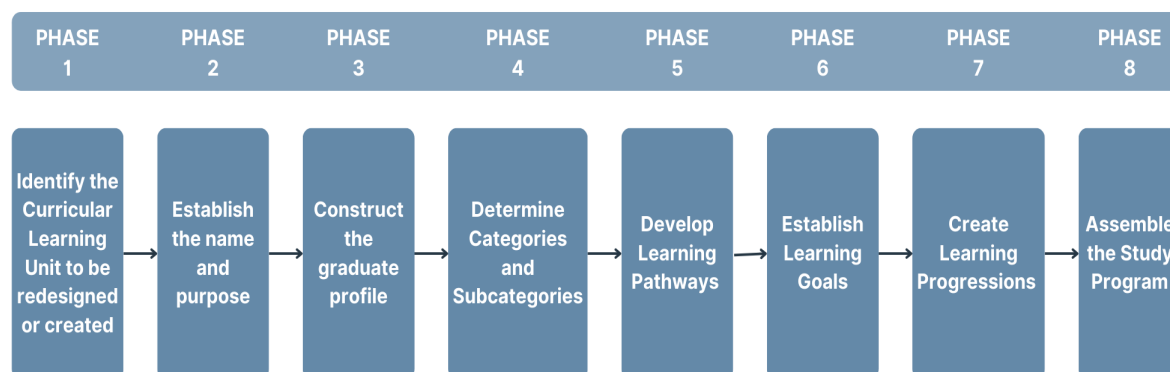
### **Results**

The elements previously discussed informed the design of a methodology for the development of learning progressions based on the artistic paradigm of curriculum design. This methodology includes heuristics that guide the design process. The approach adopted follows a bottom-up model, aiming to leverage the expertise of teachers and subject-matter specialists in constructing learning progressions grounded in their teaching experience and direct observation of student learning.

Through this approach, a pathway was developed for designing the Learning Progressions of the Curricular Learning Units (UACs) within the Extended Fundamental and Compulsory Extended Fundamental Components of the General Baccalaureate. This methodology is published in the “Psychopedagogical Guidelines for the Development of Programs and Learning Progressions”. It consists of eight phases which, due to the structural characteristics of the MCCEMS, may be omitted or reordered as needed.

The phases are outlined as follows:



**Figure 1***Suggested Pathway for the Development of Learning Progressions*

*Note.* Image created by the authors.

### **Phase 1. Identify the Curricular Learning Unit (UAC) to Be Redesigned or Created**

This phase involves determining whether to redesign an existing UAC or create a new one, based on the curriculum's needs and current educational and labor demands. Creating a new UAC allows for the incorporation of emerging disciplines, technological advancements, or labor market shifts, enabling the development of innovative proposals to address current challenges.

Conversely, redesigning an existing UAC enables more efficient use of resources by updating content, methods, or objectives to better align with present-day demands, while preserving curricular coherence and drawing on prior experience.

In both cases, it is essential to analyze the relevance of the content, available resources, and teaching capacity to ensure effective implementation. Additionally, the selected UAC must be aligned with one of the Knowledge Areas, Sociocognitive Resources, or Socioemotional learning domains of the MCCEMS, in accordance with its corresponding epistemological model.

### **Phase 2. Establishing the Name and Purpose**

In this phase, the foundation that will guide the development of the Curricular Learning Unit (UAC) is established by addressing key questions about what, how, and for what purpose the UAC will be taught. This analysis is conducted from the student's perspective, considering university entrance profiles and the current state of the discipline. A review of the UAC's state of the art is required, which involves a documentary analysis of curricula and similar programs from other institutions to ensure the relevance and up-to-date nature of the content. Moreover, it is essential to assess the needs and expectations of students to design a proposal that is aligned with current challenges.

### **Phase 3. Construct the Exit Profile**

This phase must be rigorously aligned with the purpose of the UAC and contribute integrally to its achievement. The construction is carried out through a detailed analysis of the forecast, objectives, purposes, methodology, and core content of the UAC. This analysis includes the following key points:

- Identification of the specific content to be taught.
- Establishment of educational objectives related to that content.
- Identification of the relevant disciplinary fields for the UAC's specific objectives.
- Definition of the essential knowledge needed to deeply understand the content.
- Definition of activities, tasks, and actions required in the disciplinary fields associated with the UAC.
- Identification of the values and aptitudes that will help students achieve their exit profile.
- This approach ensures a structured and comprehensive process, while ensuring coherence with the objectives of the UAC. It is essential that each element contributes synergistically to the established educational goals.

#### **Phase 4. Determine Categories and Subcategories**

In this stage, the essential elements that students need to acquire, such as knowledge, skills, activities, attitudes, and values, are identified. Based on this identification, decisions are made on whether to use, adapt, or create new Categories and Subcategories within the Knowledge Areas, Sociocognitive Resources, or Socioemotional Domains relevant to the UAC. The process involves:

- Defining the core content: Establishing the knowledge, skills, activities, attitudes, and values that students should develop.
- Relating content to existing categories: Linking this content with available Categories and Subcategories within the Knowledge Areas and associated Resources.
- Creating new categories and subcategories: If existing categories are insufficient to cover the fundamental content, new ones are designed to properly organize these elements.

This approach ensures precise alignment between the core content and the conceptual structure of the UAC. It also ensures a coherent integration of knowledge, skills, and values, making the educational experience comprehensive and organized.

#### **Phase 5. Develop the Learning Trajectories**

This phase focuses on the meaningful organization of the fundamental content that served as an input for determining the categories and subcategories. To draft the learning trajectories, the following process is carried out:

- Identification of elements that share a common category in the exit profile, considering the specific characteristics of the desired graduate.
- Organization of the elements into groups based on the identified categories.
- Evaluation of the coherence and relevance of the formed groups.
- Drafting of the learning trajectories based on the grouped elements by category.

The phase centers on the systematization and coherent structuring of the key elements identified in the previous phase, to formulate learning trajectories that reflect the characteristics of the desired graduate.

## **Phase 6. Develop Learning Goals**

In this phase, the learning trajectories are broken down into sequential and essential steps, allowing for the continuous and connected construction of teaching and learning strategies. This process follows the steps outlined below:

- Identification and description of the sequential and essential stages that precede and lead to the achievement of the learning trajectories.
- Establishment of specific goals and achievements that students should progressively reach each semester.
- Definition of evaluable indicators that facilitate the observation and feedback of student progress during the prior stages and throughout the trajectory.
- Breakdown of each goal, including specific actions that students should undertake during the trajectory.

This detailed and structured approach ensures a clear understanding of the stages and goals throughout the trajectory, facilitating the planning of coherent pedagogical strategies and the effective evaluation of student progress.

## **Phase 7. Create the Learning Progressions**

In this phase, intermediate steps are structured to guide students from simpler to more complex learnings, leveraging the specific characteristics of each Knowledge Area or Sociocognitive Resource linked to the UAC. The process is as follows:

- Identification and description of the progressive learning steps students must develop to achieve the established learning goals.
- Specification of the essential content that must be covered during the semester as the foundation for achieving the learning goals.
- Development of strategies that encourage active student participation.
- Ensuring that the Learning Progressions are broad enough to allow for adaptation and contextualization in different educational settings.
- Validation that the Learning Progressions are interconnected, with progress in one stage preparing students for the next.
- Verification of the use of all categories and subcategories developed.
- Confirmation of the linkage between categories and subcategories with the developed Learning Progressions.

This phase focuses on the detailed development of the Learning Progressions, ensuring that they build on the specific characteristics of each Knowledge Area or Sociocognitive Resource.

## **Phase 8. Assemble the Study Program**

At the conclusion of the academic work, the elements developed in each phase are organized to create the final version. This process is essential to ensure the quality and effectiveness of the work developed throughout the various phases of the creation of the Learning Progressions.

## Discussion

This study has allowed the development of a methodology to construct learning progressions aligned with the Common Curricular Framework for Higher Secondary Education (MCCEMS). The proposed methodology, structured in eight phases, offers an innovative perspective adapted to the needs of the Mexican context, drawing upon the artistic paradigm of curricular design. The results show that this methodology has been successfully applied in 49 Curricular Learning Units (CLU) within the General High School curriculum, benefiting over 27,000 students in institutions under the coordination of the General Directorate of Baccalaureate (DGB). These findings suggest that the methodology is promising for improving curricular design and the implementation of learning progressions, as it adapts to the needs of the educational environment and allows for more precise monitoring of students' academic development.

Furthermore, this initiative represents one of the first systematic efforts to develop learning progressions specifically for the General High School level in Mexico. By positioning teachers as the main curricular designers, the methodology adopts a *bottom-up* approach that ensures the curriculum is more meaningful and better adapted to the realities of the students. It also amplifies the voices of teachers—key actors in achieving student learning outcomes—by valuing their professional expertise and direct experience in the classroom. This perspective contrasts with more traditional *top-down* models, in which central authorities design curricula with limited input from practitioners.

## Conclusion and Recommendations

This methodology is the result of a rigorous and systematic effort to structure and optimize the process of curricular design based on learning progressions, establishing itself as one of the first experiences to systematize the design of learning progressions in General High School education in Mexico. Its development has enabled the establishment of a methodological framework that facilitates the construction of Curricular Learning Units (UACs) aligned with the MCCEMS, through an innovative *bottom-up* approach. By positioning teachers as the main curricular designers, the methodology ensures that the curriculum becomes more meaningful and better adapted to students' realities, while listening to the voices of those who are fundamental actors in achieving student learning.

To date, the methodology has been applied in the design of 49 UACs within the General High School curriculum, positioning approximately 230 teachers not only as specialists in their respective disciplines but also as active agents in curricular construction. This approach has strengthened the quality and coherence of educational programs in institutions coordinated by the DGB and has directly impacted over 27,000 students from the Centros de Estudios de Bachillerato.

Furthermore, its potential reach extends to around 700,000 students, as State Colleges of High School can access both the UACs designed with this methodology and the methodology itself, adapting it to their specific contexts. Likewise, Private Incorporated High Schools have the published document as a reference tool to develop their own curricula, further expanding the impact of this proposal across Upper Secondary Education.

However, it is important to recognize that the methodology has not yet been evaluated longitudinally. Further research is needed to assess its long-term impact on student learning,

school retention, and overall academic performance. Future studies will be crucial to confirm the effectiveness and sustainability of this approach throughout the full three-year educational cycle of General High School.

In terms of impact, this methodology establishes itself as a strategic national resource, offering a theoretical and practical framework that guides curricular design towards more flexible, adaptive, and student-centered models. Its implementation responds to the needs of the current educational context and lays a solid foundation for future innovations in the planning, design, and evaluation of high school education in Mexico.

### **Acknowledgements**

The authors would like to express their sincere gratitude to Jorge Alejandro Rangel Sandoval and Cuautli Suárez Jiménez for their valuable guidance and unwavering support throughout the development of this work. Their leadership and commitment were essential in shaping the vision and direction of this research.

## References

- Eisner, E. W. (1985). *The educational imagination: On the design and evaluation of school programs* (2nd ed.). Macmillan.
- Fortus, D., & Krajcik, J. (2012). Curriculum coherence and learning progressions. In Fraser, B., Tobin, K., McRobbie, C. (Eds.), *Second International Handbook of Science Education*, (pp. 783-798). Springer, Dordrecht. [https://doi.org/10.1007/978-1-4020-9041-7\\_52](https://doi.org/10.1007/978-1-4020-9041-7_52).
- Fullan, M. (1991). *The new meaning of educational change* (2nd ed.). Cassell Educational Limited.
- Heritage, M. (2008). *Learning progressions: Supporting instruction and formative assessment*. National Center for Research on Evaluation, Standards, and Student Testing (CRESST). [https://www.oregon.gov/ode/educator-resources/assessment/Documents/LLP\\_Module\\_1\\_Reading\\_Learning\\_Progression.pdf](https://www.oregon.gov/ode/educator-resources/assessment/Documents/LLP_Module_1_Reading_Learning_Progression.pdf)
- Hess, K. (Ed.). (2010). *Learning progressions frameworks designed for use with the Common Core State Standards in Mathematics K-12*. National Alternate Assessment Center at the University of Kentucky & National Center for the Improvement of Educational Assessment.
- Lee, J., & Jo, I. (2022). Assessment of mapping learning progressions in geography. In T. Bourke, R. Mills, & R. Lane (Eds.), *Assessment in geographical education: An international perspective* (pp. 55–77). Springer. [https://doi.org/10.1007/978-3-030-95139-9\\_3](https://doi.org/10.1007/978-3-030-95139-9_3)
- Marsh, C. J., & Willis, G. (2003). Approaches to curriculum. In *Curriculum: alternative approaches, ongoing issues* (3rd ed., pp. 66–92). Pearson Education.
- Masters, G., & Forster, M. (1996). Progress Maps. ACER.
- McKenney, S. E., Kali, Y., Markusauskaite, L., & Voogt, J. (2015). Teacher design knowledge for technology-enhanced learning: An ecological framework for investigating assets and needs. *Instructional Science*, 43(2), 181–202. <https://doi.org/10.1007/s11251-014-9337-2>
- Mohan, L., & Plummer, J. (2012). Exploring challenges to defining learning progressions. In Alonzo, A. C. & Gotwals, A. W. (Eds.), *Learning progressions in science*. SensePublishers, Rotterdam. [https://doi.org/10.1007/978-94-6091-824-7\\_7](https://doi.org/10.1007/978-94-6091-824-7_7)
- Secretaría de Educación Pública. (2023, August 25). *Acuerdo 09/08/23 por el que se establece y regula el Marco Curricular Común de la Educación Media Superior* [Agreement 09/08/23 establishing and regulating the Common Curricular Framework for Upper Secondary Education/]. Diario Oficial de la Federación. [https://sep.gob.mx/work/models/sep1/Resource/24955/1/images/a09\\_08\\_23.pdf](https://sep.gob.mx/work/models/sep1/Resource/24955/1/images/a09_08_23.pdf)

- Subsecretaría de Educación Media Superior. (2019). *Rediseño del Marco Curricular Común de la Educación Media Superior* [Redesign of the Common Curricular Framework for Upper Secondary Education]. Secretaría de Educación Pública.
- Subsecretaría de Educación Media Superior. (2022). *Fundamentos del Marco Curricular Común de la Educación Media Superior, 2022* [Foundations of the Common Curricular Framework for Upper Secondary Education, 2022]. Secretaría de Educación Pública.
- Subsecretaría de Educación Media Superior. (2024, August 14). *Propuesta del Marco Curricular Común de la Educación Media Superior* [Proposal of the Common Curricular Framework for Upper Secondary Education]. Educación Media Superior. <https://educacionmediasuperior.sep.gob.mx/propuestaMCCEMS>
- Talanquer, V. (2013). Progresiones de aprendizaje: Promesa y potencial [Learning Progressions: Promise and Potential]. *Educación Química*, 24(4), 362-364. [http://www.scielo.org.mx/scielo.php?script=sci\\_arttext&pid=S0187-893X2013000400001&lng=es&tlng=es](http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0187-893X2013000400001&lng=es&tlng=es)
- Tyler, R. (1949). *Principles of Curriculum and Instruction*. University of Chicago Press.
- Visser-Voerman, J. I. A., & Gustafson, K. (2004). Paradigms in the theory and practice of education and training design. *Educational Technology Research & Development*, 52(2), 69–89.
- Voogt, J., Pieters, J., & Pareja, N. (2019). Collaborative curriculum design in teacher teams: Foundations. In J. Pieters, J. Voogt, & N. Pareja Roblin (Eds.), *Collaborative curriculum design for sustainable innovation and teacher learning* (pp. 5–18). Springer. [https://doi.org/10.1007/978-3-030-20062-6\\_1](https://doi.org/10.1007/978-3-030-20062-6_1)

**Contact email:** [alma.orozco.f@gmail.com](mailto:alma.orozco.f@gmail.com)





## **Interactive Course for Power Plant Compliance Tests With Grid Connection Requirements**

Lidija M. Korunović, University of Niš, Serbia  
Vojkan Kostić, University of Niš, Serbia  
Tomislav Baškarad, University of Zagreb, Croatia  
Igor Kuzle, University of Zagreb, Croatia

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

In today's power systems, more and more often than in recent decades, new power plants mostly based on the application of renewable energy sources, are being built. That is why it is important to study grid connection requirements of the power plants and corresponding compliance tests within the educational subjects of electrical engineering studies. Also, facility owners must know precisely the requirements related to the compliance tests that should ultimately lead to the operational notification of the plant. The interactive course presented in the paper can be used by industry and the academic community. It was created within the TRANSIT project funded by the European Union and is part of a comprehensive interactive web platform for education in the field of renewable energy sources and sustainability. The interactive course on power plant compliance tests with grid connection requirements is developed on the OpenEdx platform and consists of three components: a PowerPoint presentation serving as the theoretical basis of the topic, an interactive demonstration allowing users to identify the requirements their facility must meet, based on the voltage level at the connection point and maximum capacity of power-generating module, and a quiz to the material covered. The course is followed by a survey that provides feedback on the course. Learning the procedures for connecting the power plant to the grid and numerous requirements for compliance tests is greatly facilitated by the interactive course that significantly contributes to the development of competences of industry employees and other stakeholders.

*Keywords:* interactive course, power plant, grid connection, OpenEdx platform, renewable energy

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

In nowadays power systems, new power plants that use different electricity generation technologies are built more often than in the last decades (Breeze, 2019). Therefore, it is very important to know precisely the requirements related to the compliance tests that should finally lead to operational notification of a power plant issued by the relevant transmission system operator (TSO) (“Establishing a guideline,” 2017). Firstly, the set of requirements for compliance tests provides the technical requirements for grid connection and points to the needed technical documentation. When technical documentation is prepared properly and the compliance tests are performed successfully, the final operational notification is issued by TSO.

The legal framework for compliance tests is the regulation (“Establishing a Network Code,” 2016), abbreviated RfG, which full implementation in the European Union started on April 27, 2019. According to RfG power-generating modules are divided into groups with a pre-known set of requirements. The groups are formed in relation to electricity generation technology, and maximum capacity and the voltage level at the connection point.

The content of the interactive course presented in this paper is partly based on the study (Kostić et al., 2021). Subject of this study was the harmonization of the existing Distribution Network Code (Distribution System Operator, 2017) with RfG, in the part related to the compliance tests for power-generating modules. The aim of the study was to provide: the proposal of requirements for compliance tests for different types of power-generating modules, and the proposal of protocol for each specific compliance test.

The topic of interactive courses is highly significant for the industry. In modern power systems, new power plants are being constructed more frequently than in previous decades, often utilizing diverse technologies for electricity generation, with a strong emphasis on renewable energy sources (RES). All facility owners should be aware and very well informed in detail about requirements for compliance tests. For them these are of crucial importance from both technical and economic point of view, because the design and building of the power plant is not economically justified if plant operational notification will not be issued.

On the other hand, the students of electrical power engineering should study grid connection requirements and compliance tests that must be performed in modern power systems. Thus, this matter should be included in the curriculum of power engineering studies in terms of developing the competences of future experts.

The rest of the paper is structured as follows: next section explains how the interactive course was developed; following three sections describe the parts of the course — a PowerPoint presentation, an interactive demonstration, and a quiz based on the material covered, respectively; an overview of the questions included in the survey providing the feedback on the course is presented in penultimate section, while the main conclusions regarding the contribution of the interactive course to the development of skills and competences of students and industry employees are drawn in the last section.

## Development of the Interactive Course

The interactive course presented in the paper was created within the TRANSIT project funded by the European Union (TRANSIT project, 2022) and is part of a comprehensive

interactive web platform for education in the field of RES and sustainability. For the development of interactive web platform different options were considered: Brilliant, Moodle and OpenEdx.

Brilliant platform (Brilliant) is famous for its visually engaging and interactive problem-solving approach, particularly in science, technology, engineering and mathematics (STEM) education. It is characterized by an intuitive learning experience through interactive visualizations and gamified content. However, its primary focus on specific topics, such as mathematics and computer science, limits its flexibility for broader educational applications. Additionally, Brilliant.org is not an open-source platform, making customization and course structure modifications more challenging.

Moodle platform (Moodle) is a widely used open-source learning management system that offers extensive customization options and many plugins for various functionalities. Its strengths lie in its robust community support, scalability, and flexibility for hosting diverse course types. However, Moodle's interface can feel outdated and less intuitive compared to modern platforms. Setting up and maintaining Moodle can also be very demanding.

OpenEdx platform (OpenEdx) was selected by TRANSIT project because it is an open-source platform that supports a wide range of course formats, including self-paced and instructor-led options. OpenEdx offers advanced analytics, robust scalability, and seamless integration with third-party tools and application programming interfaces (APIs). The platform is trusted by top organizations and universities worldwide, such as MIT and Harvard, which confirms its reliability. Additionally, OpenEdx provides a modern and professional interface, gamification options, and tools for creating highly interactive and engaging courses, making it the ideal choice for developing various educational courses.

Several interactive courses were developed by TRANSIT project on the OpenEdx platform. The OpenedX platform offers two main options tailored to different users: learners and course developers (teachers). For Learners OpenedX provides flexible and interactive learning experience. Learners can access a variety of courses, engage with multimedia content, participate in quizzes and discussions, and track their progress. The platform supports self-paced and instructor-led courses, allowing users to choose the learning style that best suits their needs.

Participants must enrol in each course individually in order to attend. For the participation in the course titled “Power Plant Compliance Tests with Grid Connection Requirements” only basic understanding of power systems and regulatory frameworks are required, as stated at the very beginning of the course.

Figure 1 illustrates the content of the course “Power Plant Compliance Tests with Grid Connection Requirements.” This and all other courses combine theoretical content, interactive simulations, quizzes, and surveys to facilitate effective learning. The key features include:

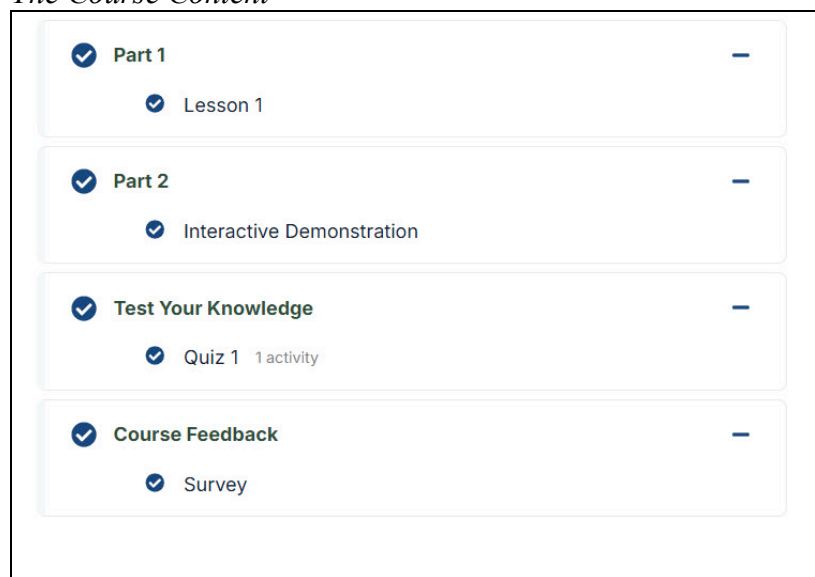
- Theory Module – Presents educational material in the form of PowerPoint presentations, HTML text, or multimedia content.
- Interactive Simulations – Hands-on applets that allow users to manipulate variables and observe real-time effects.

- Quizzes and Assessments – A variety of question formats (multiple-choice, dropdown, text input) to evaluate learning progress.
- Surveys – User feedback forms to gather insights and improve course content.

These components are described individually in detail in the following sections.

**Figure 1**

*The Course Content*



## PowerPoint Presentation

### Introductory Parts

The PowerPoint presentation is the first part of the course and serves as the base for learning of power plant compliance tests with grid connection requirements. At the beginning of the presentation the importance of knowing the requirements of compliance tests is described and the procedure for connecting a power plant to the grid is outlined. As an important and unavoidable part of studied matter, the legal framework of compliance tests is referenced (“Establishing a guideline,” 2017; “Establishing a Network Code,” 2016). These documents form the basis of the course and allow participants to gain insights into the legal framework which regulates compliance tests within the European Union.

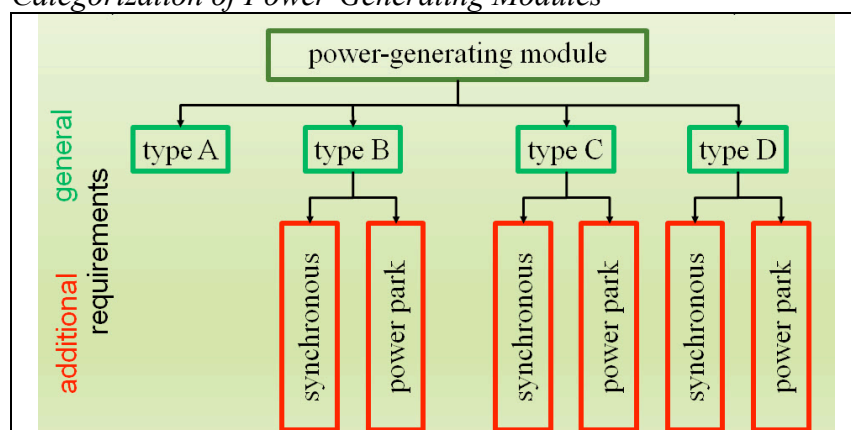
### Categorization of Power-Generating Modules

Further, the presentation covers the categorization of power-generating modules based on electricity generation technology, maximum capacity, and connection point voltage (“Establishing a Network Code,” 2016). According to this categorization, power-generating modules can be of type A, or type B, or type C, or type D (Figure 2) and each type has specific general requirements for compliance tests. In terms of types of applied electricity generation technologies, type B, type C and type D modules are divided to: synchronous power-generating modules (the frequency of the generated voltage and the frequency of network voltage are in synchronism) and power park modules (the module is non-synchronously connected to the network or connected through power electronics). Type B,

type C and type D modules also have their distinctive additional requirements for compliance tests depending on their electricity generation technologies.

**Figure 2**

*Categorization of Power-Generating Modules*



It is emphasized that power-generating modules can be only of type D for voltage levels greater or equal to 110 kV, while for voltage levels less than 110 kV the modules can be of type A, type B, type C and type D, depending on their maximum capacities. For small modules which maximum capacities are less than 0.8 kW, the categorization is not done and the compliance tests with grid connection requirements are not needed.

Different limits for maximum capacity thresholds in different synchronous areas according to (“Establishing a Network Code,” 2016), i.e. RfG, are listed in the presentation. The maximum capacity thresholds that define power-generating modules as Type B, Type C, and Type D are identical for Continental Europe and Great Britain. These thresholds are set at 1 MW, 50 MW, and 75 MW, respectively. However, national maximum capacity thresholds are proposed by the relevant TSO and approved by the relevant regulatory authority or state. Therefore, national maximum capacity thresholds can be different, even in some EU states, as demonstrated in PowerPoint presentation.

### Technical Requirements for Grid Connection

All technical requirements for grid connection across various module types are summarized in the presentation. Firstly, the general requirements for different types of power-generating modules are listed, followed by the additional requirements for modules of type B, of type C and of type D for both synchronous power-generating modules and power park modules.

The relation which describes approximately the relationships between “Set of requirements for compliance tests for power-generating modules of” (abbreviated “...”) type A, type B, type C and type D is:

$$\dots \text{type A} \subset \dots \text{type B} \subset \dots \text{type C} \subset \dots \text{type D}. \quad (1)$$

It indicates that the list of requirements for power-generating modules of type A is the shortest, while the list of the requirements for the modules of type D is the longest one, and because of that it is the most difficult to fulfill all these requirements. As illustration, the set of requirements for the modules of type A consists of only seven requirements, while the set

of requirements for compliance tests of power park modules of type D encompasses even forty-two requirements that need to be fulfilled.

### **Procedure for Power Plant Connection to the Grid**

The whole procedure for successful power plant connection to the grid can be summarized as follows:

- Technical requirements for grid connection of power-generating module are formed based on a set of requirements for compliance tests known in advance.
- Technical documentation is prepared.
- Power-generating module is constructed.
- Compliance tests are carried out.
- Operational notification is issued.

The PowerPoint presentation clarifies the last two steps of the procedure for power plant connection.

### **Carrying Out the Compliance Tests**

Each compliance test can be carried out in one of the following three ways:

- by equipment certificate issued by an authorized certifier,
- by field testing (measurements),
- by testing on a simulation model (simulations),

at relevant system operator's decision, and in accordance with RfG and legal acts related to electrical network operation. For each compliance test, the relevant system operator is obliged to define precisely in advance the Procedure for compliance testing, to introduce the facility owner to this testing, but also to play significant role in the process of carrying out compliance tests, as explained in detail in the PowerPoint presentation. However, the facility owner is ultimately responsible for carrying out compliance tests.

### **Operational Notification**

Operational notification of type A, type B, type C and type D power-generating modules is described in the presentation. The notification procedure of type A module is the simplest one and consists of two steps:

- Facility owner submits an installation document for each power-generating module within the power plant, to the relevant system operator. The installation document must contain equipment certificates issued by an authorized certifier.
- If everything is in order, operational notification will be issued to the facility owner and the plant can be connected to the grid.

Operational notification procedures for both type B and type C power-generating modules are the same, but more complex than operational notification of type A power-generating modules. The notification for type B (and type C) modules encompasses the submission of a power-generating module document (separate document for each power-generating module within the power plant), which must contain a statement of compliance.

At the request of the relevant system operator, the facility owner also shall provide equipment certificates issued by an authorized certifier, simulation models (mandatory for type C),

compliance test reports (for field testing and/or for testing on a simulation model), and studies demonstrating steady-state and dynamic performance. On acceptance of a complete and adequate power-generating module document, the relevant system operator shall issue a final operational notification to the facility owner.

The operational notification procedure for the connection of each new type D power-generating module is even more complicated than the procedures for the connection of type B and type C power-generating modules. It comprises:

- energization operational notification,
- interim operational notification, and
- final operational notification,

and all of them can be described by several items, as shown in PowerPoint presentation.

Furthermore, limited operational notification of type D power-generating modules can be issued to the facility owners in the case when facility owner reasonably expects the following circumstances will persist for more than three months: the facility is temporarily subject to either significant modification or loss of capability affecting its performance, or the failure of equipment leads to non-compliance with some relevant requirements.

### **Interactive Demonstration**

Interactive demonstration is the second part of the course. It focuses on comprehensive and the most difficult parts of the PowerPoint presentation related to the categorization of power-generating modules and technical requirements for their grid connection.

As a reminder, the window of interactive section first provides an overview of:

- the legal framework for power plant compliance tests with grid connection requirements,
- the categorization of power-generating modules based on electricity generation technology, maximum capacity, and connection point voltage, and
- the limits for maximum capacity thresholds from which the power-generating modules are of type B, type C and type D in Continental Europe and Great Britain.

Afterwards, the interactive section allows participants to quickly identify the requirements their facility must meet, based on the voltage level at the connection point, maximum capacity of power-generating module and electricity generation technology (Figure 3). This part of the interactive demonstration is built using Hypertext Mark-up Language (HTML) and Cascading Style Sheets (CSS).

An example of the interactive demonstration is presented in Figure 3. The voltage of 35 kV and the maximum capacity of 10000 kW are inserted in the boxes intended to the voltage level at the connection point and the maximum capacity of the power-generating module, respectively. Power park module is chosen as the electricity generation technology, and “Type B” is obtained in the box intended for the type of power-generating module. At the bottom of the figure, the link “Requirements for compliance tests” leads to the set of requirements for compliance tests for type B power park module.

In a similar way, the participants of the course can train themselves and determine the knowledge related to the sets of requirements for different types of power-generating modules.

**Figure 3**

*The Part of Interactive Demonstration Window*

The screenshot displays a form titled "The voltage level at the connection point and maximum capacity:". It contains two input fields: "The voltage level at the connection point:" with the value "35" and "Maximum capacity:" with the value "10000". Below these are labels "kV" and "kW". The next section is titled "Electricity generation technology:" and features two radio button options: "synchronous power-generating module" (unselected) and "power park module" (selected). The final section is titled "Type of power-generating module:" with a dropdown menu showing "Type B". A blue link "Requirements for compliance tests" is located at the bottom.

## Quiz

The third part of the interactive course is a quiz, designed to assess participants' knowledge and understanding of the material. The quiz features more than ten questions in different formats, such as checkboxes, text inputs, multiple-choice options, and dropdown lists. In principle, the answers to the questions can be accompanied by further explanations relating to a specific answer.

The questions cover all parts of the studied matter, starting from the legal framework and categorization of power-generating modules, over the sets of requirements for compliance tests and whole procedure for power plant connection to the grid, to the carrying out the compliance tests and operational notification of power-generating modules.

The quizzes feature a variety of question formats, such as:

- Multiple-choice questions – Testing factual knowledge and conceptual understanding.
- Dropdown lists – Allowing users to select the most appropriate answer from a given set.
- Text input fields – Encouraging learners to formulate their own responses.

Additionally, some quiz questions are accompanied by explanations that clarify why certain answers are correct or incorrect, providing valuable feedback for deeper learning.

As illustration, Figures 4, 5 and 6 present the parts of the screenshots with only three short questions (due to space limitation) and their correct answers. The answer to Question 2

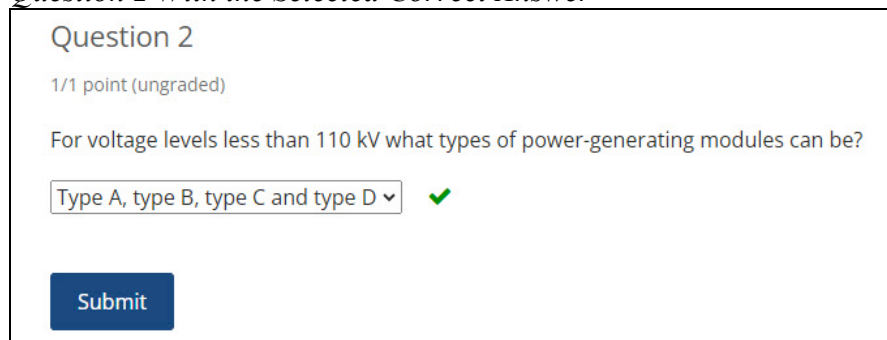


(Figure 4) is selected from the dropdown lists. Some questions, such as Question 4 (Figure 5) which is in a multiple-choice format, provide users with additional explanations and clarifications after the answer is selected. Thus, a further remark in relation to Question 4 (not represented in Figure 5 as it would be too small) reads: “For power plants of maximum capacity less than 0.8 kW compliance tests with grid connection requirements are not needed.”

Question 10 (Figure 6) refers to carrying out compliance tests. The correct answer in this figure is selected from dropdown lists with three offered answers: Relevant system operator, Facility owner, Relevant regulatory authority.

**Figure 4**

*Question 2 With the Selected Correct Answer*



Question 2

1/1 point (ungraded)

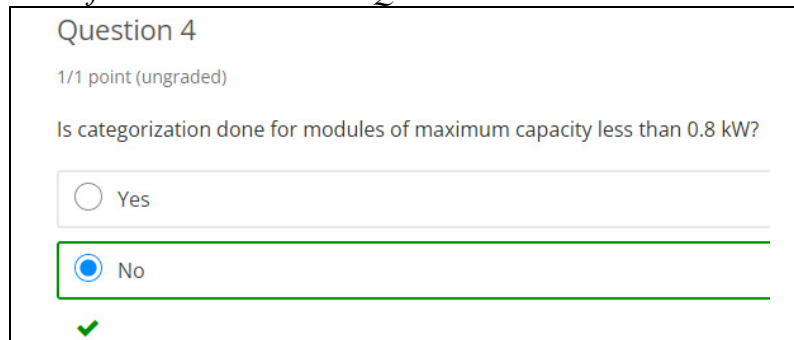
For voltage levels less than 110 kV what types of power-generating modules can be?

Type A, type B, type C and type D ✓

Submit

**Figure 5**

*Part of the Screenshot With Question 4 and Its Selected Answer*



Question 4

1/1 point (ungraded)

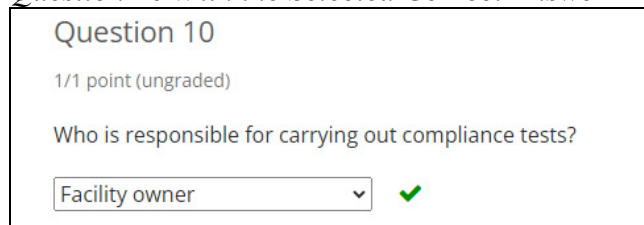
Is categorization done for modules of maximum capacity less than 0.8 kW?

☐ Yes

☒ No ✓

**Figure 6**

*Question 10 With the Selected Correct Answer*



Question 10

1/1 point (ungraded)

Who is responsible for carrying out compliance tests?

Facility owner ✓

## Course Feedback

The final part of the course is a survey that provides feedback on the course and helps the authors to improve the quality of the interactive course. This course survey, created using Microsoft Forms, allowed participants to reflect on their learning experience and offer

suggestions for improvement. The survey combined quantitative and qualitative elements to provide a comprehensive overview of user satisfaction, course design effectiveness, and areas for further development.

The survey included a mix of closed-ended and open-ended questions, each designed to capture specific aspects of the learning experience. Some questions (Figure 7) aimed to identify the target audience, such as their familiarity with the topic or the specific course they attended. Others focused on evaluating the educational impact, including whether the course met participants' learning expectations, the clarity and ease of understanding, and overall satisfaction. At the end, open comment fields allowed participants to suggest improvements or highlight particularly effective features.

**Figure 7**

*A Part of the Course Survey*

1

Please select the online training course you have completed \*

Power Plant Compliance Tests with Grid C... ▼

2

Who would you describe as the target audience for this course? \*

☐ General public

☐ Policymakers

☐ University students

☐ Engineering students

☐ Working in renewable technology

Among the nine offered modules, the feedback from the course titled “Power Plant Compliance Tests with Grid Connection Requirements” indicated a high level of engagement and satisfaction. Participants rated the course positively, with average satisfaction and expectation scores consistent with the overall dataset. All respondents found the course content relevant and timely, particularly in the context of increasing integration of renewable energy sources into power systems and the evolving regulatory framework within the EU. Notably, several participants emphasized the value of the interactive simulations and visualizations used to demonstrate compliance procedures.

The course was also praised for its clear structure and the way it connected theory with standards and regulations (e.g., European Network of Transmission System Operators for Electricity (ENTSO-E) grid code and national grid codes). Several participants mentioned that the course would be particularly beneficial for engineers working in commissioning, compliance testing, or regulatory bodies, confirming that the course successfully reached its intended audience.

Based on this feedback, future iterations of the course may include:

- Video walkthroughs of compliance test procedures.
- Interactive checklists or flowcharts summarizing test sequences.
- Optional advanced sections for users already familiar with regulatory compliance.

Finally, the results suggest that the course successfully addressed a real need for practical, standards-based training in an increasingly regulated energy environment.

### **Conclusion**

The interactive course presented in the paper is designed to simplify the learning process for participants tackling the extensive material related to power plant compliance tests with grid connection requirements. The course begins with a detailed PowerPoint presentation, followed by an interactive demonstration to enhance practical understanding. Participants then assess their knowledge through a quiz and contribute to course improvement by providing feedback through a survey. The importance of course topic is great because many new power plants are planned to be built and connected to the grid across Europe, mostly using low-carbon technologies and contributing to a sustainable future for the planet.

The course effectively fulfilled its educational objectives by providing a clear, interactive, and application-oriented overview of compliance procedures. The use of theory presentations and visual tools was particularly appreciated by participants, helping to bridge the gap between theoretical standards and real-world implementation. Feedback suggests that the course meets a growing need for accessible, regulation-focused training in the evolving energy sector.

Finally, facility owners can also use the course as a step-by-step guide how to obtain operational notification of their new power plants, while TSOs can apply it as a reminder of the sets of requirements for compliance tests for different types of power-generating modules.

### **Acknowledgements**

This paper represents a part of the research conducted within the Project TRANSIT funded by the European Union on the basis of Grant Agreement No. 101075747. The paper is also funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia based on the Contract on the Implementation and Financing of Scientific Research NIO in 2024, registration number 451-03-66/2024-03/200102 from 05.02.2024.

## References

- Breeze, P. (2019). *Power Generation Technologies*. ELSEVIER LTD.
- Brilliant [Computer software]. Brilliant.
- Distribution System Operator. (2017). *Distribution Network Code of EPS Distribucija d.o.o.* EPS.
- Establishing a guideline on electricity transmission system operation. (2017, August). *Official Journal of the European Union*. <http://data.europa.eu/eli/reg/2017/1485/oj>
- Establishing a Network Code on Requirements for Grid Connection of Generators. (2016, April). *Official Journal of the European Union*. <http://data.europa.eu/eli/reg/2016/631/oj>
- Kostić, V., Radić, M., Stanković, S., Rašić, M., Trojić, B., Lazić, V., Ilić, U., Manasijević, Z., Radović, G., & Dabić, J. (2021). Predlog Protokola za ispitivanje usaglašenosti elektrane sa tehničkim uslovima za priključenje na distributivni sistem električne energije [Proposal of Compliance Tests Protocols for Power Generation Plant With Technical Requirements for Its Connection to Distribution System]. Niš: University of Niš – Faculty of Electronic Engineering.
- Moodle [Computer software]. Moodle.
- OpenEdx [Computer software]. OpenEdx.
- TRANSIT project. (2022). *Transition to a sustainable future through training and education*. <https://transitproject.eu>

**Contact email:** lidija.korunovic@elfak.ni.ac.rs

## **Empowering Minds: Science Lessons Fostering Peace, Gender Equity, and Well-being**

María Magdalena Montserrat Contreras Turrubiarres, Universidad Autónoma de San Luis Potosí, México

Jorge Amaro Reyes, Universidad Autónoma de San Luis Potosí, México

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This study explores the integration of peace culture, gender equality and mental wellbeing in science curricula in higher education, specifically in the psychopedagogy degree program at the Universidad Autónoma de San Luis Potosí. The research proposes a transformative educational model that integrates socioemotional dimensions in traditional science education, with emphasis on peaceful conflict resolution techniques, deconstruction of gender stereotypes and mental health promotion. Work was carried out with 40 students through the design of didactic materials with a gender focus and the implementation of practical activities that foster dialogue, emotional self-care and critical analysis of gender roles in scientific contexts. At the end of the course, surveys were administered that revealed a positive impact on scientific conceptual understanding, the fostering of collaborative environments and student perception of the social relevance of science. The results demonstrate that this comprehensive approach significantly improves the academic learning and professional training of future educators, who can implement these strategies to create lasting changes in educational environments, advocating for a holistic educational paradigm that prioritizes both cognitive and socioemotional development within the scientific domain.

*Keywords:* peace education, gender equality, mental health, higher education, socioemotional learning

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Currently, higher education is facing the challenge of training professionals who not only master scientific knowledge but also develop socioemotional competencies that allow them to have a positive impact on diverse educational and social environments. In the field of science education, which has traditionally focused on cognitive development, there is a need to reconfigure it to incorporate ethical, emotional and social dimensions to respond to current issues such as structural violence, gender inequality and the mental health crisis.

In this context, integrating a culture of peace as part of science education is not only desirable, but necessary. The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2024) stresses that education should promote values, attitudes and behaviors that reject violence and resolve conflicts through dialogue and cooperation. By actively including these principles in the science classroom, we contribute to redefining knowledge as a tool for the common good, strengthening empathy, critical thinking and co-responsibility in the production of knowledge.

On the other hand, gender equality continues to be a priority in educational processes. Although progress has been made in female participation in scientific disciplines, there are still gender stereotypes that affect the academic and professional careers of women in these areas (Frontiers in Education, 2021). A critical approach to these stereotypes from a curricular perspective allows students to recognize and question the dynamics of exclusion that permeate science, and fosters more equitable and inclusive environments.

When talking about comprehensive education, we cannot leave aside the mental well-being of students, which has become a highly relevant issue for higher education institutions. Recent studies show that academic overload, professional uncertainty and social isolation have significantly increased the levels of anxiety, depression and burnout in young university students (Zhang & Wang, 2025). Promoting emotional self-regulation, self-care, and resilience strategies within the science curriculum can not only improve academic performance but also strengthen students' sense of belonging and purpose.

This work was developed in the bachelor's degree in Psychopedagogy at the Universidad Autónoma de San Luis Potosí and proposes a comprehensive educational model that articulates the teaching of science with three fundamental axes: culture of peace, gender equality and mental wellbeing. Through the elaboration of didactic materials with a gender approach and the implementation of practical activities oriented to dialogue, empathy and critical analysis of gender roles in scientific contexts, a pedagogical experience with a transforming impact was designed. The results obtained suggest significant improvements in the understanding of science, the generation of collaborative environments and the perception of science as a socially relevant tool.

By considering a comprehensive approach, a viable and relevant alternative is offered for the training of professionals who, from a humanistic and critical perspective, can influence the construction of more inclusive, peaceful and emotionally healthy educational spaces.

## Literature Review

The integration of the culture of peace, gender equality and mental well-being in higher education has been recognized as a fundamental axis for the development of more just and

resilient societies (UNESCO, 2024). Several studies have evidenced that peace education, when incorporated in scientific contexts, promotes peaceful conflict resolution and the development of socioemotional skills (Harris, 2018). An example is the implementation of restorative practices in the scientific classroom, which has been shown to reduce the incidence of conflicts and improve group cohesion (García-Carrión et al., 2020).

Concerning the gender perspective, the literature indicates that gender stereotypes and biases persist in STEM disciplines, affecting the participation and performance of women (Moss-Racusin et al.). The review by Archer et al. (2023) suggests that actively deconstructing these stereotypes through critical analysis and inclusive teaching materials fosters more equitable environments. In addition, the inclusion of historical and current examples of women and minority groups in science contributes to student identification and motivation (Bian et al., 2017).

About mental well-being, evidence shows that academic stress, career uncertainty, and social isolation have increased levels of anxiety and depression in college students (Zhang & Wang, 2025). Interventions based on social-emotional learning and self-care have been shown to be effective in reducing these symptoms and improving academic performance (Durlak et al., 2011). Recent studies highlight the importance of integrating emotional regulation and resilience strategies into university curricula (Taylor et al., 2017).

The convergence of these three axes; peace, gender and well-being in science education responds to the need for a more comprehensive, critical and transformative education (Freire, 1970). Therefore, the present study is based on international and national evidence that supports the urgency of educational models that prioritize both cognitive and socioemotional development (OECD, 2021).

## **Methodology**

### **Design and Participants**

A mixed design with a quantitative-qualitative approach was used. Forty students from the fourth semester of the Bachelor's Degree in Psychopedagogy at the Universidad Autónoma de San Luis Potosí participated. The project was developed for 12 weeks, structured in three phases: initial diagnosis, implementation of strategies and final evaluation.

### **Instruments**

- Socioemotional Competencies in Science Questionnaire ( $\alpha = 0.87$ ), adapted from the scale of Durlak et al. (2011).
- Gendered Materials Analysis Rubric, based on Moss-Racusin et al. (2012).
- Emotional Self-Care Reflective Diaries.
- Survey of Perceptions of Social Relevance of Science.

### **Didactic Strategies**

The didactic strategies were structured around three core components: peace culture, gender equality, and mental well-being. These components were articulated through a set of interdisciplinary and participatory activities designed to connect scientific concepts with socioemotional competencies.

- **Peace-Building Through Scientific Dialogue** Students participated in structured dialogic sessions where they discussed scientific controversies using protocols for respectful communication, conflict resolution, and consensus-building. These sessions aimed to foster empathy, active listening, and cooperation.
- **Gender-Inclusive Scientific Analysis** Students engaged in critical content analysis of textbooks, media articles, and scientific biographies, applying a rubric based on gender perspective. They also designed science class infographics that highlighted contributions of women and non-binary scientists, encouraging visibility and challenging traditional role models.
- **Emotional Self-Care Journals** Weekly reflective journals were used to monitor students' emotional states during science learning. Prompts included questions on stressors, positive experiences, and strategies for emotional regulation. These were discussed anonymously in class, fostering group support and normalizing emotional expression.
- **Collaborative Problem-Solving Tasks** Small groups addressed real-life scientific problems using the STEM-SEL model (Science, Technology, Engineering, Mathematics + Social Emotional Learning), emphasizing team collaboration, inclusive decision-making, and ethical reasoning.
- **Wellness Micro-Workshops** Three brief workshops were embedded into class sessions: “Mindful Focus for Scientific Inquiry”, “Science of Sleep and Academic Performance”, and “Emotional Intelligence in Scientific Professions”. These workshops provided tools for managing anxiety, improving sleep hygiene, and promoting emotional awareness.
- **Storytelling of Scientific Identity** Students created digital storytelling projects where they narrated their relationship with science, including barriers, aspirations, and gendered experiences. This activity enhanced self-reflection, empowerment, and the deconstruction of internalized stereotypes.

## Results and Discussion

The pre- and post-intervention measurements indicated significant improvements in several dimensions:

- *Socioemotional Competence*: There was a 21% average increase in scores on the adapted Durlak et al. (2011) scale. Students demonstrated better conflict resolution, empathy, and emotional regulation skills during group activities.
- *Gender Awareness in Science*: The rubric evaluations showed a shift from neutral to critically inclusive language and content in students' scientific work. 85% of students included non-male scientist references in their materials, compared to 12% at baseline.
- *Perceived Relevance of Science*: Survey results indicated that 90% of students agreed that science could be a tool for social transformation, up from 63% before the intervention.
- *Emotional Well-being*: Journal analysis showed recurring improvements in emotional tone and increased use of self-care strategies. Students reported feeling “heard,” “respected,” and “motivated” in a science classroom for the first time.

Qualitative feedback emphasized that integrating emotions and justice into science education fostered a safe, engaging environment that boosted motivation and learning retention.



## Summary

This study demonstrates that science education enriched with peace culture, gender inclusivity, and emotional well-being can substantially enhance student engagement, equity, and socioemotional growth. The intervention proved effective not only in transmitting scientific content but also in transforming attitudes, emotional skills, and social awareness among future educators.

## Recommendations

- **Curricular Integration:** Institutions should incorporate socioemotional and gender-sensitive content systematically within science education programs.
- **Faculty Training:** University educators require support to implement peace-building, emotional care, and inclusive practices in their teaching.
- **Policy Advocacy:** National and regional policies should promote comprehensive science education as a tool for peace and equality.
- **Further Research:** Longitudinal studies could evaluate the long-term impact of this model on professional practice and student wellbeing.

## Conclusion

Integrating peace, gender, and emotional well-being into science education is not only feasible but imperative in contemporary higher education. The results of this study affirm that such integration fosters more humanized, critical, and effective science teaching. Educators trained under this model can become agents of change who promote inclusive and emotionally healthy learning environments, reinforcing the role of science as a discipline in service of humanity.

## References

- Archer, L., Moote, J., Francis, B., DeWitt, J., & Yeomans, L. (2023). The impact of gender stereotypes in science education. *Journal of Research in Science Teaching*, 60(2), 157–180. <https://doi.org/10.1002/tea.21802>
- Bian, L., Leslie, S. J., & Cimpian, A. (2017). Gender stereotypes about intellectual ability emerge early and influence children's interests. *Science*, 355(6323), 389–391. <https://doi.org/10.1126/science.aah6524>
- Durlak, J. A., Domitrovich, C. E., Weissberg, R. P., & Gullotta, T. P. (2011). *Handbook of social and emotional learning: Research and practice*. Guilford Press.
- Freire, P. (1970). *Pedagogy of the oppressed*. Herder and Herder.
- Frontiers in Education. (2021). Gender stereotypes and expected backlash for female STEM students. *Frontiers in Education*, 6, Article 793486. <https://doi.org/10.3389/feduc.2021.793486>
- García-Carrión, R., Molina-Luque, F., & Molina-Roldán, S. (2020). Dialogic teaching and restorative practices: A tool for peacebuilding in educational settings. *International Journal of Educational Research Open*, 1, Article 100015. <https://doi.org/10.1016/j.ijedro.2020.100015>
- Harris, I. M. (2018). *Peace education: Theory and practice*. McFarland.
- Moss-Racusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J., & Handelsman, J. (2012). Science faculty's subtle gender biases favor male students. *Proceedings of the National Academy of Sciences*, 109(41), 16474–16479. <https://doi.org/10.1073/pnas.1211286109>
- OECD. (2021). *The State of Global Education: 18 months into the pandemic*. OECD Publishing. <https://doi.org/10.1787/1a23bb23-en>
- Taylor, R. D., Oberle, E., Durlak, J. A., & Weissberg, R. P. (2017). Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects. *Child Development*, 88(4), 1156–1171. <https://doi.org/10.1111/cdev.12864>
- UNESCO. (2024). *What you need to know about UNESCO's Recommendation on Education for Peace, Human Rights and Sustainable Development*. <https://www.unesco.org/en/articles/what-you-need-know-about-unescos-recommendation-education-peace-human-rights-and-sustainable>
- Zhang, Y., & Wang, H. (2025). Mental health-promoting intervention models in university students: A systematic review. *Journal of Affective Disorders*, 312, 45–56. <https://doi.org/10.1016/j.jad.2024.12.045>

**Contact email:** montsset90@gmail.com

## **Interconnected and Sustainable Education in Local Communities and Korean Governments: A Case Study for Addressing Educational Inequalities and Creating Inclusive**

Seri Yoon, Waseda University, Japan

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

The Neulbom School Program was highlighted as an exemplary initiative model for solving educational disparities at the 2024 G20 Education Ministers' Meeting due to its collaborative approach between local governments, schools, and communities unlike stereotypical models where resources are unilaterally moderated by the government. Preliminary data from pilot programs such as Jeju Island's KkumNang Project in rural regions have shown a 30% increase in students' participation and a 15% improvement in academic performance in STEM subjects. Edu-tech such as ICT and AI supports tailored after-school through online content and remote learning for schools in rural and fishing villages. By drawing on Elinor Ostrom's Theory on Collective Action, this research will demonstrate how cooperation between local communities and governments leads to efficient resource management and the expansion of educational opportunities, and how this collaboration addresses educational disparities, ultimately illustrating how this flexible and community-driven educational framework holds value as a global model. Using a qualitative research approach, the research incorporates document analysis and reports from local governments to investigate the broader context of the impact and discover concrete and practical data that attribute to collaborative efforts to address educational disparities. After that, the research employed in-depth interviews with school administrators, teachers, and community leaders involved in the program to uncover challenges, success stories, and the role of community collaboration in overcoming educational disparities. This case study provides other countries with valuable insights into how to reduce educational inequities in low-resource settings and to globally ensure educational opportunities regardless of geographic location.

*Keywords:* inclusive education, sustainable education, Korean education policy, after-school programs, educational disparities

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

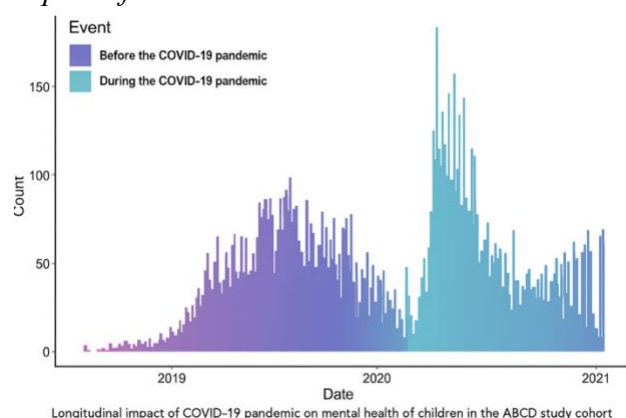
Educational inequality is one of the most urgent challenges of the twenty-first century. UNESCO's 2016 Education for People and Planet Report said that this issue has worsened due to changing social and economic conditions, unequal access to quality education, and the unexpected disruptions caused by the COVID-19 pandemic. UNESCO's 2022 Global Education Monitoring Report states that the pandemic interrupted formal education for more than 1.6 billion learners worldwide. These closures negatively affected children's academic progress, mental health, and social development. The overall decline in children's happiness during this time underscores the urgent need for education systems that can maintain learning even during crises.

In this global context, the need for sustainable and inclusive education has become more visible. Halpern (1999) said that one of the major social changes creating this need is the rise of dual-income households, which increased demand for structured childcare and highlighted the necessity of organized after-school programs. Additionally, the 2022 World Economic Forum stated that low birth rates in many countries have generated stronger political support for initiatives that prioritize children's holistic development and wellbeing. These changes highlight the need for inclusive, adaptable education.

The pandemic further exposed the limits of traditional school-based learning. Disruptions in access revealed weaknesses in existing systems and emphasized the importance of alternative approaches that can adapt to unexpected challenges. After-school programs offer one such approach by providing safe and structured environments where children can continue to learn and gain essential life skills.

**Figure 1**

*Impact of COVID-19 Pandemic on Mental Health*



The research from Hamatani et al. (2022) shows that growing concern over educational inequality has led to a renewed focus on programs that address these disparities. Interconnected education, which brings together schools, local communities, and governments, offers a holistic model that can meet the demands of inclusive education. This model encourages collaborative efforts to ensure that every child, regardless of background, has access to academic, emotional, and social support beyond regular classroom hours.

After-school programs serve as a key example of inclusive and interconnected education. They are adaptable across diverse national contexts. UNICEF's 2019 Education Strategy Report stated that International organizations such as UNICEF have developed global after-school

programs in countries like South Africa, India, and Mexico. These programs provide children with access to education, emotional care, and skill development in safe, structured environments. In parallel, national governments have introduced policies that align with these goals. South Korea's Always Care initiative, also known as the Neulbom School program, was created to provide consistent after-school care and educational support. It represents a strong case of government-community collaboration that strengthens educational equity and promotes child wellbeing.

OECD's 2022 Sustainable Development and Education Report supports the role of after-school programs by highlighting their positive effects on children's academic achievement and social development. Grossman et al. (2001) said that collaboration with local communities enables these programs to provide comprehensive support beyond standard school hours. As such, interconnected education programs not only address immediate inequalities but also contribute to long-term goals related to SDG 4 on Quality Education, SDG 5 on Gender Equality, and SDG 10 on Reduced Inequalities in the UN SDGs (2020).

This study aims to examine the effectiveness of interconnected and sustainable education models through a comparative analysis of UNICEF's global programs and Korea's Neulbom School. It explores how after-school programs close education gaps, support holistic child development, and inform future global education policy.

In order to better understand how interconnected education can operate in both international and national contexts, this study focuses on two models: UNICEF's global after-school programs and South Korea's Neulbom School initiative. These programs reflect distinct yet complementary strategies to address educational inequality and ensure sustainable learning environments for children.

## Methodology

This study adopts a qualitative research design incorporating document analysis and one round of in-depth interviews. This study investigates how community collaboration in after-school programs addresses educational disparities in underserved areas, using Neulbom School as a case to assess its scalability in similar contexts.

The research is guided by three central questions: (1) How does community collaboration in after-school programs like Neulbom School contribute to the efficient management and sustainability of educational resources? (2) How does Neulbom School promote inclusive education and ensure equal access for children from marginalized areas? (3) What lessons can other countries learn from its collaborative approach for addressing educational inequalities?

Building upon the research objectives, this study utilizes a qualitative research framework that integrates policy document analysis, local government reports, and case-based program data. Guided by Elinor Ostrom's Theory on Collective Action, the framework structured how collaborative governance affects resource management in education. Rather than testing it deductively, the theory was used to organize data collection and interpretation.

Data sources included Ministry guidelines, local implementation plans, pilot site reports (Jeju and Gangwon), and public Neulbom records on Ministry of Education, South Korea (2024). These materials were systematically reviewed to identify patterns of cooperation between schools and local governments, with particular attention to how educational resources were

mobilized and shared. Drawing on Ostrom's principles, which include sustainability, cooperative action, and collective resource management, the study organized the data thematically to uncover how decentralized collaboration contributed to the success and adaptability of the program.

By aligning the interpretation process with Ostrom's theoretical components, the study aimed to trace practical evidence of how shared responsibility and localized decision-making helped address educational disparities. This methodological approach enabled the extraction of context-specific insights that highlight how flexible, community-led education systems can evolve in response to structural inequalities, thereby offering relevant implications for both national and international education policy frameworks.

## **Data Collection & Key Findings**

The data for this study comes from documented cases of after-school programs led by UNICEF and the South Korean government. Implemented across diverse socio-economic settings, these programs have improved educational access and equity. According to UNESCO's 2022 Global Education Monitoring Report, prolonged COVID-19 school closures negatively impacted children's mental health, academic performance, and well-being. In response, India and South Korea introduced targeted after-school initiatives. UNICEF's 2024 Addressing the Learning Crisis Report shows that UNICEF partnered with Room to Read India to launch the "Home as a Learning Space" program, offering learning kits and parental guidance for children in underprivileged communities. In South Korea, the Neulbom School program supported educational continuity through collaboration between schools and local governments, particularly in remote regions like Gangwon Province.

The positive impact of after-school programs is widely recognized in both academic and policy literature. According to UNESCO, students who participate in structured after-school activities show an average 15 percent improvement in academic performance. World Bank's 2022 World Bank Education Strategy 2020 reports that such programs also yield strong economic returns by lowering crime and boosting academic success, generating over three dollars in benefits for every dollar invested. These programs help develop communication, empathy, and teamwork skills, contributing to children's overall development following the review from Center for Latin American and Latino Studies in the American University. For example, UNICEF's Care and Support for Teaching and Learning program in South Africa increased graduation rates in participating schools. UNICEF's 2022 Mexico Humanitarian Situation Report stated that programs targeting indigenous communities in Chiapas raised school attendance by 18 percent, showing the role of structured after-school care in closing education gaps in Mexico.

This study adopts a comparative case study approach to examine two models of interconnected after-school education: UNICEF's global initiatives and South Korea's Neulbom School. Both models represent efforts to ensure equitable and sustainable educational support for children, particularly in contexts marked by social vulnerability, economic disparity, or crisis.

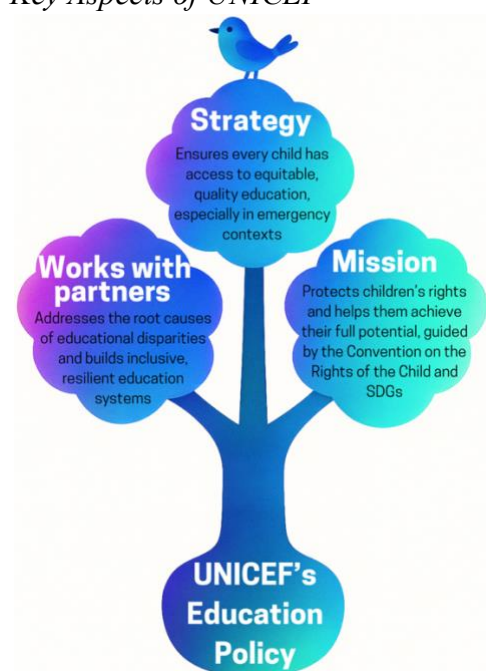
UNICEF, founded in 1946, has consistently worked to protect the rights and well-being of every child, with a strong emphasis on education by following the United Nations's 1989 Convention on the Rights of the Child (United Nations, 1989). The organization's educational mission is grounded in the Convention on the Rights of the Child and is closely aligned with the Sustainable Development Goals. UNICEF's programs are designed to guarantee equitable access to quality learning opportunities, especially in emergency settings. The organization's

strategy focuses on addressing the root causes of educational inequality through partnerships with governments and civil society organizations (UNICEF, 2019). It promotes flexible and inclusive education systems that remain resilient in the face of adversity.

At the core of UNICEF's approach is a commitment to three key areas: education in emergencies, equitable access, and quality learning, which stated in UNICEF's 2019 Linking Child Rights and the SDGs. These focus areas guide the design and implementation of after-school programs across different regions. UNICEF works with local partners to build systems that uphold children's rights and allow them to reach their full potential. This child-centered and rights-based approach ensures that even during crises, such as natural disasters or pandemics, children continue to learn in safe, supportive, and inclusive environments.

**Figure 2**

*Key Aspects of UNICEF*



By examining how UNICEF operationalizes these principles in its after-school education programs, this study seeks to understand the effectiveness of global strategies in addressing educational inequality and in building sustainable education systems that are adaptable across various local contexts.

To explore how interconnected and inclusive education models work in practice, this study examined UNICEF's after-school programs in South Africa, India, and Mexico. These programs were chosen for their measurable effects on academic outcomes, emotional support, and learning continuity in vulnerable and disrupted settings.

In South Africa, UNICEF's Care and Support for Teaching and Learning program offers a safe, supportive space for students beyond school hours. It combines academic and emotional support through local resources. A key initiative is the Breakfasts for Better Days program, run with FoodForward South Africa and Kellogg, which provided daily meals to over 30,000 children in 47 schools across major cities in 2019. This program has improved both academic performance and student well-being (FoodBanking.org, n.d.).

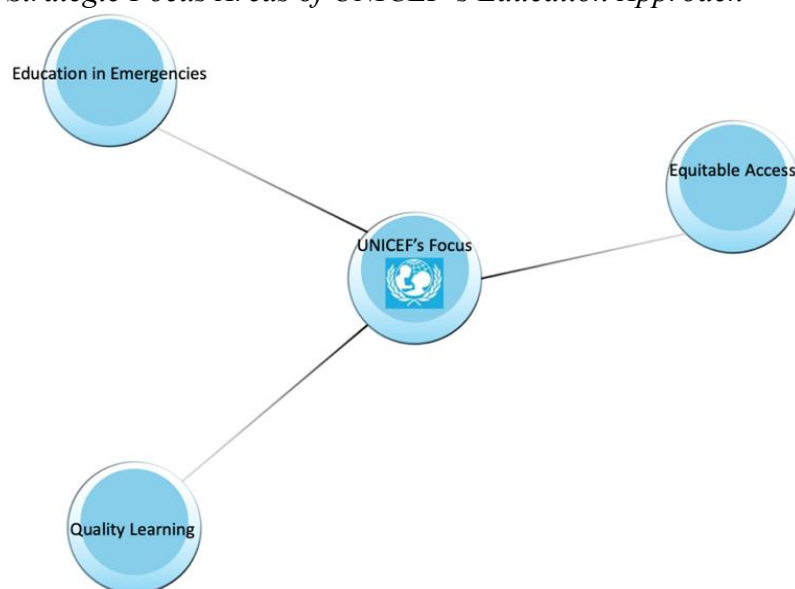
In India, UNICEF partnered with Room to Read India in 2021 to deliver the Home as a Learning Space initiative in Rajasthan and Jharkhand. This program responded to pandemic-related learning disruptions by distributing home-learning kits and support materials. A 2022 survey showed a 25 percent gain in literacy among participants. It also increased re-enrollment and helped narrow learning gaps.

In Mexico, UNICEF launched a 2022 pilot program in Chiapas to provide tutoring and mental health support for underprivileged children. The initiative offered academic help and emotional resilience workshops. It led to an 18 percent rise in school attendance, and teachers observed improved student confidence and classroom participation.

These international cases show that UNICEF's after-school programs strengthen learning, social development, and emotional health. By offering safe and inclusive environments, they reduce education gaps and help children thrive in diverse settings.

**Figure 3**

*Strategic Focus Areas of UNICEF's Education Approach*



In South Korea, the Ministry of Education introduced the Neulbom School program, also known as the Always Care policy, to respond to the dual pressures of declining birth rates and the rising demand for structured childcare. This initiative was created to ensure that all children, regardless of region or background, have access to quality education and after-school care. The program integrates local community resources with formal education systems to provide continuous learning support, especially in rural and underserved areas such as Gangwon Province, where educational access has historically been limited.

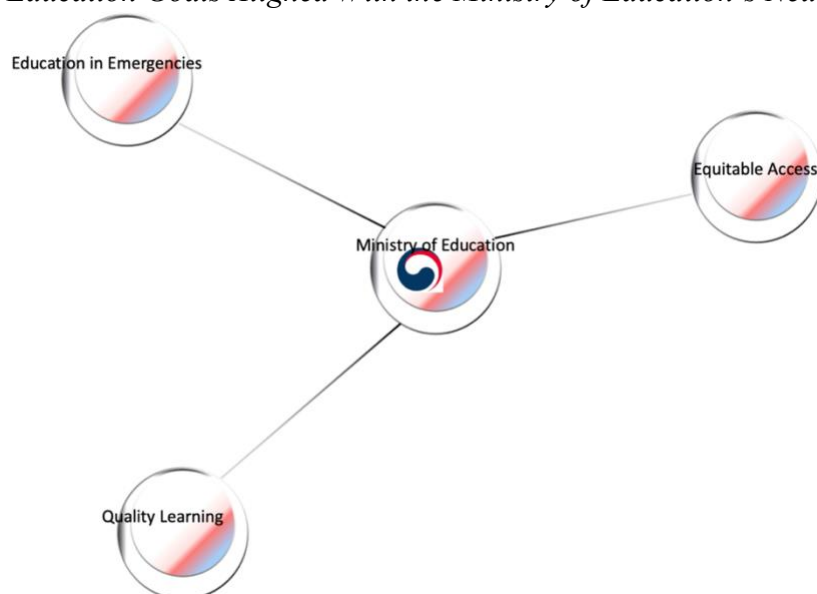
The key goals of the Neulbom School policy reflect a strong alignment with global development agendas. These include education in emergencies, equitable access, and quality learning. First, it ensures that all students, regardless of gender, income, or disability, receive equal educational opportunities. This directly supports Sustainable Development Goals 4.1 and 4.5, which emphasize inclusive and equitable quality education. Second, by offering dependable after-school care, the program supports working mothers and contributes to SDG 5.4, which highlights the importance of recognizing and valuing unpaid care work through accessible services. Third, it promotes social inclusion by providing targeted support to



children from low-income and disadvantaged backgrounds, aligning with SDG 10.2, which focuses on reducing inequality.

**Figure 4**

*Education Goals Aligned With the Ministry of Education's Neulbom Policy*



By addressing both academic and social dimensions of inequality, the Neulbom School program serves as a comprehensive model for inclusive after-school education. It demonstrates how national policies, when implemented in collaboration with local communities, can respond to demographic and economic shifts while promoting sustainable development.

The Neulbom School program in South Korea has produced measurable outcomes through its inclusive design and collaborative implementation. By integrating school-based learning with community resources, the program extends educational support beyond regular classroom hours. It particularly targets students in rural and underserved regions, providing continuous care and learning opportunities through coordinated efforts between local governments and the Ministry of Education.

One notable outcome of the program is its internationally recognized success in addressing educational inequality. During the 2024 G20 Education Ministers' Meeting held in India, the Neulbom initiative was highlighted as an exemplary model for its effective collaboration between local authorities and schools (Yonhap News Agency, 2024). The program's structure, which enables schools to manage weekday care and local governments to operate weekend activities, was praised for ensuring consistent and equitable learning environments. This recognition was supported by localized examples such as Jeju Island's "KkumNang Project," which utilized community resources to deliver specialized programs in STEM and the arts. According to the Jeju Provincial Office of Education, this project resulted in a 20 percent increase in student engagement in 2023.

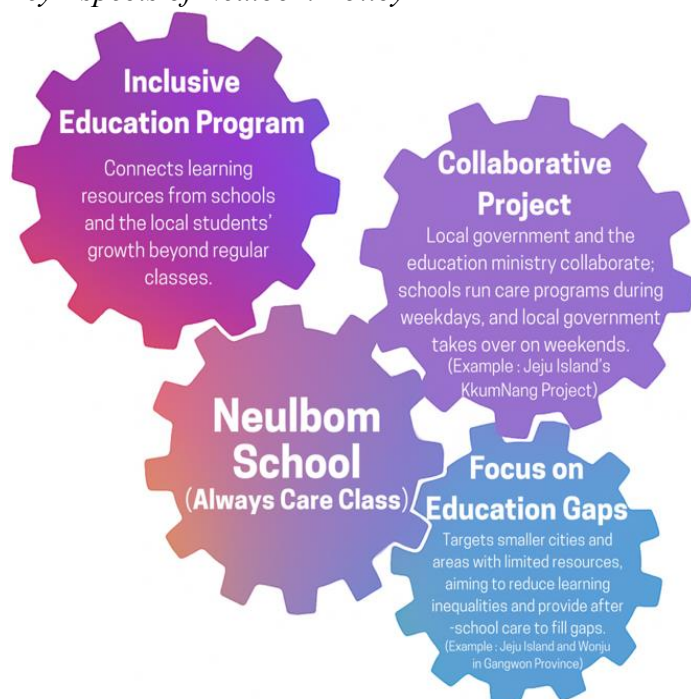
Further evidence of the program's effectiveness comes from other regions across the country. At Yangju Elementary School in Gyeonggi Province, students participating in Neulbom activities experienced improved academic motivation and reduced absenteeism. Programs such as art therapy and science-based workshops provided emotional support alongside academic enrichment. In Gangwon Province, the city of Wonju implemented targeted services including

free tutoring and after-school math support for students from low-income families. These efforts were facilitated by local community centers and resulted in a 15 percent improvement in standardized test scores, according to the Gangwon Education Policy Review.

The Neulbom School initiative also extends its focus to agricultural and science education in rural districts such as Boseong in South Jeolla Province. Workshops in agricultural science helped students with limited educational access gain exposure to practical and engaging learning experiences. These locally adapted programs demonstrate how after-school education, when supported through government-community collaboration, can significantly narrow educational gaps while responding to diverse regional needs.

**Figure 5**

*Key Aspects of Neulbom Policy*



The collaborative nature of the Neulbom School program, which engages not only schools and the Ministry of Education but also local governments and community organizations, distinguishes it from more centralized models of educational provision. This decentralized, participatory model was specifically recognized at the 2024 G20 Education Ministers' Meeting as a flexible and effective approach to addressing educational disparities. Unlike conventional systems where resources are unilaterally distributed by central authorities, the Neulbom School initiative demonstrates how shared governance and local engagement can enhance program adaptability and efficiency.

To interpret these findings within a broader theoretical context, this research draws on Elinor Ostrom's Theory on Collective Action. Ostrom's framework offers a useful lens through which to understand the Neulbom model's capacity for community-based resource coordination and sustainable educational outcomes. The theory highlights how cooperation between individual actors, including schools, governments, and local communities, can support the efficient and equitable management of shared resources. Applying this theory provides insight into how the Neulbom School program transforms after-school care from a top-down administrative service into a co-managed, adaptive, and community-driven educational ecosystem.

**Figure 6***Elinor Ostrom's Theory on Collective Action*

In Elinor Ostrom's (1990) *Governing the commons*, Elinor Ostrom's Theory on Collective Action offers a comprehensive framework for analyzing how communities can jointly manage shared resources in ways that are sustainable, inclusive, and resilient. Originally developed to understand the governance of natural resources such as water, forests, and fisheries, Ostrom's theory has since been extended to various domains including education, health, and digital commons. Her work challenges the conventional belief that only centralized governments or private markets can effectively manage public goods. Instead, she highlights the potential of local actors to collaborate and create institutional arrangements that ensure efficient and equitable resource use.

The theory is structured around three core concepts: sustainability, cooperative action, and collective resource management. Sustainability refers to the ability to use and preserve resources in a way that meets current needs without compromising the needs of future generations. In Ostrom's framework, sustainability is not just a matter of conservation but also of institutional design. It requires the active participation of communities in shaping the rules, monitoring usage, and making adjustments to avoid overuse or depletion. Sustainability is thus achieved when local actors are empowered to govern resources in a way that maintains their availability over time.

The second principle, cooperative action, describes the process by which individuals or institutions work together toward a common goal. Rather than acting in isolation or in competition, actors coordinate their efforts through communication, trust-building, and shared decision-making. Cooperative action is crucial in settings where resources are limited and require joint stewardship. It enables communities to reach agreements, distribute responsibilities fairly, and solve complex problems that cannot be addressed by one actor alone. This dynamic is particularly important in contexts where top-down interventions may fail to capture the nuanced needs of diverse local environments.

The third concept is collective resource management. This refers to the efficient and sustainable governance of resources that are shared among multiple stakeholders and cannot be exclusively owned or monopolized. Examples include clean air, water systems, and public education infrastructure. In such cases, the management of resources depends on mutual responsibility

and collaborative enforcement. In Ostrom's (2005) *Understanding institutional diversity*, Ostrom argues that communities are capable of designing their own institutions to regulate access, usage, and benefit distribution in ways that are context-specific and culturally appropriate.

Together, these three concepts provide a lens through which to analyze the governance of public services that require coordinated effort across multiple sectors. By applying this theory, researchers and policymakers can better understand how decentralized and cooperative systems function, and how shared ownership and accountability contribute to long-term success. The framework is particularly relevant in the field of education, where learning opportunities and care systems often rely on multiple actors, such as governments, schools, families, and communities, working together to manage time, space, and pedagogical resources.

**Figure 7**

*Elinor Ostrom's Theory on Collective Action*



## Results and Findings

In this study, the key findings are examined through the lens of Elinor Ostrom's Theory on Collective Action. The data were interpreted according to three core concepts drawn from the theoretical framework: collective resource management, sustainability, and inclusive education. These categories provided a structure for understanding how the Neulbom School program operates in practice, particularly in terms of how educational resources are distributed, maintained, and expanded through cooperation among schools, local governments, and communities. Each theme highlights a distinct dimension of how decentralized collaboration contributes to equitable and resilient after-school education systems.

The Neulbom School program demonstrates a clear case of collective resource management, in which schools, local governments, and communities jointly coordinate the use of educational resources. Rather than relying solely on centralized allocation from the national government, the program distributes operational responsibility among local actors who are best positioned to understand and address regional needs. This shared management structure not only increases administrative efficiency but also ensures that after-school resources are deployed in ways that directly respond to community-specific challenges.

The need for this shift emerged from the recognition that traditional top-down approaches were insufficient to address the growing complexity of educational inequality in rural and

underserved regions. As Ostrom's theory suggests, cooperative action among multiple stakeholders helps prevent the depletion of limited resources and promotes fair and responsive distribution. The Neulbom program reflects this principle by empowering local authorities to plan and manage learning support services in alignment with regional demands. For example, the Ministry of Education provides the overarching policy framework and initial funding, but local education offices and schools work together to design and operate after-school care models tailored to their communities. This approach enables better alignment of resources with local needs and promotes a sense of shared ownership and accountability.

A prominent example of effective collective resource management can be found in Jeju Province's "KkumNang Project." In this case, collaboration between schools and the local government led to the integration of community resources into after-school programming. The project offered specialized activities such as STEM workshops and art-based learning, and participation rates among students rose by 30 percent following the introduction of these coordinated efforts. The success of this initiative illustrates how local actors, when given the autonomy to manage educational delivery, can innovate and optimize available resources more effectively than centralized systems alone.

Overall, the Neulbom School's operational structure reflects a practical application of Ostrom's collective resource management concept. Through shared responsibility, flexible governance, and collaborative implementation, the program achieves more than administrative efficiency. It builds capacity at the local level to deliver targeted support to students, especially those in regions that face systemic underinvestment in education. These findings support the argument that decentralized, community-driven models are better positioned to adapt, sustain, and scale educational interventions in diverse contexts.

The Neulbom School program offers a strong example of how sustainability in educational delivery can be achieved through decentralized collaboration. Drawing from Elinor Ostrom's principle of sustainability, which emphasizes the long-term management of shared resources for the benefit of future generations, the program operates through continuous coordination between schools, local governments, and communities. Rather than relying on temporary funding cycles or top-down directives, Neulbom establishes a system in which responsibility is distributed across actors at multiple levels, creating structures that are more resilient and responsive to changing needs.

A defining feature of this sustainability model lies in the division of operational roles. Schools manage weekday after-school programs while local governments support and operate weekend initiatives. This cooperative structure allows for consistent service provision without overburdening a single actor and reduces the risk of burnout or resource depletion. In Wonju, a mid-sized city in Gangwon Province, this arrangement has enabled a stable delivery of educational services across the entire week. By sharing responsibility, local institutions are able to maintain a reliable system that supports both academic and emotional development, particularly for children in underserved communities.

The long-term success of the Neulbom model also depends on strong community support, which is consistent with Ostrom's emphasis on social capital. Sustainability is not only technical or administrative but also deeply social. In Neulbom, community members play an active role in program development, and their involvement increases both relevance and accountability. Local professionals often lead enrichment activities such as art therapy, STEM education, and environmental workshops. These contributions build a sense of ownership

among stakeholders (Ostrom, 2005). This encourages the continued use and support of after-school resources.

Ultimately, the Neulbom School program demonstrates how sustainable education systems can be developed through shared governance and persistent collaboration. By reducing dependence on centralized structures and activating regional networks of support, the program reflects Ostrom's vision of locally governed, adaptive systems. The sustainability achieved here is not a static goal but an evolving process of negotiation, coordination, and collective stewardship, making the model both durable and adaptable in the face of future educational challenges.

The Neulbom School program exemplifies how inclusive education can be promoted through cooperative and decentralized governance. Drawing from Ostrom's framework, inclusive education in this context refers to systems that ensure access to learning for all children regardless of socioeconomic background, geographic location, or physical or developmental challenges. Rather than designing separate interventions for marginalized groups, the Neulbom model incorporates inclusivity into its foundational structure by enabling collaborative decision-making and equitable resource allocation across communities.

A key example of cooperative management supporting inclusive education is found in Yangju, a city in Gyeonggi Province. In this region, local schools and community members jointly manage after-school initiatives that focus on both cognitive and emotional development. Programs such as art therapy and STEM education were developed with the goal of reaching students who might otherwise face exclusion due to economic or social disadvantages. These programs were led not only by teachers but also by local professionals and volunteers, ensuring that the activities were culturally relevant and emotionally supportive. The collaboration made these services more accessible and allowed children from marginalized backgrounds to benefit from sustained, personalized engagement.

The inclusive outcomes of the Neulbom model are deeply linked to its reliance on cooperative action. Ostrom identifies cooperation among diverse actors as critical to the resilience of shared systems. In the Neulbom program, this cooperation takes the form of shared roles among schools, parents, local governments, and civic organizations. These stakeholders work together to identify barriers to participation and co-develop strategies to overcome them. For example, community centers often host after-school tutoring and meal support programs tailored for children from low-income families. Rather than treating inclusivity as an add-on, the program embeds it into its daily operations through active cooperation.

The sustainability of inclusive education within Neulbom is also strengthened by consistent community involvement and long-term support from local governments. These relationships prevent the fragmentation or depletion of inclusive efforts over time. In alignment with Ostrom's principle of sustainability, Neulbom builds the necessary social capital to maintain inclusive services even in the face of funding fluctuations or policy shifts. By mobilizing a network of community contributors and institutional allies, the program avoids dependency on singular funding streams or administrative directives.

Taken together, these findings suggest that inclusive education is not merely a product of policy intentions but rather a dynamic process enabled by cooperative resource management, local ownership, and embedded social trust. The Neulbom School program provides a scalable model for how education systems can achieve inclusivity not through central mandates but through localized collaboration, shared governance, and sustained community engagement.

## Implications & Conclusion

The Neulbom School program shows how cooperative governance among schools, local governments, and communities reduces educational disparities and fosters inclusion. The initiative illustrates that shared resource management and localized decision-making create more responsive and sustainable education systems. In particular, the Neulbom School's structure, which includes weekday programs led by schools and weekend programs managed by local governments, shows that differentiated roles can enhance operational continuity and adaptability.

The program also contributes directly to achieving several Sustainable Development Goals. Neulbom supports SDG 4 by offering after-school care in rural areas like Gangwon and Jeju, ensuring inclusive and equitable education. Furthermore, by relieving working mothers of exclusive caregiving responsibilities through reliable after-school care, the program aligns with SDG 5, promoting gender equality and supporting women's participation in the workforce. It also contributes to SDG 10 by targeting low-income and marginalized communities, providing academic support and reducing systemic disparities in access to education. These outcomes are reflected in increased attendance and academic performance, particularly in regions with previously limited infrastructure or opportunity like World Bank education strategy 2020 was reported.

While the Neulbom School program provides a strong model for national-level cooperation, its global applicability depends on careful contextual adaptation. Cases like the CSTL program in South Africa and after-school initiatives in Chiapas show that effective education requires local tailoring and stakeholder input in the report from MIET Africa's 2021 Care and support for teaching and learning (CSTL) manual. Scaling such programs must consider infrastructure gaps, funding limits, cultural factors, and personnel shortages. In Sub-Saharan Africa, limited electricity and transport access hinder extended programming. In Latin America, regional differences in educational values demand adapted teaching approaches.

To successfully expand after-school models globally, several strategies are essential. First, countries can share best practices through international forums such as the G20, using data and cases like Jeju's "KkumNang Project" to inform localized design. Second, international organizations including UNICEF, UNESCO, and the World Bank can assist in resource mobilization, technical support, and evaluation mechanisms. Collaborative funding partnerships between international institutions and local governments, especially in Southeast Asia, have proven effective in improving program sustainability and scalability. Third, deep engagement with local communities is necessary to ensure cultural legitimacy and relevance. Programs that empower local leaders to co-design activities, such as those in Mexico's indigenous communities, foster greater ownership and long-term commitment (UNICEF, 2022).

Future research is needed to explore how the Neulbom School model can be extended to other national or regional contexts with differing economic conditions. Comparative studies across countries with varying income levels and educational governance structures can reveal which aspects of Neulbom are transferable and which require adaptation. Additionally, further studies should investigate the role of community involvement and government partnerships in sustaining after-school care programs in resource-constrained settings. Longitudinal research may also help track how shifts in local policy, social trust, or economic development influence program outcomes over time.



The findings of this study support the broader understanding that community-driven, flexible, and cooperative after-school education models can contribute meaningfully to global educational equity. Both UNICEF's global initiatives and South Korea's Neulbom School program serve as practical examples of how after-school education can bridge learning gaps, promote gender equality, and reduce systemic inequities. These efforts have increased school attendance, improved academic performance, and enhanced workforce participation among parents, especially women.

Importantly, UNESCO's 2022 Education for Sustainable Development said that the success of these programs stems not only from government funding or standardized curricula but from dynamic collaboration among schools, families, local authorities, and international partners. While UNICEF's initiatives are tailored to diverse global contexts through multilateral coordination, Neulbom School embeds inclusivity and sustainability into a national policy framework. Together, these models show that educational systems can be designed to adapt to local realities while contributing to global development goals.

As countries seek solutions to persistent educational inequality, the lessons from Neulbom and similar programs offer a roadmap for designing after-school initiatives that are inclusive, sustainable, and socially rooted. By combining collective action, contextual adaptation, and shared responsibility, future after-school systems can be both effective and equitable, even in the most challenging environments.

In light of these findings, it becomes clear that Elinor Ostrom's Theory on Collective Action offers more than a conceptual lens. It provides a practical framework for understanding how inclusive and sustainable after-school education can be governed in real-world settings. The Neulbom School program reflects all three of Ostrom's key principles: collective resource management, cooperative action, and sustainability. Resource-sharing between central authorities and local actors ensures that educational infrastructure is used efficiently. Cooperative planning among schools, governments, and communities fosters local accountability, trust, and program relevance. Finally, the sustainability of these programs is anchored in social capital, which enables long-term adaptability even in times of financial or institutional uncertainty.

This framework also strengthens the case for applying the Neulbom model beyond South Korea. By illustrating that equitable educational access can be achieved through decentralized structures, the model challenges the assumption that national governments alone must design and execute education policy. Instead, it affirms that shared governance and local participation are critical for tailoring after-school systems to the needs of specific communities. As global policymakers consider how to design effective, adaptable, and inclusive learning systems, Ostrom's principles can serve as a guide for cultivating cooperation, empowering local actors, and sustaining innovation through collaborative stewardship.



## References

- American University, Center for Latin American and Latino Studies. (n.d.). After-school programs & Latino child development. <https://www.american.edu/centers/latin-american-latino-studies/after-school-programs-latino-child-development.cfm>
- FoodBanking. (n.d.). Child hunger case study: South Africa. Retrieved January 20, 2025, from <https://www.foodbanking.org/ko/resources/child-hunger-case-study-south-africa>
- Grossman, J. B., Walker, K. E., & Raley, R. (2001). Challenges and opportunities in after-school programs: Lessons for policymakers and funders. Public/Private Ventures. <https://www.issuelab.org/resources/1185/1185.pdf>
- Halpern, R. (1999). After-school programs for low-income children: Promise and challenges. *The Future of Children*, 9(2). <https://pubmed.ncbi.nlm.nih.gov/10646261>
- Hamatani, S., Hiraoka, D., Makita, K., Tomoda, A., & Mizuno, Y. (2022). Longitudinal impact of COVID-19 pandemic on mental health of children in the ABCD study cohort. *Scientific Reports*, 12, 19601. <https://www.nature.com/articles/s41598-022-22694-z>
- Korea Policy Briefing. (2024, May). Neulbom School as a social education and care system: Establishment and future challenges. Korean Government Policy Briefing. <https://www.korea.kr/briefing/pressReleaseList.do>
- MIET Africa. (2021). Care and support for teaching and learning (CSTL) manual. Retrieved January 20, 2025, from [https://mietafrica.org/wp-content/uploads/2021/07/CSTL-Manual-FINAL-combined\\_web\\_aw.pdf](https://mietafrica.org/wp-content/uploads/2021/07/CSTL-Manual-FINAL-combined_web_aw.pdf)
- Ministry of Education, South Korea. (2024). Neulbom School policy overview. Retrieved April 03, 2024, from <https://www.moe.go.kr>
- OECD. (2022). Sustainable development and education. <https://www.oecd.org/education/sustainable-development>
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press.
- Ostrom, E. (2005). *Understanding institutional diversity*. Princeton University Press.
- UNESCO. (2016). *Education for people and planet: Creating sustainable futures for all*. UNESCO Publishing. <https://unesdoc.unesco.org/ark:/48223/pf0000247518>
- UNESCO. (2022). Education for sustainable development. <https://en.unesco.org/themes/education-sustainable-development>
- UNESCO. (2022). Global education monitoring report: Non-state actors in education: Who chooses? Who loses? <https://unesdoc.unesco.org/ark:/48223/pf0000372938/PDF/372938eng.pdf.multi>

- UNICEF. (2019). Education strategy 2019–2030.  
<https://www.unicef.org/media/59941/file/UNICEF-education-strategy-2019-2030.pdf>
- UNICEF. (2019). Linking child rights and the SDGs.  
<https://www.unicef.org/documents/linking-child-rights-and-sdgs>
- UNICEF. (2022). Mexico humanitarian situation report. Retrieved January 20, 2025, from  
<https://www.unicef.org/media/119626/file/Mexico-Humanitarian-SitRep-April-2022.pdf>
- UNICEF. (2024, August). Addressing the learning crisis: The Home as a Learning Space initiative in India. Retrieved January 20, 2025, from  
<https://www.unicef.org/documents/addressing-learning-crisis-home-learning-space-initiative-india>
- UN SDGs. (2020, July 6). Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. United Nations.  
<https://sdgs.un.org/goals/goal4>
- United Nations. (1989). Convention on the Rights of the Child. <https://www.unicef.org/child-rights-convention/convention-text>
- World Bank. (2022). World Bank education strategy 2020: Learning for all – Investing in people’s knowledge and skills to promote development. World Bank Group.  
<https://www.worldbank.org/en/topic/education>
- World Economic Forum. (2022, June 17). What does the global decline of the fertility rate look like? <https://www.weforum.org/stories/2022/06/global-decline-of-fertility-rates-visualised/>
- Yonhap News Agency. (2024, October 29). Neulbom School and Korean education policy shared at G20 Education Ministers’ Meeting.  
<https://www.yna.co.kr/view/AKR20241029033400530>

## **An Educational Ethnographic Study of Recognitional Struggles in an Indigenous Key Elementary School in Taiwan**

Yi Yin Chen, Chungnam National University, South Korea  
Changsoo Hur, Chungnam National University, South Korea

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This study aims to explore the struggles of recognition that Indigenous students face within Taiwan's educational system through examining how an Indigenous school forms the Indigenous culture within a mainstream education system. Employing Axel Honneth's theory of recognition as an analytical framework, the research focuses on three dimensions: emotional support (love), cognitive respect (rights), and social esteem (solidarity). Through an ethnographic approach involving fieldwork, interviews, and participant observation, the study investigates how Indigenous culture is either affirmed or marginalized across school, family, and societal contexts. The findings reveal that, despite the Taiwan government's policies, such as the Indigenous Education Act, intended to support Indigenous cultural preservation, Indigenous culture remains at risk of marginalization and instrumentalization in curriculum design, language education, and societal valuation. In response, this study interprets from the perspective of Axel Honneth's theory of recognition and indicates the concept of cultural agency, emphasizing that students must be granted the freedom, institutional protection, and societal acceptance to shape their own cultural identities. By addressing the limitations of dominant educational paradigms, the research contributes to a deeper understanding of Indigenous educational challenges and offers theoretical and policy insights for advancing genuine cultural recognition and equity.

*Keywords:* indigenous education, Bunun, recognition, ethnography

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

This study explores the educational struggles of Taiwan's Indigenous peoples, focusing on their pursuit of recognition, cultural development, and the establishment of a knowledge system rooted in Indigenous perspectives. Drawing on Axel Honneth's (1995) theory of recognition, the research investigates whether Taiwan's education system supports Indigenous students in realizing their self-identity. Through educational ethnography, this study documents curriculum practices and lived experiences in Indigenous key elementary schools, aiming to reveal inequalities, cultural challenges, and strategies of resilience, while fostering dialogue on Indigenous self-awareness in education.

Globally, post-WWII decolonization movements prompted Indigenous peoples to reclaim cultural rights and educational autonomy (Hanna et al., 2016; Lee, 2009). In Taiwan, Indigenous groups have endured layers of colonization and marginalization, resulting in struggles over cultural identity, land rights, and education (Chou, 2023; Tang, 2002). Although the Taiwanese government has introduced policies to improve Indigenous education, such as the Education Act for Indigenous Peoples in 1998 (amended in 2019), structural inequalities and Han-centric curricula persist, limiting Indigenous students' opportunities for identity development (Nesterova, 2019).

Amid growing democratic consciousness in Taiwan, attention to Indigenous rights has increased (Liu & Chen, 2022), but challenges remain. These include the lack of culturally responsive teaching, high teacher turnover, insufficient pathways for Indigenous educators, and educational materials that fail to reflect Indigenous worldviews (Chang & Tan, 2012; Wu & Lin, 2004). Such barriers often result in low academic achievement, identity confusion, and marginalization among Indigenous students.

As previously mentioned, the questions for this study are, firstly, how do the teachers form an Indigenous culture in the Indigenous Key elementary school? And, secondly, how do we interpret their struggles through the theory of recognition of Axel Honneth?

## Literature Review

### The History, Education, and Challenges of Taiwan's Indigenous People

Taiwan's Indigenous peoples have endured over 300 years of colonization, beginning with the Dutch in 1624 and continuing through Spanish, Chinese, Japanese, and Nationalist rule, each imposing control that marginalized Indigenous societies and suppressed cultural identity (Simon & Mona, 2023; Van Bekhoven, 2016). Japanese colonial rule (1895–1945) emphasized assimilation through education, using “Banzin” and “Bandou” schools to instill imperial loyalty (Peng & Chu, 2017). After WWII, the KMT regime continued these policies, portraying Indigenous practices as primitive while promoting modernization (Liu, 2021). The rise of democratization in the 1960s and 70s catalyzed Indigenous activism, culminating in curricular reforms in the 1990s, including the 1993 curriculum inclusion and the 1998 Education Act for Indigenous Peoples, which aimed to promote culturally responsive education (Chiang, 2009; Tiun, 2020). Since then, bilingual programs and tribal cultural integration have expanded, with 139,000 Indigenous students enrolled in schools by 2023 (Ministry of Education of Taiwan, 2024).

Despite legal progress, substantial challenges persist. School-based ethnic education initiatives since 2013 promote cultural preservation, but goals remain ambiguous, and systemic inequality persists (Chang & Tan, 2012; Chou, 2023; Huang & Liu, 2016; Liu & Cheng, 2013; Yeh et al., 2014). Indigenous knowledge transmission is fragile due to past cultural displacement (Yeh, 2019), and while research supports embedding Indigenous languages and pedagogies (Duff & Li, 2009; Hare & Anderson, 2010; Renganathan & Kral, 2018; Sharma & Phyak, 2017), mainstream systems often reinforce stereotypes, and teachers lack multicultural training (Abacioglu et al., 2020). Although the Council of Indigenous Peoples offers guidance, it lacks decision-making power (Chiang, 2009), and education remains centrally controlled. Exam-driven curricula, urban migration, and resource disparities, such as economic hardship and linguistic barriers, limit educational equity (Chen, 2007; Liou, 2018; Yeh, 2020). As Yeh (2019) argues, truly transformative Indigenous education must move beyond recognition toward critical pedagogy and meaningful community empowerment.

## **Bunun Culture**

Taiwan's Indigenous peoples, including the Bunun, belong to the Austronesian family and have historically maintained deep ecological and communal traditions (Giletycz et al., 2021). As of 2024, they constitute 2.6% of Taiwan's population across 16 recognized groups (Council of Indigenous Peoples of Taiwan, 2025). The Bunun, meaning "people," number 63,737 and primarily inhabit the Central Mountain Range, where their resilience was shaped by the harsh terrain and late subjugation under Japanese rule (Tien, 2013). Traditionally, their society emphasizes relational ethics, with status earned through communal contribution, especially in farming and hunting (Tien, 2002; Yang, 2005). Children are taught modesty, responsibility, and harmony, values reinforced through music such as the polyphonic *pasibutbut* and hunting chants like *Malastapang* (Chen, 2005; Tien, 1995). Spiritually, the Bunun revere *Dihaning*, a divine force representing moral order, with rituals like the *Ear-shooting Festival* sustaining social bonds and ecological reverence (Vava, 1997). Though Christianity has reshaped many practices, Indigenous values persist beneath new religious frameworks (Yang, 2022; Ye, 2001). Colonialism and modernization disrupted millet-based rituals, hunting customs, and kinship structures, especially through forced relocations and name changes (Wang, 2012). Still, storytelling, elder-led education, and hunting remain vital sources of cultural identity. Despite external pressures, Bunun traditions continue to provide a foundation for ethical living, collective identity, and culturally grounded education.

## **Theoretical Framework**

Axel Honneth, a German philosopher and social theorist, developed the theory of recognition. His early work, *The Critique of Power* (1991), explored links between Frankfurt School critical theory and Foucault's notion of power. In *The Struggle for Recognition* (1995), Honneth examined Hegel and Mead to construct a theory grounded in mutual recognition, enabling individuals to form identities without harm. He identifies three key forms of recognition (love, rights, and solidarity) as essential to social justice. Denial of recognition, manifested through degradation or social exclusion, results in injustice. For Honneth, social struggles are ultimately moral efforts to gain recognition, and resolving social pathologies requires affirming diverse forms of relationships. This chapter uses Honneth's recognition theory as a normative lens to explore how education can support students' self-realization, addressing the implications and challenges of recognition in educational contexts.

## The Concept of Recognition

The term "recognition" denotes a firm acknowledgment of oneself and others (Kima & Leeb, 2016). The German word *Anerkennung*, as used by Hegel, encapsulates both "acknowledgment" in the cognitive sense and "recognition" in moral and relational terms (Honneth, 2015). Honneth adopts "recognition" to emphasize its role in forming identity, respect, and social belonging. For him, recognition, through love, rights, and solidarity, is essential for individual self-realization and social justice. Its absence, manifesting as degradation or neglect, constitutes injustice (Honneth, 1995).

Taylor similarly views recognition as foundational to justice, advocating for equal respect and identity in a democratic society (Taylor, 1994). Fraser adds that recognition must be addressed alongside distributive justice in critiques of capitalism (Fraser & Honneth, 2003). Honneth, drawing on Hegel, emphasizes uncovering hidden suffering and unmet expectations that drive resistance against social injustice. Thus, recognition becomes the moral basis for building just relationships (Kim, 2009).

In *The Struggle for Recognition* (Honneth, 1995), Honneth reinterprets Hegel's *System of Ethical Life* (1979), outlining three stages: emotional bonds in the family (love), legal relations in civil society (rights), and solidarity in ethical life. These correspond to phases of self-development, emotional, cognitive, and ethical (Lee, 2015). Each stage reflects a different form of personhood shaped through recognition. Because individuals develop autonomy through being recognized, Hegel's model insists on mutual recognition as its core.

Honneth develops this into an "ethics of recognition," integrating modern psychology, sociology, and history. He argues that social struggles stem from experiences of misrecognition, which may escalate into political resistance, including violence, when recognition is denied.

## Recognition Theory of Axel Honneth

Unlike theories of justice rooted in abstract principles, Honneth's theory of ethical life (1995) emphasizes the social nature of individuals and their dependence on mutual recognition for self-realization, drawing from Hegel, Mead, and empirical studies (Anderson, 1995). He identifies three spheres of recognition, love, rights, and esteem. Each one is essential to personal development.

Love is the first and most foundational form of recognition, shaping early self-confidence through caregiving relationships (Honneth, 1995). Within the family, love allows a child to perceive themselves as irreplaceable and fosters trust in their own needs and emotions. This intimate recognition forms the basis for autonomy and social interaction. Without love, particularly when replaced by abuse, individuals may develop mistrust in themselves and others, inhibiting later recognition. Those who experience such misrecognition in childhood may unconsciously reproduce it in future educational or caregiving roles (Honneth, 2004, 2008; Stojanov, 2006).

Rights, the second form of recognition, are grounded in equal moral worth and expressed through legal systems (Honneth, 1995). Legal recognition affirms one's agency and supports self-respect. Denial of rights results in exclusion and moral invisibility. Civil society, characterized by market economies, provides the institutional space where individuals

articulate personal needs in socially intelligible ways (Anderson, 1995). For Honneth, education should prepare students not only to acquire knowledge but also to express their interests as rights-bearing subjects. Schools, therefore, play a key role in fostering discursive participation and civic self-respect (Honneth, 1995, 2009).

Esteem, the third form, relates to social appreciation of individual traits that contribute to collective goals (Honneth, 1995). Unlike rigid class-based hierarchies, modern esteem reflects value pluralism and personal merit. Social esteem, located within the state, confirms individuals' worth by recognizing their contributions to the common good. This recognition supports self-esteem and enables the realization of freedom through solidarity and democratic participation.

Honneth's theory extends beyond description. It outlines how recognition evolves historically through struggles against misrecognition, allowing individuals to increasingly see themselves as full members of society. These conflictual processes are essential to moral progress, as they expand the conditions under which recognition, and thus freedom, can be universally achieved (Honneth, 1995, 2004).

### **Research Method**

This study employs ethnography to examine challenges and recognition struggles in Taiwan's Indigenous education, focusing on the Bunun community. Grounded in Honneth's (1995) recognition theory, it explores Indigenous educational values and practices through interviews, observations, and document analysis. Ethnography was chosen for its capacity to reveal shared meanings within cultural groups and to capture how recognition operates in everyday educational settings.

Fieldwork took place from March to December 2024 at a Bunun elementary school in Nantou County in Taiwan, serving about 80 students (including kindergarten students), 90% of whom are Indigenous. The teaching staff comprises both Indigenous and non-Indigenous educators. The curriculum blends national standards with local knowledge, such as hunting, language, and outdoor education. Fourteen teachers and 53 students participated in the study.

Data were collected via semi-structured interviews and classroom observations. Five educators, including teachers, one Bunun language teacher, and one administrator, were interviewed on topics like pedagogy and cultural integration. Observations were conducted three times weekly for a year, yielding over 90 hours of data. The researcher adopted a non-participant role, documenting teaching practices and cultural expressions using field notes, audio recordings, and teacher reflections. Data included curriculum materials, student work, interview transcripts, and visual documentation.

Analysis followed Miles and Huberman's (1994) four-stage model: data collection, condensation, display, and conclusion drawing. To ensure credibility and cultural sensitivity, the study applied triangulation, member checking, and reflexivity. Triangulation cross-validated data across methods. For example, when a teacher emphasized the Pasibutbut ritual (a polyphonic prayer for millet harvest) in an interview, lesson recordings and teacher and student participation confirmed its presence in classroom practice. Contrasting views across participant groups were also compared, for instance, differing attitudes toward Indigenous language use between teachers and students, highlighting cultural tensions. Member checking allowed participants to review transcripts, fostering authenticity. Reflexivity involved

journaling and consultation with Indigenous teachers, helping the researcher identify biases and respect community perspectives.

## **The Path to Recognition**

### **Navigating Emotional Support and Cultural Belonging**

In the Bunun context, emotional support extends beyond the nuclear family and is collectively sustained by families, schools, and tribal structures. However, despite these collective traditions, many Bunun students experience emotional care as fragmented due to structural challenges such as economic hardship and shifting family dynamics.

Many Bunun students come from single-parent or economically marginalized families. Based on field observations, this is closely tied to the tribe's geographic isolation and historical dispossession. The Wanfeng tribe, located in a remote mountainous region, faces limited access to employment beyond short-term agricultural labor. These constraints stem from Japanese colonial relocation policies that severed Indigenous communities from traditional lands and livelihoods. As a result, parents, who often engaged in subsistence farming, are absent during most of the day and sometimes evenings, leaving children unsupervised. A teacher explained that

Most parents start working on the farm around 6 AM. They usually return from the farms around 7 or 8 PM. When children return from school at 4 PM, often no adults are at home, and you'll see kids wandering around the tribe.

In this context, teachers have assumed a part of caregiving roles. One teacher, who also serves as the student affairs director, explained how an after-school program was initiated to provide both academic guidance and emotional care. Teachers often offer meals, monitor students' well-being, and even visit families to ensure basic needs are met. One teacher shared: "Sometimes, some children come to school without having breakfast... So you'll see that in the morning, I distribute some bread or milk on the children's desks." At mealtime, teachers and students eat together, building trust and modeling family life. "Eating with teachers not only fosters relationships but also allows us to guide students. This is part of family life education, I suppose," said the director of education affairs. These efforts represent a form of "substitute parenting," filling in emotional gaps where familial support is lacking. Such care practices are not merely pedagogical obligations but reflect an ethical commitment to collective well-being, resonating with the Bunun communal nurturing.

Tribal elders also play a crucial role in emotional support by transmitting cultural knowledge through ritual. Elders were invited into schools to teach traditional chants and ceremonies such as Pasibutbut (millet harvest prayer) and malastapang (collective hunting songs). These rituals serve not only as cultural education but also as intergenerational bonding practices. One elder emphasized that "We are gradually trying to restore our traditions because we believe that our traditional customs cannot simply disappear... This way, our children will want to return to the tribe in the future." By participating in these events, as one elder described, these events offer students a sense of "returning home spiritually," where cultural identity and emotional security intertwine. These communal efforts act as both cultural preservation and emotional healing mechanisms.



Thus, despite differing roles, families, schools, and the tribe together constitute a resilient, informal support network. The family initiates emotional bonding, the school stabilizes it through daily interactions, and the tribe enriches it through cultural rituals and shared moral grounding. Together, these layered practices affirm students not only as learners but as cultural subjects whose emotional and identity needs are recognized within a shared educational and cultural ecosystem.

### **Policy Expectations and the Classroom Realities in Indigenous Education**

This section explores how the notion of cognitive respect manifests within Taiwan's Indigenous education policies and their practical implementation. Taiwan has made legislative strides in promoting Indigenous rights through the Education Act for Indigenous Peoples (1998) and the Indigenous Languages Development Act (2017), which legally recognize Indigenous languages as national languages. However, the gap between policy intention and classroom reality remains substantial.

Regarding language revitalization, fieldwork reveals that Bunun students receive only 40 minutes of Bunun language instruction per week, with limited materials mostly sourced from government websites. A Bunun student noted, "We prepare for tests in language class, but we don't use the language much at home because sometimes our parents speak Mandarin to us, or don't speak it well either." This limited exposure undermines language revitalization, reducing it to a formal requirement rather than a lived cultural practice.

Although policies like entrance exam bonuses aim to incentivize language learning, the system inadvertently shifts focus toward test performance. As one teacher lamented,

Talking about the language certification, it's just for advancing education, gaining extra points, or using the certification results to find better schools, or for the state to recognize you as Indigenous. But I realized it's sad. Why does it become a matter of needing state certification to prove you're Indigenous? We are Indigenous to begin with, even if some children can't speak the language, they are fundamentally Indigenous. So I'm confused too. Am I teaching (the mother tongue) to gain state recognition as Indigenous, or are we doing this (language revitalization) to preserve culture? So now I feel sorry for the children.

As a result, Bunun language classes are often treated by students and some teachers as a means of gaining extra points rather than engaging with cultural memory and heritage. This instrumentalization reduces the depth of engagement with the language, and the focus on test preparation overshadows the richness of oral traditions, worldviews, and intergenerational knowledge embedded in the language.

In the aspect of curriculum, curriculum autonomy policies encourage schools to localize content, yet most teaching materials remain Han-centric. The director who is in charge of course design indicated that the localized courses were originally designed to enhance students' cultural identification with the Indigenous group and provide an environment for learning traditional knowledge of the Bunun people. Not only is the course title named after the Bunun cultural elements, but the course design also incorporates the traditional knowledge and values of the Bunun people into the curriculum, allowing students to understand their cultural traditions while cultivating a sense of cultural belonging.

However, first, during the development of these courses, there is a lack of strong curriculum and teaching support systems. In practice, teachers often lack understanding of interdisciplinary integrated curriculum models and the core competencies involved, such as culturally responsive pedagogy. In addition, teachers are already burdened with routine teaching tasks and administrative work, they have insufficient time to participate in curriculum development. One teacher in the study acknowledged this dilemma, stating that:

Actually, I started thinking about and trying to incorporate some of our Bunun knowledge into the curriculum... For example, teaching about the plants and animals of our tribe, or our traditional concepts about nature. But honestly, I often don't have the time or resources to work on it.

This illustrates the tension between good intentions and institutional constraints. Localized curricula require significant time, effort, resources, and funding for tasks such as collecting curriculum materials, attending professional development workshops or training sessions, discussing and drafting curriculum plans, writing lesson plans and teaching materials, and preparing for curriculum evaluations. These often lead to teacher burnout or resistance to reforms during curriculum changes.

Second, there is too much top-down execution and administrative management. School-based and school-developed curriculum are intended to align with educational principles such as deregulation, decentralization, empowerment, teacher leadership, and school-based management. Teachers are expected to act as curriculum developers, researchers, and implementers, replacing the traditional top-down curriculum development model. However, in practice, the excessive top-down execution and administrative management still remain during curriculum development and promotion. The director of education affairs shared that:

Our curriculum is more like what the government wants us to do. So, I think about whether the policy requirements should be combined with something in my school. In theory, well, what is the difficulty? After aligning with all the indicators that are required, and without giving teachers extra work, teaching will be easy in real practice. In other words, (for the paperwork), they seem to do two things, but actually they still do the same.

This not only fails to inspire intrinsic motivation of school and teachers to participate in the curriculum development, but also causes the director of education affairs, who acts as a bridge between higher authorities and teachers, to experience high stress and low job satisfaction.

### **Social Esteem and Collective Recognition That Goes Beyond Tokenistic Inclusion**

In the case of Bunun students, social esteem is often expressed through how their culture is integrated and valued within the school system. Yet, in practice, these efforts are often fragmented, symbolic, or superficial, risking cultural tokenism rather than fostering genuine esteem.

Such as the cultural tokenism in the school curriculum. Although curriculum reforms in Taiwan have increasingly emphasized multiculturalism, the representation of Indigenous knowledge remains marginal and often superficial. Even well-intentioned cultural integration often becomes symbolic rather than substantive. For example, textbooks may introduce

rituals such as the Shao people's Ancestral Spirit Festival or the Tao people's Flying Fish Festival to showcase the cultural value of Indigenous peoples in Taiwanese society. However, many teachers, Indigenous and non-Indigenous alike, often remain at a surface-level understanding of these practices. Even Indigenous teachers may only briefly present representative ceremonies without explaining their historical origins or cultural meanings. As a result, such instruction fails to deepen students' understanding of Indigenous cultures and may inadvertently reinforce stereotypes.

Moreover, the challenges posed by globalization and modernization to Indigenous cultures persist, particularly among the younger generation. Since the implementation of Taiwan's 12-Year Basic Education curriculum in 2014, which included "Multiculturalism and Global Understanding" as a core competency, multicultural education has become a prominent policy focus. For instance, in the fourth-grade social studies textbook, cultural diversity is introduced through the experiences of four distinct characters: a foreign transfer student, a child of immigrant parents, a student with physical disabilities, and an Indigenous student. These symbolic representations and visual imagery expose students to multicultural content in daily life and promote learning and engagement with diverse cultures. However, the arrangement of such characters within the textbook constructs a cultural narrative of coexistence and tension, revealing the dual identity challenges faced by Bunun students. On one hand, they must integrate into a globalized and multicultural environment; on the other, they are encouraged to maintain and identify with their Indigenous identity and culture. This duality reflects the contemporary cultural reality for the Bunun people and the ongoing multicultural challenges they encounter. To improve mutual understanding between Bunun and non-Indigenous students, the school also implemented several programs for building bridges between students from different cultures. In these programs, Bunun students visit urban schools for homestays, while urban students are invited to the Bunun village for experiential learning. While these activities have value in increasing visibility and breaking stereotypes, they also often expose deep socio-economic inequalities and emotional vulnerabilities.

Before such exchanges, Bunun teachers provide counseling to prepare students for cross-cultural interactions. As one teacher noted that:

We always tell our children not to be afraid of their darker skin or different habits, and to be confident when they meet students from the city. But many children are still reluctant to go. They remember being laughed at for torn socks or their clothes.

Another teacher further explained that "Some host families take our children shopping or treat them very well, but our students may feel like they're being treated as poor or inferior. When they return, they feel embarrassed or frustrated." Although these activities create learning opportunities, they can also deepen students' awareness of marginalization, turning recognition into a double-edged experience. These remarks underscore how well-meaning inclusion can still reinforce otherness and inequality when social dynamics are not adequately addressed.

In conclusion, while symbolic inclusion of Bunun culture has become more visible in schools, this alone does not guarantee authentic recognition. For the Bunun students in this study, recognition must move beyond tokenism and performance toward sustained practices that affirm their culture as a valuable and evolving part of society. Only through such efforts can schools truly function as spaces of social solidarity and cultural affirmation.

## **The Transition From Recognition Struggle to Cultural Agency**

This chapter builds on the previous analysis of Indigenous education through Honneth's recognition theory (1995) by exploring whether recognition can evolve into cultural agency. While the school fosters a sense of belonging among Bunun students, structural barriers, such as limited curriculum content and minimal language instruction, undermine cultural engagement. Cultural agency, as conceptualized by Ortner (2006), involves navigating and resisting institutional constraints through everyday practices, rather than passively receiving cultural content. However, in the studied school, the Bunun language is taught only one hour per week, with limited real-life use, reflecting symbolic rather than substantive inclusion. Honneth's dimensions, emotional support, cognitive respect, and social esteem, highlight how marginal access to cultural knowledge hinders identity formation and reproduces internalized inferiority. Though Taiwan has passed progressive legislation to protect Indigenous rights, implementation remains weak and Han-centric systems dominate. Cultural content is often treated as static or decorative, rather than dynamic and future-oriented. Moreover, under neoliberal pressures, families are pushed to prioritize Mandarin and English for social mobility, reinforcing Fraser's (2000) critique of cultural and economic marginalization. Cultural agency must thus be supported structurally, not merely tolerated. Drawing on Smith (2012) and Simpson (2014), this chapter argues for a transformative pedagogy rooted in Indigenous epistemologies, connecting heritage with contemporary expression and self-determination. True recognition requires not only legal inclusion but also institutional reforms, curriculum innovation, and broader social valorization of Indigenous knowledge as meaningful, evolving, and economically viable.

### **Conclusion**

This study investigated the recognition experiences of Bunun students within Taiwan's Indigenous education system, applying Axel Honneth's theory of recognition (1995) to analyze how emotional support, cognitive respect, and social esteem shape students' cultural identities. While policy frameworks have increasingly addressed Indigenous rights, this research reveals that recognition remains fragmented, constrained by institutional structures, mainstream educational models, and social value hierarchies.

At the emotional level, family, school, and tribal networks offer partial support, but economic precarity and parental absence limit the depth of emotional recognition. Schools often compensate through caregiving roles and cultural programming, yet these efforts operate within a system that marginalizes Indigenous epistemologies. In terms of cognitive respect, although legislation such as the Indigenous Languages Development Act signals formal inclusion, practical implementation remains insufficient. Language revitalization efforts are weakened by limited instructional hours, test-oriented teaching, and symbolic curricular content. Structural inequalities continue to shape students' educational experiences, reducing cultural learning to a secondary or instrumental pursuit. Regarding social esteem, the visibility of Bunun culture has improved through school-based cultural symbols and events. However, these are often reduced to token gestures. Broader societal values tied to economic productivity and academic competitiveness continue to devalue Indigenous knowledge, limiting its perceived legitimacy and students' long-term cultural self-confidence.

To address these tensions, this study introduced the concept of cultural agency, according to Honneth (1995)'s framework, by emphasizing students' ability to actively engage with and shape their cultural identities. Cultural agency entails not only recognition but also the

freedom, support, and institutional conditions necessary to pursue one's cultural meaningfully within and beyond school.

The findings suggest that recognition alone is insufficient without systemic changes to educational structures. Deliberative governance, which involves Indigenous communities in decision-making, offers a pathway toward more responsive, contextually grounded policies. By shifting from symbolic inclusion to structural transformation, education systems can better support Indigenous students not just as learners, but as cultural agents with the capacity for self-determination.

## Reference

- Abacioglu, C. S., Volman, M., & Fischer, A. H. (2020). Teachers' multicultural attitudes and perspective taking abilities as factors in culturally responsive teaching. *British Journal of Educational Psychology*, 90(3), 736–752.
- Anderson, J. (1995). "Translator's Introduction" to Axel Honneth, *The Struggle for Recognition: The Moral Grammar of Social Conflicts*.
- Chang, J. H., & Tan, G. D. (2012). The Implementation and the Challenges Involved in Indigenous Integrated Secondary Schools in Taiwan: A Case Study of Lan-Yu High School. *Bulletin of Educational Research*, 58(3), 73–103.
- Chen, H. L. S. (2007). The Issues of Inequality of Educational Opportunity in Rural Junior High Schools and Related Educational Policies: A Preliminary Investigation. *Bulletin of Educational Research*, 53(3), 1–35.
- Chen, Y. F. (2005). Culture Reconstruction and Crisis of Culture Legacy of Modernized Bunun folk Songs of Hualien Gufeng Tribe National Cheng Kung University. <https://thesis.lib.ncku.edu.tw/thesis/detail/e7ffdcfb6f1b6898b878fc0d882c4cab/>
- Chiang, C. C. (2009). The Law of Indigenous Education from a Postcolonial Viewpoint. *Bulletin on Hungkuang Institute of Technology*, (55), 67–79.
- Chou, Y. C. (2023). Analysis of Textbooks and Teaching Practices in the Social Field Under the Transitional Justice of Indigenous National Taichung University of Education. Taiwan.
- Duff, P. A., & Li, D. (2009). Indigenous, minority, and heritage language education in Canada: Policies, contexts, and issues. *Canadian Modern Language Review*, 66(1), 1–8.
- Fraser, N. (2000). Rethinking recognition. *New left review*, 3, 107.
- Fraser, N., & Honneth, A. (2003). *Redistribution or recognition?: a political-philosophical exchange*. Verso.
- Giletycz, S., Kot-Giletycz, O., & Brown, D. (2021). Regional geology, extreme weather events and natural disasters: Environmentally-forced, involuntary settlement migrations of the indigenous people of southern Taiwan. *Tectonophysics*, 806, 228796. <https://doi.org/10.1016/J.TECTO.2021.228796>
- Hanna, P., Langdon, E. J., & Vanclay, F. (2016). Indigenous rights, performativity and protest. *Land Use Policy*, 50, 490–506.
- Hare, J., & Anderson, J. (2010). Transitions to early childhood education and care for indigenous children and families in Canada: Historical and social realities. *Australasian Journal of Early Childhood*, 35(2), 19–27.

- Hegel, G. W. F., Harris, H. S., & Knox, T. M. (1979). *System of ethical life (1802/3) and first Philosophy of spirit (part III of the System of speculative philosophy 1803/4)*. State University of New York Press.
- Honneth, A. (1991). *The Critique of Power: Reflective Stages in a Critical Social Theory* (Vol. 39). MIT Press.
- Honneth, A. (1995). *The struggle for recognition: The moral grammar of social conflicts*. MIT Press.
- Honneth, A. (2004). Recognition and justice: Outline of a plural theory of justice. *Acta sociologica*, 47(4), 351–364.
- Honneth, A. (2008). *Reification: A new look at an old idea*. Oxford University Press.
- Honneth, A. (2009). *Pathologies of reason: On the legacy of critical theory*. Columbia University Press.
- Honneth, A. (2015). *Verdinglichung: eine anerkennungstheoretische Studie*. Suhrkamp Verlag.
- Huang, S. M., & Liu, S. H. (2016). Discrimination and incorporation of Taiwanese indigenous Austronesian peoples. *Asian Ethnicity*, 17(2), 294–312.
- Kim, W. S. (2009). Recognition and Redistribution. *Social Philosophy*, (17), 97–128.
- Kima, N., & Leeb, K. O. (2016). A study of Asian students' lack of recognition and struggle for recognition in Korean college: In terms of Honneth's theory. *Multicultural Education Studies*, 9(1), 119–152.
- Lee, C. J. (2009). AT THE RENDEZVOUS OF DECOLONIZATION: The Final Communiqué of the Asian-African Conference, Bandung, Indonesia, 18–24 April. *Interventions*, 11(1), 81–93.
- Lee, H. J. (2015). Reconstruction of Recognition Theory for City Life: Hegel, Honneth, Butler. *Korean Feminist Philosophy*, 23, 5–31.
- Liou, J. N. (2018). Implementation of School-style Experimental Education in Remote-area Schools: From Turning Point to Obstacle and Way Out of Practice-Take the Taitung County as Example. *Journal of Education Research*, (287).
- Liu, J. S. (2021). Subjectivism of the Indigenous Peoples and Its Challenge: The Mountain Administration Reform Project in Postwar Taiwan, 1950-1954 [Subjectivism of the Indigenous Peoples and Its Challenge: The Mountain Administration Reform Project in Postwar Taiwan, 1950-1954]. *Academia Historica*, (69), 1–37.
- Liu, M., & Chen, A. S. (2022). An Inquiry on the Evaluation Framework of the “International Civic and Citizenship Education Study” in Response to Social Changes. *Journal of Education Research*, (338).

- Liu, S. M., & Cheng, T. N. (2013). A Case Study of a Rukai Tribe Principal in Promoting the Indigenous Education. *Bulletin of Research on Elementary Education*, (28), 121–153.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.
- Nesterova, Y. (2019). Teaching Indigenous children in Taiwan: Tensions, complexities and opportunities. *Global Studies of Childhood*, 9(2), 156–166.
- Ortner, S. B. (2006). *Anthropology and social theory: Culture, power, and the acting subject*. Duke University Press.
- Peng, H., & Chu, J. (2017). Japan's colonial policies – from national assimilation to the Kominka Movement: a comparative study of primary education in Taiwan and Korea (1937–1945). *Paedagogica Historica*, 53, 441–459.  
<https://doi.org/10.1080/00309230.2016.1276201>
- Renganathan, S., & Kral, I. (2018). Comparative Analysis of Language and Education Policies for Indigenous Minorities in Australia and Malaysia. *International Journal of Multicultural Education*, 20, 138–156.
- Sharma, B. K., & Phyak, P. (2017). Neoliberalism, linguistic commodification, and ethnolinguistic identity in multilingual Nepal. *Language in Society*, 46, 231–256.
- Simon, S., & Mona, A. (2023). Between Legal Indigeneity and Indigenous Sovereignty in Taiwan: Insights From Critical Race Theory. *Social Inclusion*.  
<https://doi.org/10.17645/si.v11i2.6514>
- Simpson, L. B. (2014). Land as pedagogy: Nishnaabeg intelligence and rebellious transformation. *Decolonization: Indigeneity, Education & Society*, 3(3).
- Smith, L. T. (2012). *Decolonizing methodologies: Research and indigenous peoples*.
- Stojanov, K. (2006). *Bildung und Anerkennung*. Springer.
- Taiwan, C. o. I. P. o. (2025). Statistics of the Indigenous population by ethnicity and age. Council of Indigenous People of Taiwan  
<file:///Users/lindachen/Downloads/11312%E7%8F%BE%E4%BD%8F%E5%8E%9F%E4%BD%8F%E6%B0%91%E4%BA%BA%E5%8F%A3%E6%95%B8%E6%8C%89%E6%97%8F%E5%88%A5%E5%8F%8A%E5%B9%B4%E9%BD%A1%E7%B5%B1%E8%A8%88%E8%A1%A8.html>
- Taiwan, M. o. E. o. (2024). Summary analysis of statistical results of indigenous education. Ministry of Education of Taiwan  
[https://stats.moe.gov.tw/files/analysis/112native\\_ana.pdf](https://stats.moe.gov.tw/files/analysis/112native_ana.pdf)
- Tang, R. Y. (2002). Cultural Identity of Taiwan Aborigines and the Reconstruction of Schooling. *Bulletin of Educational Research*, 48(4), 75–101.
- Taylor, C. (1994). Multiculturalism: Examining the politics of recognition. ERIC.



- Tien, T. I. (1995). 台灣布農族風俗圖誌. 常民文化事業有限公司. [Taiwan Bunong zu feng su tu zhi. Chang min wen hua shi ye you xian gong si.] <https://books.google.com.tw/books?id=8vh8AAAACAAJ>
- Tien, T. I. (2002). 台灣布農族文化. 師大書苑有限公司. [Taiwan Bu nong zu wen hua. Shi da shu yuan you xian gong si.] <https://books.google.com.tw/books?id=Hv0tAAAAMAAJ>
- Tien, T. I. (2013). 玉山的守護者: 布農族 [Yu Shan de shou hu zhe : Bunong zu.] (Vol. 4). Wu-Nan Book Inc.
- Tiun, H. K. (2020). Mother Tongues First: Planning Taiwanese Native Languages Education Policy for Language Revitalization. *Journal of Research in Education Sciences*, 65(1).
- Van Bekhoven, J. (2016). Identity crisis: Taiwan's laws and regulations on the status of indigenous peoples. *Asia Pacific Law Review*, 24(2), 202–232.
- Vava, H. (1997). 中央山脈的守護者—布農族. [Zhongyang shan mai di shou hu zhe: Bunong zu.] Daw Shang Publishing Co., Ltd.
- Wang, J. y. (2012). A Study of Self-Ethnic Identity by Four High School Students from Bunun Tribe Tzu Chi University].
- Wu, M. L., & Lin, C. S. (2004). Differences in the Related Factors of Learning Behavior and Academic Achievement between Aborigines and Hans Students. *Kaohsiung Normal University Journal*, (17), 37–55.
- Yang, N. T. (2022). A Preliminary Study on the Influences of Christian Missions on Bunun Marriage Taboo (samu) and the Pastoral Situations Taiwan Graduate School of Theology].
- Yang, S. Y. (2005). Imagining the state. *Ethnography*, 6, 487–516. <https://doi.org/10.1177/1466138105062474>
- Ye, J. N. (2001). The history of formosan aborigines: Bunun. 國史館臺灣文獻館. [Taiwan Historica.] [https://books.google.co.kr/books?id=d\\_V-AAAAIAAJ](https://books.google.co.kr/books?id=d_V-AAAAIAAJ)
- Yeh, C. R. (2019). 民族自治才能確立的原民轉型正義：透過教育之可為與不可為. [Mínzú zìzhì cáinéng quèlì de yuán mín zhuǎnxíng zhèngyì: Tòuguò jiàoyù zhī kě wéi yǔ bùkě wéi.] *Taiwan Indigenous Studies Review*, (26), 55–70.
- Yeh, C. R., Chen, S. H., & Yang, S. W. (2014). Needs Assessment of Professional Growth of Teachers for Schools in Indigenous Area- a point of view of Major Indigenous Schools' teachers and education authority Executives. *Journal of Professional Teacher*, (8), 85–107.
- Yeh, H. Y. (2020). On to Transform or to Abolish Schools in Rural or Remote Areas. *Journal of Education Research*, (314).

**Contact email:** [wjp3270@hotmail.com](mailto:wjp3270@hotmail.com)

## **Teachers' Perceptions of Integrated STEM Learning Management in Compulsory Education**

Punyapat Chanpet, Muban Chombueng Rajabhat University, Thailand  
Kanphitcha Kodkanon, Muban Chombueng Rajabhat University, Thailand

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This study aims to examine the integrated STEM learning management model in basic education schools and to compare teachers' perceptions of STEM-based learning management across different groups categorized by teaching experience and school type. Additionally, it explores strategies to enhance teachers' implementation of integrated STEM education. The sample consisted of 224 teachers from the subject groups of Science, Mathematics, Career and Technology, selected through stratified random sampling. The research instrument was a questionnaire on teachers' perceptions of STEM-based learning management, with a reliability coefficient of 0.96. Data were analyzed using frequency, percentage, mean, standard deviation, t-test, one-way ANOVA, and content analysis. The findings revealed that teachers' overall and specific aspects of perception regarding STEM-based learning management were at a high level. There were no significant differences in perceptions when categorized by teaching experience and school type. The study identified key strategies for improving STEM-based learning management, including encouraging teachers' participation in curriculum planning, providing necessary support and resources for learning management, ensuring the availability of ICT tools and internet access, fostering understanding of authentic student assessment, and developing both internal and external learning environments conducive to integrated STEM education. Additionally, continuous monitoring and assessment of learning outcomes should be implemented to refine and improve diverse models of STEM-based learning management.

*Keywords:* STEM education, integrated learning management, teacher perception, basic education, instructional development

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

In today's rapidly changing world, digital technology and scientific innovation play a crucial role in driving both the economy and society. Consequently, education must evolve to align with the demands of the 21st century, focusing on the development of key skills such as analytical thinking, creativity, problem-solving, and collaboration (Firat, 2020; Thibaut et al., 2018). One educational approach that addresses these changes is STEM Education, which integrates knowledge from the fields of science, technology, engineering, and mathematics to cultivate interdisciplinary skills essential for future living and careers (Kelley et al., 2020).

The basic education level is a critical period for developing foundational concepts and skills. Therefore, effectively promoting STEM learning in primary and secondary schools is imperative. Numerous international studies have found that the success of implementing STEM Education depends on several factors, particularly teachers' knowledge, understanding, and attitudes (Shernoff et al., 2017; Yabaş & Abanoz, 2024). Teachers who are well-prepared to design integrated learning activities can more effectively foster student learning. In the context of Thailand, the National Science and Technology Development Agency has developed a framework for organizing STEM Education activities that emphasizes design thinking and problem-solving based on real-world situations. This framework also advocates for the pivotal role of teachers in designing learning experiences, supported by training, resource development, and the establishment of professional networks to enhance the quality of integrated learning. Domestic research, such as those by (Gardner, 2017), confirms that for sustainable implementation of STEM learning, it is essential to empower teachers in terms of content knowledge, activity design skills, and systemic support. However, the implementation of STEM learning in basic education is varied due to different contextual factors such as school type, physical environment, and teachers' instructional experiences, which may affect their perceptions and capabilities in delivering such instruction. This research, therefore, aims to examine the implementation of integrated STEM learning in the basic education system by comparing teachers' perceptions based on their teaching experience and school type, and to propose recommendations for enhancing the effective and sustainable implementation of STEM Education. The concept of STEM Education has become a key approach in developing modern international education, with the goal of enhancing students' analytical thinking, creativity, and problem-solving abilities (Firat, 2020). STEM encompasses four core disciplines—science, technology, engineering, and mathematics—each playing a significant role in preparing learners for a rapidly changing world (Cao et al., 2024). In Thailand, the promotion of STEM learning is driven by national policies and initiatives within educational institutions, particularly at the basic education level—a critical period for laying the foundation for lifelong skills and thinking. Nonetheless, the success of STEM implementation in schools relies on teachers' preparedness in terms of understanding, attitudes, and the ability to design integrated learning activities (Shernoff et al., 2017; Thibaut et al., 2018). This study, therefore, aims to investigate the implementation of STEM learning in basic education schools, compare teachers' perceptions based on teaching experience and school type, and examine teachers' recommendations for further development of this approach.

## Literature Review

The integration of science, technology, engineering, and mathematics (STEM) into basic education has garnered widespread international attention, with the aim of fostering analytical thinking, creativity, and problem-solving skills among learners. However, the success of

implementing integrated STEM learning largely depends on teachers' perspectives, their teaching experiences, and the contextual factors of their schools. This article seeks to explore teachers' viewpoints on integrated STEM learning across different groups based on teaching experience and school type. It also examines strategies to enhance teachers' capacities in implementing such learning approaches. The discussion draws on relevant literature, including works of (Azman & Maat, 2019), Shernoff et al. (2017), and Kelley et al. (2020), all of which emphasize the critical role of teachers in driving successful STEM education.

Experienced teachers tend to have a more positive outlook on STEM integration, as they are more adept at adapting new approaches to teaching and recognize the value of interdisciplinary learning that promotes 21st-century skills. In contrast, novice teachers may face challenges due to limited experience and fewer opportunities for professional development. Comparisons of teachers' perspectives across different school contexts reveal disparities between urban and rural schools, as well as between public and private institutions. These differences manifest in varying levels of support, resource availability, and policy flexibility for implementing integrated learning. Common obstacles faced by teachers across all groups include resource scarcity, insufficient professional training, and the complexities involved in designing integrated curricula. Recommended strategies to support STEM implementation include designing professional development (PD) programs tailored to specific contexts, establishing professional learning communities (PLCs), allocating appropriate resources and infrastructure, and securing policy-level support from school administrators. Furthermore, assessments should focus on interdisciplinary skills—such as design thinking, problem-solving, and collaboration—rather than on evaluations segmented by individual subjects (Delahunty et al., 2021).

The literature review thus indicates that effective promotion of STEM requires addressing factors at the individual, school, and policy levels. In particular, continuous enhancement of teachers' knowledge, skills, and support systems is essential to creating meaningful and sustainable learning experiences for students.

A review of the STEM Education framework, teacher perceptions, and the development of integrated learning approaches—as evidenced by both domestic and international studies—reveals that teachers with a strong grasp of the STEM approach are better equipped to design effective learning activities (Guerzon & Busbus, 2023). Additionally, the availability of resources and contextual support within schools significantly influences the success of STEM implementation (Grancharova, 2024; Wang, 2023).

## **Methodology**

This research employs a mixed-methods design, incorporating both quantitative and qualitative data collection to provide comprehensive and in-depth insights into the implementation of integrated STEM education by teachers in the compulsory education system.

## **Population and Sample**

The study population consists of teachers in the subject areas of science, mathematics, vocational education, and technology at basic education schools under the Ratchaburi Primary Educational Service Area Office 1, totaling 509 teachers from 169 schools. The sample comprises 224 teachers, selected through stratified random sampling based on

teaching experience and school type, in order to ensure a diverse and representative range of learning contexts.

### **Research Instruments**

The instrument used for data collection is a 5-point Likert scale questionnaire that covers four dimensions: (1) learning design, (2) organization of learning activities, (3) assessment, and (4) the development of learning resources and the use of technology, comprising a total of 12 items. The questionnaire's reliability was confirmed through Cronbach's Alpha, yielding a high reliability coefficient of 0.96.

### **Instrument Development Process**

1. A review of theories, concepts, and related research on STEM learning and teacher perceptions was conducted to establish the structure of the questionnaire.
2. A draft questionnaire was developed and reviewed by three experts to assess content validity (IOC).
3. The questionnaire was revised based on expert feedback and pilot tested with a sample of 30 participants.
4. The reliability analysis using Cronbach's Alpha produced a coefficient of 0.96, indicating high confidence in the instrument.

### **Data Collection**

The researcher personally coordinated with the schools to distribute the questionnaire to the designated subject-area teachers. The participants took approximately 15–20 minutes to complete the questionnaire, with continuous follow-up to maximize and ensure the completeness of the responses.

### **Data Analysis**

Quantitative data were analyzed using descriptive statistics, including frequency, percentage, mean, and standard deviation, as well as inferential statistics such as the t-test and One-Way ANOVA to compare teacher perceptions based on teaching experience and school type. Qualitative data were analyzed using content analysis on the open-ended responses related to strategies for enhancing the implementation of STEM learning.

## **Results**

### **Section 1: General Profile of Respondents**

The sample data indicate that the majority of respondents were primary school teachers, particularly from Educational Opportunity Expansion schools, and most had between 6 and 20 years of teaching experience. This period reflects a stage in which teachers have acquired substantial professional expertise, thereby establishing a solid baseline of awareness regarding the implementation of STEM education.

**Table 1***Number and Percentage of Respondents Classified by Teaching Experience and School Type*

<b>Respondent Status</b>	<b><i>n</i> = 224</b>	<b>Percentage (%)</b>
<b>Teaching Experience</b>		
Less than 5 years	58	25.89
5–10 years	76	33.93
More than 10 years	90	40.18
<b>Total</b>	<b>224</b>	<b>100.00</b>
<b>School Type</b>		
Primary School	134	59.82
Secondary School	58	25.89
Educational Opportunity Expansion	32	14.29
<b>Total</b>	<b>224</b>	<b>100.00</b>

As shown in Table 1, 40.18% of the respondents had more than 10 years of teaching experience, followed by those with 5–10 years, and less than 5 years, respectively. Regarding school type, the majority of respondents were from primary schools (59.82%), with secondary schools and Educational Opportunity Expansion schools accounting for 25.89% and 14.29% respectively. These findings suggest that the respondents generally possess sufficient teaching experience and exposure to diverse educational settings, which are crucial factors in effectively implementing integrated STEM learning practices.

## **Section 2: Analysis of Teachers' Perceptions on STEM-Based Learning Implementation**

This section aims to assess the level of teachers' perceptions regarding the implementation of STEM-based learning, divided into four primary dimensions: (1) learning design, (2) organization of learning activities, (3) learning assessment, and (4) the development of learning resources and technology utilization. Descriptive statistics, including the mean and standard deviation, were employed to systematically interpret the teachers' perceptions in each dimension.

**Table 2***Overall Analysis of Perceptions on STEM-Based Learning Implementation by Dimension (n = 224)*

<b>Dimension of STEM-Based Learning Perception</b>	<b>Mean</b>	<b>SD</b>	<b>Perception Level</b>
1. Learning Design	4.26	0.45	Very Good
2. Organization of Learning Activities	4.18	0.49	Very Good
3. Learning Assessment	4.10	0.52	Very Good
4. Development of Learning Resources and Technology Use	4.05	0.50	Very Good
<b>Overall</b>	<b>4.15</b>	<b>0.49</b>	<b>Very Good</b>

The analysis in Table 2 reveals that the teachers in the sample exhibit a "Very Good" level of perception regarding the implementation of STEM-based learning across all dimensions. Notably, the learning design dimension achieved the highest mean score (4.26), followed by the organization of learning activities (4.18), learning assessment (4.10), and the development of learning resources and technology use (4.05). The overall mean of 4.15 suggests that teachers generally understand, accept, and are prepared to apply the STEM approach comprehensively in their instructional practices.

**Table 3***Mean and Standard Deviation of Perceptions on Learning Design*

Item	Mean	SD	Perception Level
1. I can design integrated STEM learning activities effectively across multiple disciplines.	4.28	0.43	Very Good
2. I set learning objectives that are consistent with the curriculum and learners' contexts.	4.32	0.44	Very Good
3. I can select appropriate media and technology for my learning plan.	4.19	0.47	Very Good
Overall	4.26	0.45	Very Good

The analysis of Table 3 indicates that teachers' overall perception of learning design is rated as "Very Good" with an overall mean of 4.26. Among the items, the highest mean score is observed for the statement "I set learning objectives that are consistent with the curriculum and learners' contexts" (mean = 4.32), suggesting that teachers possess a clear understanding of how to establish learning goals that are well-suited to their teaching contexts. This is followed by "I can design integrated STEM learning activities effectively across multiple disciplines" (mean = 4.28), which reflects teachers' ability to develop coherent and interdisciplinary lesson plans. The item with the lowest mean, although still at a "Very Good" level, is "I can select appropriate media and technology for my learning plan" (mean = 4.19). This lower score indicates a potential need for additional support to enhance teachers' access to and integration of technology in their instructional planning. Overall, the findings demonstrate that the sample of teachers is well-equipped with the knowledge and skills necessary for planning, designing, and organizing high-quality STEM-based learning activities.

**Table 4***Mean and Standard Deviation of Perceptions on the Organization of Learning Activities*

Item	Mean	SD	Perception Level
1. I can organize activities that promote analytical thinking and problem solving.	4.22	0.46	Very Good
2. I encourage learners to work collaboratively in STEM activities.	4.17	0.50	Very Good
3. I can implement STEM activities in a systematic manner.	4.15	0.52	Very Good
Overall	4.18	0.49	Very Good

The analysis of teachers' perceptions regarding the organization of learning activities indicates an overall "Very Good" level with a mean score of 4.18. The highest-rated item is "I can organize activities that promote analytical thinking and problem solving" (mean = 4.22), suggesting that teachers are highly capable of designing activities that effectively stimulate higher-order thinking skills among learners. The next item, "I encourage learners to work collaboratively in STEM activities" (mean = 4.17), reflects a strong emphasis on teamwork and collaborative learning within an integrated STEM context. The item "I can implement STEM activities in a systematic manner" received the lowest mean (4.15), which, although still within the "Very Good" range, indicates an area where there is potential for further development to enhance teachers' confidence in executing systematic STEM activity procedures. Overall, these findings suggest that teachers are proficient in organizing hands-on, collaborative, and analytically challenging STEM activities—an essential component for effective STEM-based learning.



**Table 5***Mean and Standard Deviation of Perceptions on Learning Assessment*

Item	Mean	SD	Perception Level
1. I use various assessment tools such as tests, rubrics, and portfolios.	4.08	0.54	Very Good
2. I can assess learners' abilities in problem-solving and analytical thinking.	4.12	0.51	Very Good
3. I allow learners to engage in self-assessment and reflect on their learning outcomes.	4.10	0.52	Very Good
Overall	4.10	0.52	Very Good

*Analysis of Learning Assessment*

Teachers' perceptions regarding learning assessment are rated at a "Very Good" level, with an overall mean of 4.10. The highest mean score is found for the statement "I can assess learners' abilities in problem-solving and analytical thinking" (mean = 4.12), indicating that teachers are effectively using assessments to capture authentic learning outcomes. The item "I allow learners to engage in self-assessment and reflect on their learning outcomes" follows closely (mean = 4.10), demonstrating a commitment to participatory assessment and fostering metacognitive skills. Although the statement "I use various assessment tools such as tests, rubrics, and portfolios" received the lowest mean (4.08), it still reflects a strong effort by teachers to employ diverse assessment methods to comprehensively evaluate learners' competencies across multiple dimensions. Overall, these results suggest that teachers are inclined to adopt an integrated approach to assessment, effectively capturing content knowledge, skills, and cognitive processes.

**Table 6***Mean and Standard Deviation of Perceptions on the Development of Learning Resources and Technology Use*

Item	Mean	SD	Perception Level
1. I can use digital technology to enhance classroom learning.	4.06	0.49	Very Good
2. I actively participate in the development of learning resources within the school and community.	4.03	0.51	Very Good
3. I can select out-of-school learning resources for implementing STEM activities.	4.05	0.50	Very Good
Overall	4.05	0.50	Very Good

*Analysis of Learning Resources Development and Technology Use*

The findings indicate that the teachers' perceptions in this area are also rated at a "Very Good" level, with an overall mean of 4.05. The highest-rated item is "I can use digital technology to enhance classroom learning" (mean = 4.06), which demonstrates that teachers possess the fundamental skills required to integrate digital tools effectively into their instructional practices. The item "I can select out-of-school learning resources for implementing STEM activities" (mean = 4.05) underscores teachers' ability to leverage external resources to enrich integrated learning experiences. The lowest mean score is for "I

actively participate in the development of learning resources within the school and community” (mean = 4.03). Although this rating remains within the "Very Good" range, it suggests that there is an opportunity to further encourage teachers' involvement in developing and optimizing local learning resources. Overall, the results reflect that teachers are proficient in incorporating both technology and diverse learning resources—internal and external—to support effective STEM-based instruction.

### Section 3: Comparison of Teachers' Perceptions on STEM-Based Learning Implementation by Teaching Experience and School Type

This section aims to compare teachers' perceptions regarding the implementation of STEM-based learning in basic education schools, based on two factors: (1) teaching experience and (2) school type. Inferential statistics, specifically One-Way ANOVA, were utilized to examine differences in mean perception scores across different groups within the sample.

#### Comparison by Teaching Experience

The One-Way ANOVA results indicate that there is no statistically significant difference in teachers' perceptions of STEM-based learning across the three groups categorized by teaching experience (less than 5 years, 5–10 years, and more than 10 years). This finding is illustrated in Table 7.

**Table 7**

*One-Way ANOVA Results on STEM Perceptions by Teaching Experience*

Source of Variation	df	SS	MS	F	Sig.
Between groups (different teaching experience groups)	2	0.472	0.236	1.018	0.363
Within groups (variation within each experience group)	221	51.267	0.232		
Total	223	51.739			

Since the significance value (Sig. = 0.363) is greater than the predetermined alpha level of 0.05, it can be concluded that there is no statistically significant difference in the perception levels of STEM-based learning among teachers with varying teaching experiences. All groups consistently exhibit a “Very Good” level of perception, reflecting equal opportunities and understanding of the STEM approach across different levels of teaching experience.

#### Comparison by School Type

Similarly, the One-Way ANOVA conducted to compare teachers' perceptions among those working in primary schools, secondary schools, and Educational Opportunity Expansion schools revealed no statistically significant differences ( $p > 0.05$ ). This indicates that regardless of the type of school, teachers' perceptions of STEM-based learning implementation remain consistently high.

Overall, these findings suggest that both teaching experience and school type do not significantly influence teachers' perceptions of STEM-based learning. The consistent “Very Good” perception across all groups implies that teachers, irrespective of their background or institutional context, have received equitable exposure to and understanding of STEM-based educational strategies.

**Table 8***One-Way ANOVA Results on STEM Perceptions by School Type*

Source of Variation	df	SS	MS	F	Sig.
Between school types (different types of schools)	2	0.385	0.193	0.814	0.444
Within school types (variation within each school type)	221	52.198	0.236		
Total	223	52.583			

As shown in Table 8, the significance level (Sig. = 0.444) exceeds the predetermined alpha level of 0.05. This result indicates that there is no statistically significant difference in the level of STEM-based learning perceptions among teachers across different types of schools. In other words, teachers from all school types demonstrate uniformly high levels of understanding and positive attitudes toward STEM-based instruction.

### Summary of Comparative Results

The comparison of teachers' perceptions regarding the implementation of STEM-based learning—categorized by teaching experience and school type—revealed no statistically significant differences in either factor. This finding suggests that regardless of their teaching experience (whether limited or extensive) or the type of school to which they belong, teachers consistently exhibit a “Very Good” level of perception. This uniformity is a positive indicator for the effective development and implementation of STEM-based learning in the basic education system.

### Section 4: Analysis of Strategies to Promote STEM-Based Learning Implementation

The analysis of strategies to enhance the implementation of STEM-based learning was conducted using qualitative methods. Open-ended questionnaire responses from 224 teachers were analyzed through content analysis to systematically synthesize key themes regarding proposed strategies for advancing and supporting STEM-based instruction within schools, as well as the contextual support from relevant agencies.

Based on the analysis of teachers' responses, five major strategic areas for promoting STEM-based learning were identified:

1. **Teacher Participation in Curriculum and Learning Plan Design:**  
Most teachers emphasized the importance of involving educators in the planning and design of STEM learning from the curriculum level. Such participation ensures that learning activities are well aligned with the specific contexts of schools and learners, fostering a sense of ownership and sustainability in implementation.
2. **Provision and Support of Educational Resources:**  
Teachers called for enhanced support in terms of educational resources—such as ICT equipment, science laboratory kits, dedicated workspaces, and digital media—as well as reliable high-speed internet access. These resources are deemed essential for delivering high-quality STEM activities, which are critical for 21st-century learning.
3. **Continuous Professional Development:**  
There was a strong recommendation for regular, context-specific training programs, including hands-on workshops, model teaching observations, and the establishment of professional learning communities (PLCs). Such initiatives are seen as pivotal to

enhancing teachers' capabilities in delivering STEM-based learning across content, process, and technology integration.

**4. Development of Assessment Systems Aligned with STEM:**

Many teachers suggested that student assessment systems should be reformed to encompass interdisciplinary skills such as analytical thinking, problem solving, communication, and teamwork. They recommended the use of diverse assessment tools (e.g., rubrics, portfolios, and self-assessments) that better reflect authentic learning outcomes compared to traditional end-of-term exams.

**5. Support and Monitoring by School Administrators and Affiliated Agencies:**

Teachers indicated that school leaders should actively support STEM initiatives by providing adequate budgets, time, personnel, and encouragement. Moreover, there should be ongoing monitoring and evaluation of STEM-related activities to inform continuous improvement and expansion of effective practices.

Overall, the strategies for promoting STEM-based learning should be comprehensive, addressing policy, institutional, and individual levels. Establishing robust infrastructure, ensuring continuous professional development, fostering teacher involvement, and implementing appropriate assessment systems are key mechanisms to enhance the quality and sustainability of STEM learning in basic education.

## Discussion

The study, which examined the implementation of integrated STEM-based learning in basic education schools, found that teachers generally hold "Very Good" perceptions regarding STEM-based learning across all dimensions. Notably, the highest perception was observed in the area of learning design, indicating that teachers are effective at designing interdisciplinary lesson plans. This was followed by the organization of learning activities, learning assessment, and the development of learning resources and technology use, respectively.

When comparing teachers' perceptions by teaching experience, no significant statistical differences were observed; teachers, regardless of their years of experience, consistently reported a "Very Good" level of perception. Similarly, the type of school did not significantly affect teachers' perceptions, suggesting that national STEM initiatives have successfully promoted equitable professional development across diverse educational contexts.

## Conclusion

The results confirm that teachers in basic education possess a very high level of understanding and positive attitudes toward STEM-based learning. Teachers are proficient in designing lessons, organizing learning activities, conducting assessments, and integrating resources and technology effectively. These findings align with the views of Loh et al.(2020), who argue that successful STEM education relies on the integration of academic content and learner-centered processes that foster essential 21st-century skills such as analytical thinking, communication, and collaboration. The absence of significant differences in perceptions when categorized by teaching experience and school type is noteworthy. It likely reflects the widespread and systematic implementation of STEM policies and support measures at the national level. As proposed by Wang (2023), the success of STEM learning is dependent on systemic drivers, including curriculum development, teacher training, and inter-agency collaboration. The similar levels of teacher perception across urban, rural, public, and private schools indicate a positive trend toward educational equity and professional development

nationwide (Khuyen et al., 2020). Furthermore, the qualitative findings reveal that teachers provide concrete and varied suggestions for enhancing STEM-based instruction. Their recommendations—ranging from increased participation in curriculum design to better resource support and ongoing professional development—demonstrate a deep understanding of the practical challenges and opportunities in implementing STEM learning (Holincheck et al., 2024). In particular, the area concerning the development of learning resources and technology, while rated “Very Good,” emerged as a relatively lower-scoring aspect compared to other dimensions, highlighting a clear need for further support in this area. This aligns with the findings of Muchtar and Ding (2024), who noted that resource and infrastructure limitations are significant challenges, especially in schools outside major urban centers.

Overall, this discussion underscores the initial success of STEM initiatives in Thailand, as evidenced by high levels of teacher awareness and readiness. However, continuous, systemic development—particularly in terms of flexible curriculum design, budgetary support, and context-appropriate assessment methods—remains crucial for ensuring the long-term sustainability and effectiveness of STEM education in the basic education system.

## **Recommendations**

### **Policy Recommendations**

- Establish systematic and continuous STEM support policies at all levels of basic education.
- Allocate dedicated budgets for developing learning resources and providing effective teacher training.

### **Practical Recommendations**

- Promote active teacher participation in curriculum design, the formation of professional learning communities (PLCs), and inter-school knowledge exchange.
- Organize hands-on workshops that address real-world contexts and support the sustainable integration of technology into STEM activities.

### **Recommendations for Future Research**

- Investigate the long-term impact of STEM training programs or curricula on teachers’ instructional practices.
- Examine the relationship between teachers’ perceptions and student outcomes in STEM activities to develop a more in-depth and systematic understanding.

This comprehensive study aimed to (1) explore the implementation of integrated STEM-based learning in basic education schools, (2) compare teachers’ perceptions based on teaching experience and school type, and (3) examine strategies to promote STEM-based instruction. The sample consisted of 224 teachers from the subject areas of science, mathematics, vocational education, and technology, selected through stratified random sampling. The findings offer valuable insights into the current state of STEM education in Thailand and suggest actionable strategies for further enhancement and sustainability.

## References

- Azman, A. A., & Maat, S. M. (2019). A Systematic Review of Teacher's Perceptions and Challenges towards STEM Integrations. *International Journal of Academic Research in Progressive Education and Development*, 8(4), 964–974. <https://doi.org/10.6007/IJARPED/V8-I4/6814>
- Cao, L. X., Le, T. T., Nguyet, D. T., Thuy, T., & Khanh, L. M. (2024). Perspectives from teachers and managers on STEM classrooms and STEM teaching equipment. *Multidisciplinary Reviews*, 7(12), 2024307. <https://doi.org/10.31893/multirev.2024307>
- Delahunty, T., Delahunty, T., Prendergast, M., & Ní Ríordáin, M. (2021). Teachers' Perspectives on Achieving an Integrated Curricular Model of Primary STEM Education in Ireland: Authentic or Utopian Ideology? *Frontiers in Education*, 6. <https://doi.org/10.3389/FEDUC.2021.666608>
- Firat, E. A. (2020). Science, Technology, Engineering, and Mathematics Integration: Science Teachers' Perceptions and Beliefs. *Science Education International*, 31(1), 104–116. <https://doi.org/10.33828/SEI.V31.I1.11>
- Gardner, M. (2017). *Understanding integrated STEM science instruction through the experiences of teachers and students*. <https://surface.syr.edu/etd/686/>
- Grancharova, D. (2024). Innovating STEM education: Teacher reflections on challenges, strategies, and development. *International Journal of Emerging Trends in Social Sciences*, 17(2), 37–45. <https://doi.org/10.55217/103.v17i2.836>
- Holincheck, N., Kraft, T., Galanti, T. M., Baker, C. K., & Nelson, J. (2024). “Everybody Was Included in the Conversation”: Teachers' Perceptions of Student Engagement in Transdisciplinary STEM Learning in Diverse Elementary Schools. *Education Sciences*, 14(3), 242. <https://doi.org/10.3390/educsci14030242>
- Kelley, T. R., Knowles, J. G., Holland, J. D., & Han, J. (2020). Increasing high school teachers self-efficacy for integrated STEM instruction through a collaborative community of practice. *International Journal of STEM Education*, 7(1), 1–13. <https://doi.org/10.1186/S40594-020-00211-W>
- Khuyen, N. T. T., Bien, N. V., Lin, P. L., Lin, J., & Chang, C.-Y. (2020). Measuring teachers' perceptions to sustain STEM education development. *Sustainability*, 12(4), 1531. <https://doi.org/10.3390/SU12041531>
- Loh, S. L., Pang, V., & Lajium, D. (2020). A Case study of teachers' pedagogical content knowledge in the implementation of integrated STEM education. *Jurnal Pendidikan Sains & Matematik Malaysia*, 10(1), 49–64. <https://doi.org/10.37134/jpsmm.vol10.1.6.2020>
- Muchtar, A. H., & Ding, L. (2024). Integrated STEM Education in Indonesia: What Do Science Teachers Know and Implement? *Jurnal Pendidikan Sains Indonesia*. <https://doi.org/10.24815/jpsi.v12i1.35588>

- Shernoff, D. J., Sinha, S., Bressler, D. M., & Ginsburg, L. (2017). Assessing teacher education and professional development needs for the implementation of integrated approaches to STEM education. *International Journal of STEM Education*, 4(1), 13. <https://doi.org/10.1186/S40594-017-0068-1>
- Thibaut, L., Knipprath, H., Dehaene, W., & Depaepe, F. (2018). How school context and personal factors relate to teachers' attitudes toward teaching integrated STEM. *International Journal of Technology and Design Education*, 28(3), 631–651. <https://doi.org/10.1007/S10798-017-9416-1>
- Wang, T. (2023). *Towards Effective Teacher Professional Development for STEM Education in Hong Kong K-12: A Case Study* (pp. 3–19). [https://doi.org/10.1007/978-981-19-8040-4\\_1](https://doi.org/10.1007/978-981-19-8040-4_1)
- Yabaş, D., & Abanoz, T. (2024). Developing Teachers' Integrated STEM Education Knowledge and Lesson Planning Skills: A Professional Development Model for Preschool and Primary School Teachers. *JOURNAL OF EDUCATION AND FUTURE*. <https://doi.org/10.30786/jef.1404946>
- Zhou, X., Shu, L., Xu, Z., & Padron, Y. N. (2023). The effect of professional development on in-service STEM teachers' self-efficacy: a meta-analysis of experimental studies. *International Journal of STEM Education*, 10(1). <https://doi.org/10.1186/s40594-023-00422-x>





## **Developing Leadership Through Improvisation: Insights From the MBA Classroom**

Marco Aponte-Moreno, University of Southern California, United States

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

As automation and artificial intelligence reshape industries, the need for human-centered leadership skills—such as listening, collaboration, and creative problem-solving—has become increasingly urgent. This preliminary study explores the potential of improvisation, a technique rooted in theater, to develop essential leadership competencies. Drawing from Tina Fey’s principles of improvisation and Amy Edmondson’s psychological safety framework, the research highlights how structured improvisation exercises can foster adaptability, creativity, and interpersonal connection in leadership. The study involved 96 MBA students from an American university who participated in a 3-hour improvisation session. Improvisation activities such as “Yes, And,” “Freeze Tag,” and “Genre Switch” were conducted during the session to strengthen five critical leadership skills: listening, decision-making, collaboration, creativity, and psychological safety. Data were gathered through Likert-scale surveys, open-ended feedback, and facilitator observations. Preliminary findings revealed that participants overwhelmingly agreed the exercises helped develop these skills: 96% reported improved listening, 85% noted enhanced decision-making, 93% experienced stronger collaboration, 94% highlighted increased creativity, and 92% felt greater psychological safety. These results demonstrate the transformative potential of improvisation in fostering key leadership skills and building cohesive teams. This study provides practical insights for educators, corporate trainers, and leaders aiming to enhance leadership skills and build stronger teams.

*Keywords:* leadership, improvisation, emotional intelligence, psychological safety, MBA education

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

As automation and artificial intelligence (AI) reshape industries, the demand for distinctly human skills, such as listening, collaboration, and creative problem-solving, grows. Leaders today must navigate ambiguity, inspire diverse teams, and create environments of psychological safety to thrive in this evolving landscape. Improvisation, traditionally a theatrical tool, has emerged as a powerful way to cultivate these essential skills. Improvisation fosters adaptability, creativity, and interpersonal connection.

This preliminary study explores the potential of improvisation exercises to enhance leadership and team-building skills. The study is based on a structured improvisation session involving a total of 96 MBA students in an American university. It sheds light on how improvisation can foster listening skills, decision-making skills, collaboration, creativity, and psychological safety. It provides actionable insights for educators, coaches, and corporate trainers.

## Theoretical Framework

Improvisation can be considered an effective tool for leadership development due to its alignment with key leadership competencies (Aponte-Moreno, 2024). The principles of improvisation, as outlined by American actress Tina Fey in her book *Bossypants* (2011), include four core rules:

1. Always Agree (“Yes”): Encourages openness and receptivity.
2. Say “Yes, And”: Promotes co-creation and collaboration by building on others’ ideas.
3. Make Statements, No Questions: Fosters confidence, assertiveness, and the ability to take initiative.
4. There Are No Mistakes, Just Opportunities: Normalizes experimentation and emphasizes learning from failure.

These rules align with the concept of psychological safety, introduced by Harvard professor Amy Edmondson (1999). Psychological safety encourages team members to take risks, share ideas, and engage in open dialogue without fear of judgment. The premise is that by fostering psychological safety in the workplace, teams will be stronger and more cohesive. By normalizing experimentation and reframing mistakes as learning opportunities, improvisation helps build environments of trust and mutual respect that are critical for effective leadership.

In addition, improvisation can significantly enhance emotional intelligence (Goleman, 1995) by cultivating key dimensions such as self-awareness, self-regulation, empathy, and social skills. These attributes empower leaders to navigate interpersonal dynamics effectively and inspire their teams. Improvisation also aligns closely with Seligman’s PERMA model (2011), which defines a positive workplace through five pillars: positive emotions, engagement, relationships, meaning, and achievement. By fostering these elements, improvisation not only strengthens leadership capabilities but also contributes to a more fulfilling and productive work environment.

## Methodology

The improvisation session was integrated into an MBA Organizational Behavior course and conducted in person with a cohort of 96 students. The three-hour session was structured around three key improvisation exercises:

- “Yes, And”: Students worked in teams to build narratives collaboratively by accepting as truth what the previous team member said and then adding to it. The exercise demands active listening, concentration, and openness. It is used both as an icebreaker and as an activity to help students familiarize themselves with the four core rules of improvisation.
- “Freeze Tag”: In this group activity, students improvised scenes until one participant “froze” the action. At that point, the participant replaced another person in the scene and started a brand-new story. Everyone was expected to adapt immediately to the new story. The game requires quick thinking, flexibility, and the courage to enter the unknown.
- “Genre Switch”: Students enacted a scene based on a given premise (e.g., a meeting in the office) until someone changed the genre. At that point, all participants adapted to the new genre (e.g., from romantic comedy to horror; from horror to musical; from musical to documentary, etc.) and a new story began. The activity challenges participants to stay present and adapt in real time.

At the end of the exercises, a debrief session took place. The exercises were interspersed with facilitated reflection, brief discussions, and additional debriefs. Students were invited to notice what felt easy, what felt uncomfortable, and what surprised them.

Data collection involved three components:

- Post-session surveys using a 5-point Likert scale to assess perceived development in each of the five targeted skills
- Open-ended written reflections, completed immediately after the session
- Facilitator field notes, including observations of team dynamics, participation levels, and shifts in energy throughout the session

## Results and Discussion

The results, while preliminary, were remarkably consistent across the five targeted skill areas. Students reported significant perceived improvement in the categories tested (listening, collaboration, psychological safety, creativity and decision making). Their written reflections offered qualitative insights that brought the numbers to life. What emerged was not only a picture of skill development, but also a shift in how students related to themselves and others in a leadership context.

Listening stood out as the most widely cited area of growth. Over 96% of students reported becoming more attuned to others in the room. Many admitted they had previously thought of listening as a passive activity—something akin to waiting for their turn to speak. What they discovered through the simplicity of “Yes, And” was the rigor of active listening: letting go of preconceptions, making space for others, and co-creating meaning in real time.

Closely linked to this was collaboration, where 93% of students indicated stronger feelings of team cohesion and trust. Collaboration, in this context, was not about dividing tasks or aligning incentives; it was about engaging with others moment to moment, without a script, and building something together. The group dynamic evolved visibly throughout the session. As one student reflected, “It was one of the few times in business school where I felt like we were all cheering for each other instead of competing.” Another wrote, “I took a risk in front of my peers, and instead of being judged, I was applauded.”

Psychological safety, cited by 92% of participants as improved, seemed to arise organically from the structure and tone of the exercises. The culture of affirmation—central to improvisation—created a space where students felt free to experiment and even fail. Several remarked that it was a relief to not be evaluated or graded during the session, which allowed them to take interpersonal risks they might otherwise avoid.

Creativity also flourished in this context, with 94% reporting enhanced capacity for spontaneous thinking and expression. Students described the “Genre Switch” game as both liberating and challenging. The activity required them to abandon linear thinking and embrace absurdity, ambiguity, and surprise. For many, it was the first time in years they had accessed this kind of imaginative play. One student remarked, “It felt like I gave myself permission to be creative again. I didn’t realize how much I missed that.”

Of all the skills, decision-making showed the lowest rate of self-reported improvement; though still high, at 85%. This result may reflect the complexity of spontaneous decision-making in a group setting. The “Freeze Tag” exercise, in particular, pushed students to make rapid choices in front of an audience, often with little time to think. Some found this exhilarating, but others admitted they hesitated, overthought their choices, or felt frozen by self-consciousness.

Several students noted that the experience surfaced a deep discomfort with ambiguity and “getting it wrong”—feelings that are highly relevant to leadership under pressure. What seemed to help was reframing decision-making not as a test of correctness but as an invitation to act, adjust, and respond. Improvisation, by its very nature, makes room for imperfect action. This is something many students found both uncomfortable and freeing.

Beyond specific skills, the session seemed to spark a broader rethinking of what leadership can look and feel like. Students began to see leadership not as a matter of expertise or control, but as a set of relational practices grounded in presence, trust, and responsiveness. As one student reflected, “I realized I don’t have to know everything to lead. I just have to be fully present.” Others echoed this insight, noting that the session helped them access a more human, less performative version of leadership—one that welcomes uncertainty and values connection over certainty.

## Conclusion

Improvisation is more than just a fun theatrical experience; it is a deeply humanizing practice that helps emerging leaders rehearse the very skills our workplaces so urgently need. Through this session, MBA students were able to feel, not just understand, what it means to listen actively, to collaborate generously, to make decisions without full information, and to contribute to a space of shared psychological safety.

These early findings suggest a powerful opportunity for educators and leadership developers. By incorporating improvisation into business curricula, we not only enrich the learning experience but also model a different way of being with others: one rooted in trust, flexibility, and co-creation.

This study is a first step. Future work will expand on this framework through a semester-long MBA elective, *Leadership through Improv*. My hope is that more people will come to see

improvisation not as a performance, but as a practice for leading with courage, humanity, and imagination.

### **Acknowledgement**

I am grateful to the MBA students who brought curiosity and vulnerability to this experience.

## References

- Aponte-Moreno, M. (2024). *Leadership as Performance: Developing Leadership Skill through Acting*. Routledge.
- Edmondson, A. C. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, 44(2), 350–383.
- Fey, T. (2011). *Bossypants*. Reagan Arthur Books.
- Goleman, D. (1995). *Emotional Intelligence: Why It Can Matter More Than IQ*. Bantam Books.
- Seligman, M. E. P. (2011). *Flourish: A Visionary New Understanding of Happiness and Well-being*. Atria Books.

## **Test Item Bias Analysis Using Differential Item Functioning (DIF): A Mantel-Haenszel Chi-Square Statistics Approach**

Arlene Nisperos Mendoza, Pangasinan State University, Philippines

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This study highlights the importance of implementing Differential Item Functioning (DIF) analysis to assess the fairness and validity of educational measures. The analysis examines possible test item biases against certain groups of test-takers based on factors like age, sex, socio-economic status, and school type. Utilizing the Mantel-Haenszel Chi-Square Statistic, the study identified biased test items, with over one-third exhibiting bias, consequently compromising the assessment's fairness and validity. The findings demonstrated that age, sex, socioeconomic status, and the type of educational institution exerted a discernible influence on the disparities observed in students' performance on the examination. Moreover, it was ascertained that age played a particularly significant role in these variations. Removing potentially biased items resulted in a more equitable and valid assessment, emphasizing the importance of identifying potential biases to enhance the test's quality and reliability, ultimately contributing to the improvement of educational assessment.

*Keywords:* differential item functioning (DIF), Mantel-Haenszel chi-square statistics, mathematics achievement test, item bias, item reliability, test validity

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

In the realm of educational assessment, it is of utmost importance to ensure that tests are fair and equitable for all examinees. According to Wetzel and Böhnke (2017), the responses observed from individuals should solely depend on their inherent abilities and not be influenced by external factors like gender. To address the historical disparities in test-taking populations caused by systemic inequality, statistical and psychometric tools can be employed to identify and eliminate test items that perpetuate the problem, as pointed out by Lucey and Saguil (2020). One such powerful tool available for this purpose is Differential Item Functioning (DIF) analysis (Wetzel & Böhnke, 2017).

DIF analysis has long been recognized as a fundamental aspect of educational assessment, particularly in the domain of large-scale assessments like the Trends in Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA) (Chen & Jin, 2018; Stark et al., 2006). The Standards for Educational and Psychological Testing (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014) emphasize the importance of validity as the primary consideration in test development and usage. To ensure a meaningful and appropriate interpretation of test scores, incorporating evidence from various sources, including DIF analyses, is recommended (AERA, APA, & NCME, 2014; Wu et al., 2018).

DIF occurs when a test item displays a difference in the probability of correctly answering the item among individuals from different groups, even when matched on the underlying latent trait (Wetzel & Böhnke, 2017). Typically, this difference is based on demographic attributes such as gender, ethnicity, or language. The presence of a significant number of items with DIF poses a serious threat to the construct validity of tests and the inferences drawn from test scores obtained from items with and without DIF. Karami (2012) notes that if the factor contributing to DIF is not related to the construct being tested, the test results become biased. In other words, if DIF is not taken into account, it can distort the test scores and lead to invalid conclusions about examinees' performance on the test.

In recent times, there has been growing concern and criticism surrounding standardized testing, particularly regarding test inequality. This criticism suggests that educational assessments used both in North America and globally exhibit systematic discrimination against marginalized groups of students, such as Black, Latino, and low-income students (Koljatic et al., 2021; Sireci, 2021), as indicated by Miranda (2020). As a response to this problem, the University of California System has decided to discontinue the use of the ACT and SAT for admission purposes (Moskowitz, 2022; Rio, 2021).

An incident in Nueva Vizcaya involving a misrepresented document about Igorots has raised questions about the Philippine government's duty to provide quality, equitable, culture-based, and comprehensive basic education (Department of Education [DepEd], 2021). The DepEd (2021) strictly enforces a zero-tolerance policy on discrimination of any kind. Once the error was found, field offices swiftly withdrew the document, preventing learners from accessing it.

Jones (2019) warns that the presence of differential item functioning (DIF) can introduce bias in assessing group differences and compromise research outcomes and risk factors. Similarly, Garcia et al. (2021) investigated the psychometric properties of the Beck Anxiety Inventory



(BAI) across various demographic variables in a multi-ethnic cohort. While the BAI has proven effective for measuring anxiety symptoms in Hispanic/Latino Americans and Non-Hispanic/Latino Americans (Bardhoshi et al., 2016), further validation of its cross-cultural applicability is recommended for improved measurement accuracy.

Similarly, Almarabheh and Alshammari (2020) identified sex-related differential item functioning (DIF) in Raven's Standard Progressive Matrices (SPM) Test. Their study revealed biased items against female performance, highlighting the need for additional analysis using item response theory-based techniques like logistic regression, simultaneous item bias test (SIB), or IRT-likelihood ratio (IRT-LR) methods to confirm the findings.

Despite the importance of DIF analysis in evaluating biases in testing, its complexity has limited its adoption among researchers who are less mathematically inclined (Karami, 2012). The intricacies of DIF analysis stem from the underlying statistical and psychometric concepts involved, typically requiring advanced statistical techniques and a solid understanding of the theoretical framework. This can pose challenges for researchers with limited mathematical or psychometric expertise.

The limited adoption of DIF analysis among less mathematically oriented researchers has significant implications for the development and implementation of testing practices. Ensuring fairness and equity in testing practices for individuals, irrespective of their demographic characteristics, is crucial. Therefore, efforts should be made to enhance the accessibility of DIF analysis and develop simpler and more user-friendly procedures that researchers with varying levels of mathematical and psychometric expertise can easily understand and implement.

The objective of the current study was to develop a reliable, valid, and fair test by detecting bias in test items. To achieve this goal, the researcher employed the Mantel-Haenszel (MH) Chi-Square Statistics to identify biased items in the Mathematics Achievement Test. This method has been found to be effective in detecting bias in dichotomously scored tests.

In a study by Rustam et al. (2019), the Mantel-Haenszel (MH) method outperformed the standardization method in detecting DIF for samples of 400 and 2000. The authors acknowledged that the standardization method may be suitable for smaller sample sizes or imbalanced focus groups. However, the superiority of either method should not be assumed.

Similarly, Al-Batosh and Qur'an (2018) used the MH method to investigate DIF in assessment tools for higher education quality in Jordan, focusing on different academic colleges. Their findings revealed bias in favor of Science faculty students, disadvantaging Education and Arts faculty students. Additionally, DIF significantly impacted the internal construction validity indicators of the assessment tool.

Moreover, the current study assessed the effects of eliminating biased items on test quality measures, including content and concurrent validity, as well as internal consistency reliability. The findings hold considerable significance for the creation and implementation of equitable and dependable assessments, particularly in contexts where testing carries high stakes.

The identification and elimination of biased items play a pivotal role in the creation of fair and equitable assessments, particularly in high-stakes testing environments. In this regard, the

present study holds immense potential to make a profound contribution to the field of educational research, specifically in the realm of test development. Test experts, developers, and educators stand to gain valuable insights from this study. Firstly, they can acquire a deep understanding of the applicability of Differential Item Functioning (DIF) detection methods. Secondly, they can recognize the validity of DIF methods in identifying biased test items based on students' diverse characteristics, such as age, sex, socioeconomic status, and school type. Thirdly, they can utilize DIF methods to construct assessments that are both valid and equitable. Lastly, they can employ DIF methods to refine their assessment instruments, thus augmenting the precision and impartiality of their tests. In summary, this study offers a valuable framework for enhancing the quality and equity of educational assessments, ultimately benefiting both students and teachers.

## **Literature Review**

This research is grounded on Measurement Invariance (MI), a fundamental psychometric concept that guarantees the interpretation of scores similarly across groups. DIF points to MI violations at the item level, which implies bias. The research employs the Mantel-Haenszel (MH) approach, one of the most popular methods of detecting DIF.

### **Measurement Invariance**

Measurement invariance, or construct equivalence, ensures that a test measures the same underlying trait across different groups. DIF indicates that people with the same trait level from different groups have different probabilities of answering an item correctly.

The study's aim to "assess the fairness and validity of educational measures" and identify "possible test item biases" directly addresses the principle of measurement invariance. The presence of DIF, as detected by the Mantel-Haenszel method, serves as empirical evidence that the mathematics achievement test is not invariant across the specified demographic groups.

### **The Mantel-Haenszel (MH) Method Within Classical Test Theory (CTT)**

The MH method, based on Classical Test Theory (CTT), is a non-parametric technique where an observed score equals a true score plus error. In DIF analysis, CTT helps create "matching" variables, like total scores, as proxies for ability, allowing comparison of item performance between groups while controlling for overall proficiency.

The study's explicit choice of the MH Chi-Square Statistic aligns with its advantages for dichotomously scored tests and its robustness, as highlighted by Rustam et al. (2019). While other methods exist, this study leverages the MH approach's practical utility for identifying bias in a straightforward and interpretable manner.

### **Test Fairness and Educational Equity**

Beyond statistical invariance, this framework emphasizes the ethical obligation for test fairness. Fair assessment demands tests measure intended traits without unfairly disadvantaging subgroups based on irrelevant traits. The Standards for Educational and Psychological Testing (AERA, APA, & NCME, 2014) states that validity—support for score interpretation—is tied to fairness.

The research supports social and educational equity. It references concerns about "systematic discrimination against marginalized groups" in standardized tests, leading to policy changes like the University of California System dropping ACT/SAT. The study illustrates a psychometric approach to addressing such inequities, especially in the diverse Philippine education system with reports of cultural insensitivity (DepEd, 2021). Findings on factors like age, sex, socioeconomic status, and school type reveal areas where psychometric vigilance can foster fairer educational outcomes.

### **Enhancing Test Quality and Accessibility**

The framework shows that addressing DIF improves test validity and reliability. Removing biased items strengthens construct validity by ensuring the test measures the intended construct consistently across groups. It also boosts internal consistency by ensuring items contribute cohesively to the overall score without extraneous variance from group-specific factors.

Acknowledging Karami's (2012) note on the complexity of DIF analysis limiting its use among less mathematically inclined researchers, this study contributes to the discussion on making psychometric tools more accessible. By demonstrating the Mantel-Haenszel Chi-Square Statistic, it provides a practical example for test experts, developers, and educators, encouraging the adoption of DIF analysis for improving assessments. This shows that even without advanced IRT knowledge, robust DIF detection is possible.

## **Methodology**

### **Research Design**

This research undertook a comprehensive exploration using a descriptive research design, employing an achievement test in Mathematics to assess student performance. To analyze the test items, the researcher employed the Differential Item Functioning (DIF) method, specifically the Mantel-Haenszel Chi-Square Statistic approach. The DIF analysis focused on investigating potential variations among different groups, encompassing factors such as age, sex, socioeconomic status, and school type. Through this rigorous examination, the study sought to uncover valuable insights into the presence of any differentials in item performance, shedding light on the potential influence of various demographic variables on test outcomes.

### **Respondents of the Study**

The examination was administered to all students in the higher education program for Secondary Education, with a focus on Mathematics. These students were from State Universities and Colleges, as well as some selected Higher Education Institutions in Region I. They were specifically chosen because they successfully completed the Calculus course, which was an essential part of their required curriculum within their chosen academic field.

### **Data Gathering Instrument**

In this research study, a structured questionnaire was developed for the purpose of collecting information on several key demographic factors among the student population, including age,

sex, socioeconomic status, and school type. This data was subsequently used to identify and detect any potential biases present in the questionnaire items.

Furthermore, to gather quantitative data regarding the academic performance of the students, an academically rigorous achievement test focusing on the subject of Calculus was administered. This meticulously designed test consisted of a robust set of 100 multiple-choice items, crafted to encompass a wide range of crucial concepts. These concepts encompassed Functions (8 items), Limits and Continuity (27 items), Derivatives (31 items), and Analysis of Functions and their Graphs (34 items), ensuring comprehensive coverage of the subject matter.

### **Data Gathering Procedure**

With the objective of developing a valid and equitable mathematics test, the constructed test underwent a rigorous evaluation by a panel of mathematics experts, followed by extensive field testing among mathematics-specializing students. After successful content validation, the test was administered to a representative sample of students enrolled in the program of interest across multiple state universities, colleges, and selected higher education institutions within the region. The resulting test scores were analyzed, considering key demographic variables such as age (17 and below or 18 and above), sex (male or female), socioeconomic status in terms of gross monthly income (PHP 8,000.00 and below or above PHP 8,000.00), and school type (public or private).

These diverse groups formed the basis for item analysis, employing the DIF method. This method enabled the identification of potential performance disparities among subgroups, offering valuable insights into factors influencing academic achievement. The detection of DIF guided the elimination and improvement of test items. The revised version of the test subsequently underwent further tests of validity and reliability using established statistical methods.

### **Statistical Treatment of Data**

#### ***Detection of Bias Items Using the Mantel-Haenszel Chi-Square Statistic Approach***

This study aimed to identify bias in test items using MH Statistics to detect DIF. By analyzing odds ratios across subgroups, significant performance differences indicated item bias. A follow-up investigation sought the bias sources.

The computation of the MH Statistic commenced with the determination of the probabilities of correct and incorrect responses for both the focal and reference groups. This was followed by assessing the relative likelihood of each group answering an item correctly. The overall measure of DIF was obtained by aggregating the odds ratios across all ability levels and normalizing them based on the number of ability levels. The resulting index is known as the Mantel-Haenszel odds ratio, denoted by  $\alpha_{MH}$ , which is commonly transformed using the formula:  $\beta_{MH} = \ln \alpha_{MH}$  (Karami, 2012).

According to Wiberg (2007), a negative value of  $\beta_{MH}$  indicated the presence of DIF favoring the focal group, while a positive value indicated DIF favoring the reference group. In some cases,  $\beta_{MH}$  was further recalibrated into  $MHD = -2.35 \ln \alpha_{MH}$ . The Mantel-Haenszel Delta (MHD) serves as an indicator of the degree of DIF. As noted by Karami (2012), a positive

MHD value indicated that the test item presented greater challenges for the reference group, whereas a negative value indicated that the focal group experienced greater difficulty with the item.

The Mantel-Haenszel Differential Item Functioning (MH DIF) analysis utilized a Chi-Square Statistic to assess item bias. This statistic was compared to a critical value of 3.8415 at a significance level of 0.05, with one degree of freedom, serving as a detection threshold for potentially biased items. Items exceeding the threshold with an MH Chi-Square Statistic value were flagged as displaying Differential Item Functioning (DIF) and underwent further analysis to identify the source of bias.

Pedrajita (2015) proposed a classification system to categorize the degrees of DIF in test items into three levels: A, B, and C. This system aims to avoid identifying items with statistically significant DIF that are practically trivial. The categories are defined as follows: Category A: Items flagged as A show negligible amounts of DIF, with the absolute value of the Mantel-Haenszel Delta (MHD) significantly differing from 0 but smaller than 1; Category B: Items identified as B exhibit moderate levels of DIF, with MHD values significantly differing from zero and either not significantly greater than 1.0 or smaller than 1.5 in absolute value; Category C: Items falling into the C category display large amounts of DIF, with the absolute value of the MHD being greater than 1.5 or significantly different from 1.0. The table below provides a summary of these categories:

**Table 1**

*Detection Threshold and Effect Size of Mantel-Haenszel Chi-Square Statistics DIF Detection Method*

Detection Threshold	Effect Size	Code	Scale Used
3.8415	0.0 – 1.0	A	Delta Scale
	1.0 – 1.5	B	
	> 1.5	C	

### ***Validity and Reliability of the Achievement Test***

The study employed various methods to evaluate the validity and reliability of the test. Firstly, a factor analysis approach was utilized to assess the construct validity of the test, examining the interrelatedness of its factors to demonstrate its unidimensionality.

Concurrent validity was established by analyzing the relationship between predictors, such as examinees' scores in the Calculus achievement test, and the criterion variable, which was their grade point average (GPA). This relationship was quantified using the Pearson Product Moment correlation coefficient, commonly known as a validity coefficient (Pedrajita, 2015).

To evaluate the content validity of the test, a content validity index (CVI) was calculated using a 5-point rating agreement scale. Content experts provided ratings of scale relevance, ensuring that the test adequately represented the intended content domain.

The internal consistency reliability of the revised test was assessed using the KR-20 formula, designed for dichotomous test items. It measured item heterogeneity and test consistency.

This evaluation helped the researcher verify the effectiveness of revisions and the test's overall reliability.

## Results and Discussion

This section presents research findings using the MH Chi-Square Statistic to identify biased items across student variations in age, sex, socio-economic status, and school type. It also highlights significant findings regarding the validity and reliability of the revised achievement test.

### Detection of Bias Items Using Mantel-Haenszel Chi-Square Statistic Approach

The results of the MH analysis were presented in Tables 2, 3, 4, 5, and 6, accompanied by Figures 1, 2, 3, and 4, providing a visual representation of the findings.

#### *Based on Age Differences*

The study analyzed measurement invariance by age, with results in Table 2 and Figure 1. Using DIF detection, 23 items showed bias: four (8, 16, 37, 96) toward the group 17 and below, and 19 (18 and above) toward the reference group.

**Table 2**

*Biased Items With Significant DIF Across Age Using MH*

Item No.	MH $\chi^2$ Statistic	p-value	$\alpha_{MH}$	MHD	Potentially Biased Groups
8	5.2129*	0.0224	Inf	-Inf <sup>C</sup>	Focal
10	11.9951**	0.0005	0.0905	5.6459 <sup>C</sup>	Reference
11	4.2082*	0.0402	0.1588	4.3238 <sup>C</sup>	Reference
13	4.0750*	0.0435	0.2468	3.2882 <sup>C</sup>	Reference
15	10.1538**	0.0014	0.0848	5.7983 <sup>C</sup>	Reference
16	12.8489**	0.0003	Inf	-Inf <sup>C</sup>	Focal
19	5.6008*	0.0180	0.1640	4.2492 <sup>C</sup>	Reference
22	15.8631**	0.0001	0.0503	7.0264 <sup>C</sup>	Reference
34	8.2728**	0.0040	0.0590	6.6501 <sup>C</sup>	Reference
37	6.1449*	0.0132	Inf	-Inf <sup>C</sup>	Focal
44	6.3181*	0.0120	0.1825	3.9977 <sup>C</sup>	Reference
52	6.8628**	0.0088	0.1736	4.1145 <sup>C</sup>	Reference
53	11.9554**	0.0005	0.0928	5.5874 <sup>C</sup>	Reference
57	9.9643**	0.0016	0.0447	7.3011 <sup>C</sup>	Reference
58	6.2843*	0.0122	0.1174	5.0350 <sup>C</sup>	Reference
61	7.4552**	0.0063	0.0729	6.1546 <sup>C</sup>	Reference
66	4.2206 *	0.0399	0.0662	6.3816 <sup>C</sup>	Reference
69	11.1771**	0.0008	0.0550	6.8156 <sup>C</sup>	Reference
72	14.0188**	0.0002	0.0486	7.1054 <sup>C</sup>	Reference
74	16.8953**	0.0000	0.0626	6.5101 <sup>C</sup>	Reference
77	5.1305*	0.0235	0.1332	4.7365 <sup>C</sup>	Reference
81	6.2241*	0.0126	0.0772	6.0193 <sup>C</sup>	Reference
96	4.7843*	0.0287	10.4840	-5.5221 <sup>C</sup>	Focal

Legend: \* significant at  $\alpha = .05$  \*\* significant at  $\alpha = .01$ ; C – large DIF

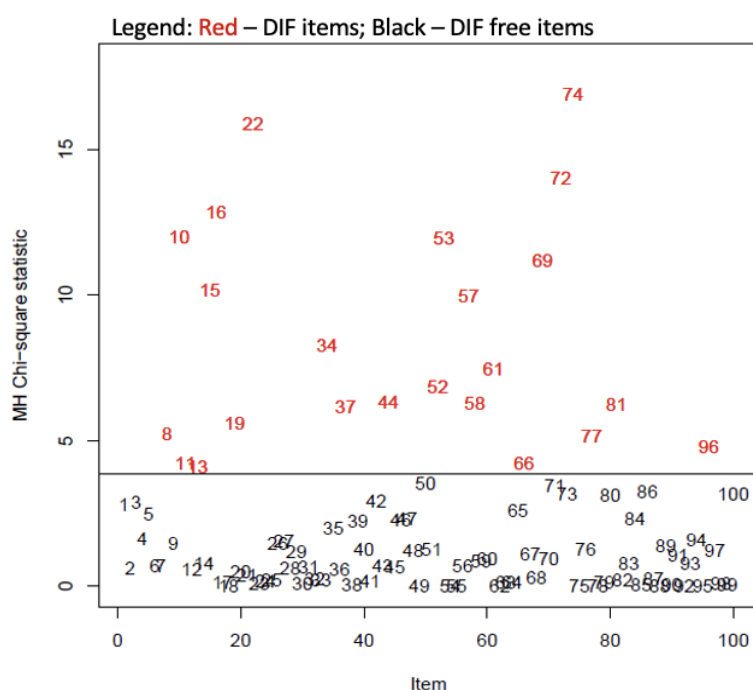
Among the items analyzed, it was found that Item 74 showed the highest level of DIF, putting the reference group at a disadvantage. This item challenged students to understand the first derivative of an exponential function, which may have been particularly difficult for individuals aged 18 and older. Conversely, Item 13 had the lowest DIF estimate, as indicated by the MH Chi-Square Statistic. This item involved inverse functions and asked students to find the value of a composite function using its inverse, making it somewhat less challenging for the test takers.

The analysis yields a compelling outcome, revealing a notable discrepancy in the number of DIF items that may exhibit bias against the reference group, as elegantly demonstrated in the accompanying table. These intriguing findings suggest the possibility that individuals aged 17 and below possess a heightened capacity for memory retention, granting them a distinct advantage in recalling the intricacies covered in Calculus. In contrast, those aged 18 and above may benefit from engaging in additional review of the subject matter addressed in the identified DIF items, as these particular questions could hold significant importance for their impending board examination.

This phenomenon is believed to be associated with the ongoing growth and maturation of the brain, coupled with the intricate formation of neuronal connections during this crucial developmental stage of life (Eichenbaum, 2017; Keresztes et al., 2017).

Furthermore, it is noteworthy that all the identified DIF items have been classified under the category "C," signifying a substantial effect and necessitating rigorous revision or potential replacement. In contrast, the remaining items not featured in the table have been assigned classifications of "A" and "B" and have not exhibited any detectable DIF. Nevertheless, these items are still visible and traceable in Figure 1, providing valuable insights into their performance characteristics.

**Figure 1**  
*Item Bias Detection Using MH Statistics Across Age*



The graphical representation in Figure 1 depicts the deviation of each item's MH Chi-Square Statistics from the critical value. This visual aid serves to provide support for the obtained outcomes, as exemplified in Table 2.

The study highlights tailoring teaching and assessments to diverse student abilities across ages, improving fairness and inclusivity while fostering better learning. Adjustments for age differences ensure unbiased testing, recognizing each group's unique needs and promoting equitable evaluation.

### ***Based on Sex Differences***

The present analysis provides significant insights into sex differences in the MH analysis, as shown in Table 3. Importantly, only items 37 and 72 showed potential bias against the reference and focal groups, respectively.

**Table 3**

*Biased Items With Significant DIF Across Sex Using MH*

Item No.	MH $\chi^2$ Statistic	p-value	$\alpha_{MH}$	MD	Potentially Biased Groups
37	4.1693*	0.0412	0.3531	2.4461 <sup>C</sup>	Reference
72	5.1985*	0.0226	3.7984	-3.1363 <sup>C</sup>	Focal

Legend: \* significant at  $\alpha = .05$ ; C – large DIF

The analysis has uncovered noteworthy insights regarding item 37 in the test, which evaluates students' proficiency in identifying properties of the graph of  $y = \arctan x$  beyond mere graphing skills. Intriguingly, the reference group exhibited challenges in answering this item, hinting at a potential knowledge gap in graphing the function. These findings suggest the possibility of lower vigilance among male examinees regarding the graphical representation of mathematical functions, as evidenced by the results. Further research and investigation are warranted to comprehensively comprehend and address these potential disparities.

On the other hand, item 72 pertains to the determination of  $\frac{d}{dx}\left(\frac{f+g}{h}\right)$ , considering that  $f$ ,  $g$ , and  $h$  are differentiable functions of  $x$ . The focal group exhibited difficulty in tackling this item, potentially attributed to its emphasis on both differentiable functions and the rules of differentiation. This observation implies that female examinees may encounter challenges when it comes to generalizing mathematical rules and computations.

Both DIF items are categorized as "C," indicating potential for significant impact on the test. These items were also identified in MH analysis based on age differences, confirming their bias susceptibility. Findings are supported by Figure 2.

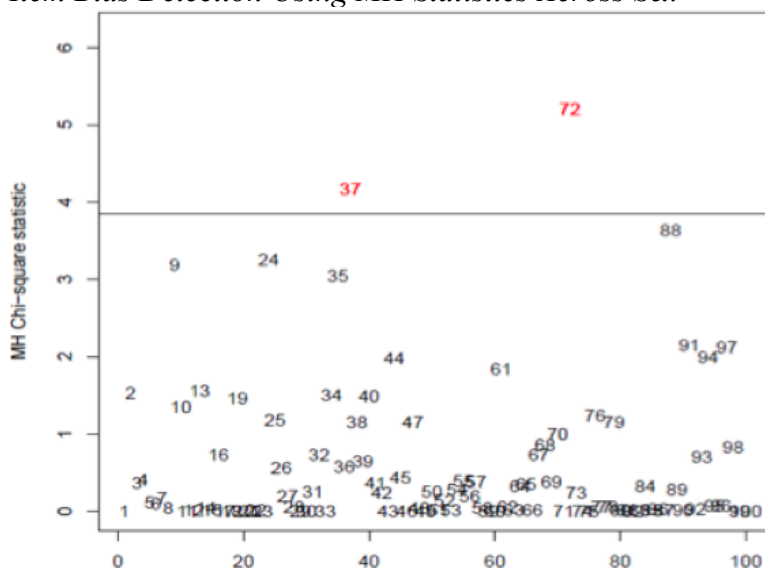
Dale et al. (2025) noted that DIF can appear "despite differences in content areas and bias directions," which supports the study's findings of different patterns (males struggling with one item, females with another). This improves the generalizability of the results by showing sex-based DIF, indicating that DIF related to sex exists across various fields.



This study, as well as Dale et al. (2025), emphasizes the need for ongoing vigilance in test development. The consistent detection of DIF in mathematics and medical education demonstrates that test items can unintentionally disadvantage certain groups, even when overall ability is similar. Dale et al. (2025) stated that the validity of score-based inferences, especially for group comparisons, depends on test items functioning equally across different groups.

**Figure 2**

*Item Bias Detection Using MH Statistics Across Sex*



Legend: Red – DIF items; Black – DIF free items

### ***Based on Socioeconomic Status Differences***

Table 4 shows the results from the Mantel-Haenszel (MH) analysis, which examined how differences in socioeconomic status affect the test items. In this analysis, two items, specifically item 47 and item 86, were identified as showing DIF with a severity rating of "C." This rating indicates a significant level of DIF for these items.

**Table 4**

*Biased Items With Significant DIF Across Socio-Economic Status Using MH*

Item No.	MH $\chi^2$ Statistic	p-value	$\alpha_{MH}$	MHD	Potentially Biased Groups
47	4.1455*	0.0417	2.5450	-2.1952 <sup>C</sup>	Focal
86	8.0617**	0.0045	0.2179	3.5806 <sup>C</sup>	Reference

Legend: \* significant at  $\alpha = .05$  \*\* significant at  $\alpha = .01$ ; C – large DIF

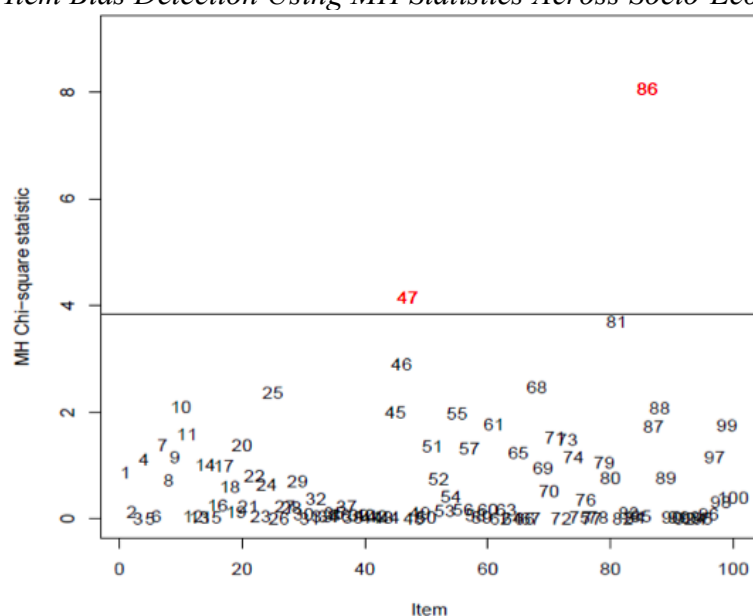
Item 86 exhibited a substantial Mantel-Haenszel DIF value, implying a potential bias against the reference group comprised of students with a monthly income exceeding Php 8,000. Students belonging to this group encountered greater challenges in achieving success on this particular item. Furthermore, the item demonstrated a significantly high level of significance, underscoring a noteworthy correlation between students' likelihood of succeeding on the item and their socio-economic status differences.

In contrast, item 47 placed the focal group, encompassing students with a monthly gross income below Php 8,000, at a disadvantage. This item assessed their comprehension of the behaviors exhibited by the graph of a given function within a specific interval of  $x$ , encompassing intricate concepts concerning limits and continuity of a function. The complexity inherent in these concepts may have induced confusion among the students.

Similar to item 86, item 47 also demonstrated a significant level of significance, signifying a meaningful relationship between students' likelihood of achieving success on the item and their socioeconomic disparities (Tan, 2024). Therefore, it is advisable to revise or potentially remove these items to mitigate bias in evaluating students' performances with respect to their socioeconomic backgrounds.

**Figure 3**

*Item Bias Detection Using MH Statistics Across Socio-Economic Status*



Legend: Red – DIF items; Black – DIF free items

Figure 3 visually reaffirms Table 4, showing black items as those without DIF in the Mantel-Haenszel analysis for socioeconomic disparities. This indicates that socioeconomic differences significantly influence students' overall test performance (Tan, 2024).

### ***Based on School Type Differences***

Table 5 presents the findings derived from the MH analysis, meticulously assessing the implications of variances in school type on the test items.

**Table 5***Biased Items With Significant DIF Across School Type Using MH*

Item No.	MH $\chi^2$ Statistic	p-value	$\alpha_{MH}$	MHD	Potentially Biased Groups
33	4.2754*	0.0387	4.2113	-3.3788 <sup>C</sup>	Focal
43	5.5413 *	0.0186	6.7612	-4.4913 <sup>C</sup>	Focal
44	5.5817 *	0.0181	5.4396	-3.9802 <sup>C</sup>	Focal
55	4.4308 *	0.0353	3.7161	-3.0848 <sup>C</sup>	Focal
59	4.4721 *	0.0345	14.2667	-6.2461 <sup>C</sup>	Focal

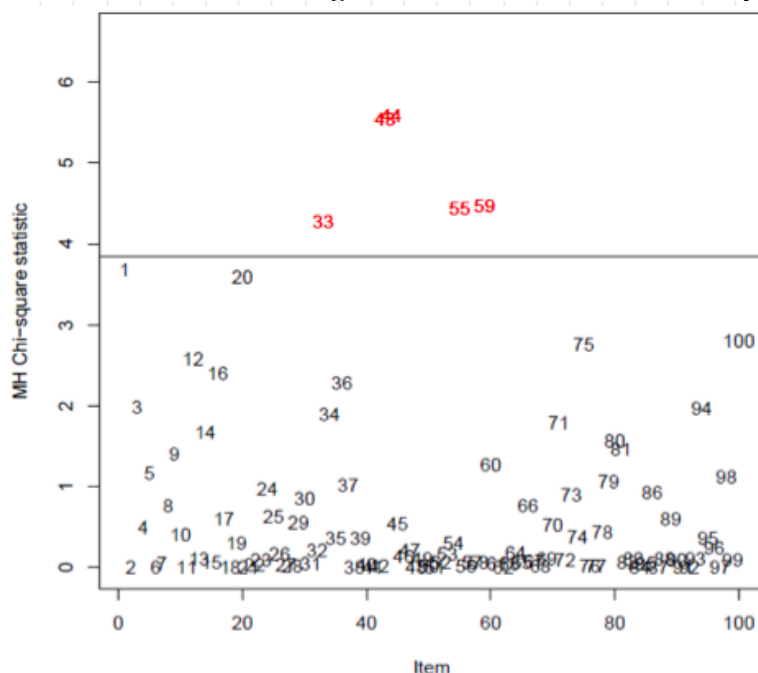
Legend: \* significant at  $\alpha = .05$ ; C – large DIF

The analysis presented in Table 5 unveils compelling insights regarding the DIF of five specific test items (namely, items 44, 43, 59, 55, and 33) in relation to school type differences. These items manifest notable instances of severe DIF, signified by their classification within the "C" category, indicating a potential bias against the focal group. Particularly noteworthy is the observed difficulty experienced by students enrolled in public higher education institutions (HEIs) when attempting to excel in these items, suggesting a potential bias targeting this specific student cohort. Such biases may emanate from diverse factors, encompassing disparities in curriculum, instructional methodologies, or student backgrounds. These findings distinctly underscore the paramount significance of diligently identifying and mitigating the origins of DIF within educational assessments to ensure impartial and accurate evaluations of student performance.

Item 44 exhibits the highest DIF among the five items influenced by school type, indicating it does not function equally for students from different schools. It involves understanding a rational function's curve and properties, which requires algebraic and graphical skills. Students, especially from public HEIs with less proficiency, may struggle.

The implications of the findings suggest that incorporating computer-aided materials and projectors to present real graphs of functions can significantly enhance students' comprehension of the subject matter. By serving as valuable visual aids, these teaching tools foster better understanding and retention among learners (Pope, 2023).

Figure 4 shows items deviating from the detection threshold, suggesting they may function differently among student groups and introduce bias.

**Figure 4***Item Bias Detection Using MH Statistics Across School Type*

Legend: **Red** – DIF items; **Black** – DIF free items

### Validity and Reliability of the Revised Achievement Test

Based on the DIF, validity, and reliability results, the achievement test was revised to 50 items covering the four Calculus subtopics. Table 6 shows the revised test's validity and reliability indices.

**Table 6***Validity and Reliability Test of the Revised Achievement Test*

Measures	Coefficient	Description
Construct Validity	0.667	Good
Concurrent Validity	0.159	Significant
Content Validity	0.9793 and 0.8965	Acceptable
Internal Consistency Reliability	0.822	Good

The construct validity coefficients have shown that the revised version of the Achievement Test exhibits strong psychometric properties, confirming its effectiveness as a reliable assessment tool. Additionally, the results indicate that the selected test items in the revised version align well with a single underlying dimension. Moreover, the concurrent validity coefficient provides evidence of a positive and statistically significant correlation between the test score and the grade point average in Calculus I. This supports the validity of the revised test, confirming its capacity to measure the intended construct. Furthermore, the content validity indices of the revised test meet the acceptable threshold, and expert evaluations further support its validity.

On the other hand, the data in Table 6 show a reliability coefficient above 0.8 for the revised version of the test, indicating strong internal consistency and a dependable scale for measuring students' performance.

The importance of these findings is underscored by their role in confirming the reliability of the revised test as a valid tool for assessing Calculus proficiency among students. This evaluation, in turn, becomes a valuable resource in making well-informed decisions concerning student progression, curriculum enhancement, and instructional planning. The data obtained from this assessment can serve as a powerful instrument for guiding instructional methodologies, pinpointing areas of excellence and deficiency, and implementing focused interventions aimed at enhancing student learning outcomes.

### **Conclusions**

The application of the Mantel-Haenszel Chi-Square Statistics technique to assess Differential Item Functioning (DIF) has yielded valuable insights into test item performance and potential biases linked to age, gender, socioeconomic position, and school type.

It also highlighted the significance of construct validity, concurrent validity, content validity, and reliability analyses in assessing test item quality. The construct validity coefficients confirmed the overall success of the redesigned Achievement Test, suggesting its capacity to appropriately assess the desired construct. The concurrent validity coefficient found a favorable and substantial link between the test score and the grade point average in Calculus I, bolstering the redesigned test's validity. The content validity indices suggested that the test items were suitable, and the reliability coefficient confirmed the test's internal consistency and dependability.

These findings highlight the need of using robust statistical approaches to evaluate the quality of test items. Educators and researchers may acquire useful insights into the performance and biases of test questions by using this technique, guiding choices about curriculum creation, instructional planning, and student growth.

### **Acknowledgements**

The researcher expresses heartfelt gratitude to Divine Providence for wisdom and blessings, making her desire possible. She also thanks the Bachelor of Secondary Education College students majoring in Mathematics and their Professors in Calculus I across Higher Education Institutions in Region 1 for their cooperation during data gathering.

### **Declaration of AI-Assisted Technology in the Writing Process**

The researcher would like to state that she used Grammarly to improve the language of the research content.

## References

- Al-Batosh, A. Y., & Qur'an, M. F. A. (2018). Examining the differential item functioning in students' assessment instruments for quality of higher education in Jordan according to academic collage using Generalized Mantel-Haenszel method. *Journal of Al-Quds Open University for Educational & Psychological Research & Studies*, 8(23). [https://digitalcommons.aaru.edu.jo/jaqou\\_edpsych/vol8/iss23/12](https://digitalcommons.aaru.edu.jo/jaqou_edpsych/vol8/iss23/12)
- Almarabheh, A., & Alshammari, S. (2020). Detection of Sex-Related differential item functioning in Raven's standard progressive matrices test using the Mantel-Haenszel method. *Journal of Education and Practice*. <https://doi.org/10.7176/jep/11-29-10>
- American Educational Research Association (AERA), American Psychological Association (APA), & National Council on Measurement in Education (NCME), (2014). Standards for educational and psychological testing. <https://eric.ed.gov/?id=ED565876>
- Bardhoshi, G., Duncan, K., & Erford, B. T. (2016). Psychometric meta-analysis of the English version of the beck anxiety inventory. *Journal of Counseling & Development*, 94(3), 356–373. <https://doi.org/10.1002/jcad.12090>
- Chen, H., & Jin, K. (2018). Applying logistic regression to detect differential item functioning in multidimensional data. *Frontiers in Psychology*, 9. <https://doi.org/10.3389/fpsyg.2018.01302>
- Dale, E. D., Abulela, M. A. A., Jia, H., & Violato, C. (2025). Are medical school preclinical tests biased for sex and race? A differential item functioning analysis. *BMC Medical Education*, 25(1). <https://doi.org/10.1186/s12909-024-06540-6>
- Department of Education (DepEd). (2021, February 9). DepEd reiterates zero tolerance vs. discrimination after erroneous document on Igorots surfaces. <https://www.deped.gov.ph/2021/02/09/on-addressing-discrimination/>
- Eichenbaum, H. (2017). Memory: organization and control. *Annual Review of Psychology*, 68, 19–45. <https://doi.org/10.1146/annurev-psych-010416-044131>
- Garcia, J. M., Gallagher, M. W., O'Bryant, S. E., & Medina, L. D. (2021). Differential item functioning of the Beck Anxiety Inventory in a rural, multi-ethnic cohort. *Journal of Affective Disorders*, 293(1), 36–42. <https://doi.org/10.1016/j.jad.2021.06.005>
- Jones, R. N. (2019). Differential item functioning and its relevance to epidemiology. *Current Epidemiology Reports*, 6, 174–183. <https://doi.org/10.1007/s40471-019-00194-5>
- Karami, H. (2012). An introduction to differential item functioning. *The International Journal of Educational and Psychological Assessment*, 11(2), 59–76. [https://www.researchgate.net/publication/310153908\\_An\\_Introduction\\_to\\_Differential\\_Item\\_Functioning](https://www.researchgate.net/publication/310153908_An_Introduction_to_Differential_Item_Functioning)

- Keresztes, A., Ngo, C. T., Lindenberger, U., Werkle-Bergner, M., & Newcombe, N. S. (2017). Hippocampal maturation drives memory from generalization to specificity. *Trends in Cognitive Sciences*, 21(4), 249–267. <https://doi.org/10.1016/j.tics.2018.05.004>
- Koljatic, M., Silva, M., & Sireci, S. G. (2021). College Admission Tests and Social Responsibility. *Educational Measurement: Issues and Practice*, 40(4), 22–27. <https://doi.org/10.1111/emip.12425>
- Lucey, C. R., & Saguil, A. (2020). The consequences of structural racism on MCAT scores and medical school admissions: The past is prologue. *Academic Medicine*, 95(3), 351–356. <https://doi.org/10.1097/ACM.0000000000002939>
- Miranda, N. A. R. (2020, January 6). Chilean university admissions tests hit by fresh protests. Reuters. <https://www.reuters.com/article/us-chile-protests-university-idUSKBN1Z522I/>
- Moskowitz, J. B. (2022). *The hitchhiker's guide to differential item functioning (DIF)*. <https://www.apadivisions.org/division-5/publications/score/2022/01/differential-item-functioning>
- Pedrajita, J. Q. (2015). Using Contingency Table Approaches in Differential Item Functioning Analysis: A Comparison. *Education Journal*, 4(4), 139–148. <https://doi.org/10.11648/j.edu.20150404.11>
- Pope, D. (2023). Using Desmos and GeoGebra to engage students and develop conceptual understanding of mathematics. In C. Martin, B. Miller, & D. Polly (Eds.), *Technology Integration and Transformation in STEM Classrooms* (pp. 104–129). IGI Global Scientific Publishing. <https://doi.org/10.4018/978-1-6684-5920-1.ch006>
- Rio, G. (2021, May 15). University of California Will No Longer Consider SAT and ACT Scores. *The New York Times*. <https://www.nytimes.com/2021/05/15/us/SAT-scores-uc-university-of-california.html>
- Rustam, A., Naga, D., & Supriyati, Y. (2019). A comparison of Mantel-Haenszel and standardization methods: Detecting differential item functioning. *MaPan: Jurnal Matematika dan Pembelajaran*, 7(1), 16–31. <https://doi.org/10.24252/mapan.2019v7n1a2>
- Sireci, S. G. (2021). NCME Presidential Address 2020: Valuing educational measurement. *Educational Measurement: Issues and Practice*, 40(1), 7–16. <https://doi.org/10.1111/emip.12415>
- Stark, S., Chernyshenko, O. S., & Drasgow, F. (2006). Detecting differential item functioning with confirmatory factor analysis and item response theory: Toward a unified strategy. *Journal of Applied Psychology*, 91(6), 1292–1306. <https://doi.org/10.1037/0021-9010.91.6.1292>

- Tan, C. Y. (2024). Socioeconomic status and student learning: insights from an umbrella review. *Educational Psychology Review*, 36(100). <https://doi.org/10.1007/s10648-024-09929-3>
- Wetzel, E., & Böhnke, J. (2017). Differential item functioning. *Encyclopedia of Personality and Individual Differences*, 1–5. [https://doi.org/10.1007/978-3-319-28099-8\\_1297-1](https://doi.org/10.1007/978-3-319-28099-8_1297-1)
- Wiberg, M. (2007). Measuring and detecting differential item functioning in criterion-referenced licensing test: A theoretic comparison of methods (EM No. 60). Umeå University, Department of Measurement and Psychometrics. <https://paperzz.com/doc/7172905/measuring-and-detecting-differential-item>
- Wu, X., Wu, R., Peabody, M., & O'Neill, T. (2018). Detecting cross-cultural differential item functioning for increasing validity: an example from the American Board of family medicine in-training examination. *Education in The Health Professions*, 1(1), 19–23. [https://doi.org/10.4103/EHP.EHP\\_12\\_18](https://doi.org/10.4103/EHP.EHP_12_18)

**Contact email:** arlenenmendoza1@gmail.com



## Conceptual Aspects to Support the Implementation of Digital Transformation in Higher Education Governance

Nadine Baumann, RheinMain University of Applied Sciences, Germany  
Christian Schachtner, RheinMain University of Applied Sciences, Germany

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

This research focusses on digital transformation and university governance, thus the strategic changes which underly a transformation in university management. It explores the impact of digitalization on the challenges in designing change within university structures. The research builds upon existing research on university governance models. It is based on studies related on the German Excellence Initiative and the Higher Education Pact 2020, which have significantly influenced governance structures and innovation processes in German universities (Alshaer et al., 2017). The study employs a case study methodology, utilizing an expert panel (n = 18) at the Conference of the National Society of Public Administration Informatics. This approach allows in-depth analysis of real-world scenarios and expert insights into the challenges and opportunities presented by digitalization in university governance. The research reveals that data governance and digitalization of management offer significant advantages to university governance. However, these advancements also necessitate adapted governance approaches to fully leverage their potential. For academics and administrators, the study highlights the need for flexible governance models that can adapt to the rapidly changing digital landscape. Policymakers should consider the interplay between funding criteria and governance structures when designing higher education initiatives. This paper provides a perspective on the intersection of comprehensive analysis of how digitalization jointly influences governance structures and innovation processes in German universities.

*Keywords:* university governance, digital transformation, innovation processes

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

In today's era of digital revolution, the integration of technology plays an increasingly important role in academia. It has a strong influence on research, teaching, and university administration (Clark, 2018). In the field of research, digitization enables efficient research data management as well as improved collaboration opportunities and communication between research teams at different locations. According to Pritchard et al. (2020), researchers in many countries use advanced digital technologies such as big data, AI, and cloud technologies to efficiently analyze and manage large-scale research data. In the context of teaching, digitization increases in importance. Colleges offer online courses and digital learning resources to enable learning regardless of time and location (Selwyn, 2016). The COVID-19 pandemic has exacerbated the importance of digital learning and forced universities to quickly switch from traditional face-to-face teaching to online teaching (Crawford et al., 2020), even though the pandemic cannot be seen as a driver of digitization at universities in principle, as the expansion of data centers and IT structures had already been planned and initiated beforehand (Lübcke et al., 2022, p. 88). The university administration also benefits from digitization through efficient administrative processes. Some universities now use modern management information systems, online application portals and electronic document management systems (Öztemel & Gürsev, 2020). University governance should therefore be considered in conjunction with data governance, digital sovereignty, and networking in the sense of cross-university cooperation.

### Higher Education Funding as an Influencing Factor

The distribution of funds for universities in Germany is a controversial topic that affects both political and academic circles. Several aspects contribute to this discussion. While some federal states are relatively well equipped in terms of higher education funding, others have to deal with smaller budgets. Accordingly, the financing models and structures of the universities vary considerably, depending on the federal state.

In accordance with Article 20 of the German Constitution, higher education funding in Germany is provided by the federal states, especially with regard to the financing of research and teaching. They make up the majority of the university budget and finance both university operations (buildings, staff, etc.) and research. However, the German government also intervenes in funding through certain channels, such as the Excellence Initiative or the Higher Education Pact. The distribution of funds within the framework of the Higher Education Pact in the federal states of Germany can be summarised as follows:

The Higher Education Pact 2020 was adopted by the federal and state governments to accommodate the increasing number of first-year students and to enable them to study at a high quality. Billions of euros were made available for this purpose, with which the states were able to create the necessary training capacities at the universities.

The federal states set various priorities in the implementation of the Higher Education Pact:

- Expansion of study capacities across all types of higher education institutions in order to be able to accommodate the increasing number of first-year students
- Improvement of study orientation and counselling to support prospective students in their choice of study programmes
- Increasing the permeability between academic and vocational education and training, e.g. through the recognition of skills and part-time courses of study

The Higher Education Pact contributed to the fact that the universities were able to accept a significantly higher number of first-year students. At the same time, the number of academic staff at the universities was increased in order to be able to teach the additional students. Overall, it can be seen that the federal states have used the funds of the Higher Education Pact to expand study capacities in line with demand and to ensure the quality of higher education.

The distribution of public higher education funding can vary greatly depending on the federal state. According to the quarterly publication “Finances and Taxes” of the Federal Statistical Office (Destatis), Baden-Württemberg, for example, is on top with an expenditure rate of 106 euros per capita, while Saxony-Anhalt ranks last. On average, the federal states spent around 87 euros per capita on higher education institutions in 2017 (Federal Statistical Office, 2018).

In this debate, there is also a demand for more intensive federal-state cooperation in terms of higher education funding. The German Council of Science and Humanities calls for greater participation by the federal government in the financing of colleges and universities (German Council of Science and Humanities, 2018). This would imply a comprehensive reform of German higher education funding and could potentially lead to a reduction in the current disparities between the federal states.

The financing of a university has a significant influence on its governance structure and processes. For example, the distribution of funds, budget decisions, and external funding sources can influence the autonomy and decision-making of university management. Conversely, the governance structure of a university can also have an impact on funding, as transparent and efficient governance practices, for example, can influence the allocation of resources. After all, both funding and governance are critical to a university's successful development and performance.

### **Transformation Approach Through Digitalization**

Based on the 2018 focus study “Digitization of Universities”, the level of digitization in terms of research was 34.4%, in teaching and learning 29.3% and in higher education administration 23.3% (Gilch et al., 2019, p. 3). In 74.0% of the universities surveyed in the study, digitization was anchored in the higher education strategy, in 83.0% this also included the digitization of teaching and learning, and in 79.0% of the respondents, the digitization of administration. For 42.9%, digitization was part of the university's target agreement with the state government (Gilch et al., 2019, p. 4). The 2019 report of the Higher Education Forum on Digitalisation also emphasises the importance of digitalisation in higher education and the need to promote digital skills. It shows that universities in Germany are making progress in digitization, but that there are still challenges here. Topics such as e-learning, digital teaching and learning formats and the role of Open Educational Resources will be discussed. In addition, the importance of data protection and IT security in the context of digitization is emphasized, and the need to promote digital innovation and the creation of a digital infrastructure is cited. Overall, it is depicted that the digitization of universities is a continuous process.

Digitization is often found as a profile feature in the mission statement of a university, especially as a focus in the mission statement of teaching. Digitization should also be mentioned in a digitization strategy, in the university development plan or in a future concept, which are designed for the long term, as well as in study and examination regulations (Lübcke et al., 2022, pp. 88-90) and in relation to university administration. In this context, a look at different management approaches of universities will be taken in order to shed light on the

causes of the lower degree of digitization in higher education administration at the time of the survey compared to the aspect. Finally, the study by Weisflog and Böckel (2020) comes to the conclusion that students also consider the digitization of almost all organizational processes to be important, especially processes that recur frequently (Weisflog & Böckel, 2020, pp. 31–32).

### **Hybrid Governance Models to Create Connectivity to Digitalization**

Generally speaking, university leaders are responsible for the strategic direction and effective administration of a university or college. Higher education governance refers to the oversight and management of higher education institutions, universities, and higher education systems. It defines the management of responsibilities, duties, and relationships between the various actors such as university management, faculty, students, regulators, and society (Kehm, 2020). Higher education governance is therefore a continuum of tensions and trade-offs between different goals, values, expectations, and challenges. It requires a deep understanding of the specific contexts, cultural characteristics and institutional dynamics of each university or higher education institution.

Over the years, various governance models have developed to better distribute responsibilities and power structures and introduce control mechanisms. These models can be broadly divided into two main categories, collegial and managerial governance models. The collegial model follows the approach in which decision-making and leadership are broadly distributed across subject matter experts within the organization (Bircher, 2016). The managerial model, on the other hand, is characterized by stronger central management and a clear distribution of roles. The collegial model can contribute to greater participation and a sense of community, but it can also slow down decision-making processes and lead to disagreements. The managerial model, on the other hand, can be more efficient and responsive, but there is a risk that academically less qualified people will be at the helm of a higher education institution and make decisions that may be more focused on business interests. It is also possible to combine elements of both models to create a hybrid model that takes advantage of both approaches (Morley, 2013). In practice, most university administrations are a mixture of both models. They have a management that sets strategic goals and manages the administration, but also a management committee that makes decisions and advises.

Higher education governance is undergoing significant changes. These are often due to the influence of various forces, including financial pressures, societal change, and technological innovation (Stensaker & Vabø, 2013). Most recently, the management of a global pandemic, climate disasters, global and political uncertainties, increasingly economic downward trends in addition to digitalization, demographic change and decarbonization. Accordingly, universities are also forced to redefine and adapt their leadership and management structures. With linking university governance and data governance concepts, universities and colleges can promote the digitization process and optimize their performance in teaching, research and administration.

### **Importance of Big Data, Interoperability, Digital Sovereignty and Cooperation**

Data governance refers to the formulation and enforcement of formal policies, processes, and standards around data governance (Weber et al., 2009) and refers to the use of big data to improve decision-making and management in higher education institutions. The use of data drives the strategic direction of the institution of higher education, improves efficiency and productivity, and supports quality assurance and accreditation. In addition to these benefits, data-driven governance also comes with risks and challenges. For example, the use of data

increases the risk of data breaches. There is a risk of misinterpretation and thus of making wrong decisions. Data literacy as orientation knowledge thus becomes almost a compulsory course for university staff (Hense et al., 2023, p. 45).

In addition to the targeted handling of data, digital sovereignty is another meta-topic when it comes to the digital transformation of universities. Digital sovereignty in the context of higher education governance refers specifically to how universities and colleges manage their data-driven services and processes and ensure that they can make their own decisions about their digital infrastructure and data policy (Karcianas et al., 2020). This means, for example, reducing dependencies on individual software providers and database management systems (e.g., Microsoft Access, Oracle, SAP MaxDB). One advantage of digital sovereignty in higher education administration is improved data security (Zuiderwijk et al., 2020). When a higher education institution controls and manages its own data, it can take better security measures to prevent data breaches and loss. Digital sovereignty also enables greater autonomy over one's own digital processes. Universities can design their own systems and platforms that are specifically tailored to the needs of their administration, their students and their staff (Weissinger, 2018). However, maintaining and updating their own digital infrastructures and systems can be expensive and labour-intensive for higher education administrations, especially when specialized expertise and skills are required. It is therefore crucial that institutions take a clear and strategic approach to developing their digital sovereignty in order to maximise potential benefits and minimise negative impacts (Schulz, 2019).

When operating your own digital infrastructure and services, it is important that these systems can function smoothly with each other; whether for the exchange of information between different departments within the university or for cooperation with external partners and systems. Interoperability refers to the ability to interact for mutual benefit and in the interest of common goals (Berger et al., 2023, p. 3). It is also considered one of the pillars of the development of effective information management with regard to higher education institutions (Smith, 2018). By connecting different applications, individual work processes can be streamlined, for example by eliminating duplicate data entry during student registration or updating employee information (Johnson, 2020). In addition, interoperability provides a centralized information base that provides quick access to up-to-date and consistent data (Roberts & Fisher, 2017). In addition, interoperability opens up the possibility of creating integrated analytics and reports, enabling higher education administrators to identify trends and make better strategic decisions (Smith, 2018). Interoperability also requires a digital agenda so that strategic implementation in administration, research and teaching can be supported in a structured way to promote an overarching strategic vision (Willcox et al., 2016).

With regard to both adaptable and data-driven university governance, which pursues and enables extensive autonomy with regard to digital services and processes, requires corresponding systems in this regard, and against the background of advancing knowledge and technology, one of the most practical ways not to be left behind is to build cooperation and networks with other universities. Although universities are often perceived as self-contained organisations, they are part of a larger education system and can also benefit from greater interaction with this system (Burt, 2001). Conferences, workshops and other events aimed at promoting cooperation between universities in the field of digitalisation can also be helpful. These platforms enable exchanges and relationships between universities (Bentley-Goode et al., 2017). Here, either the university management or the level of the faculties and institutes can take an initiating role, working groups can be set up to promote digitization, existing networks and structures can be used, or external partners such as technology companies,

consulting firms, etc. can be involved in order to use resources and knowledge to accelerate digitization. In order to successfully establish networks and cooperations to promote digitization at universities, a combination of these different approaches is certainly necessary.

In addition to guidelines for digitalisation, as summarised in a digital agenda, and supporting measures, the measurement of the impact of digital measures is important. This is because measurement helps organizations understand and optimize the success of their activities and also enables the data-driven decision-making already mentioned several times.

## Methods

The following survey is intended to establish the relationship between administrative digitization and requirements from the target group of administrative employees. The interplay between practical requirements and scientific knowledge interests is intended to open up the service of administrative digitization as a field of design. In this respect, qualitative statements about administration and research in this field had to be collected.

### Conducting and Evaluating Expert Interviews

For the present study, guideline-based, qualitative expert interviews were conducted with various actors from administration, science and business (N = 18). The survey period lasted from September 2024 with a workshop at the Conference of the National Society of Public Administration Informatics to the integration and writing in February 2025. The interviews were recorded, transcribed, and then evaluated by means of content-structuring content analysis (according to Mayring). The aim was to identify central topics, challenges and solutions in the context of smart cities, digitalisation and administrative practice with regard to synergies with the control logics of knowledge companies. Two interviews could not be used due to irreconcilable conclusions about the person.

The statements of the experts were anonymized and summarized in the form of table statements. The sample was determined with the minimum criteria of a minimum three-year-old member of the status group as well as corresponding disciplinary responsibility in the field. The assignment was made according to the main focus of content. The evaluation was carried out deductively along predefined categories (e.g., challenges, funding structures, reuse, cooperation, sustainability) and was supplemented by inductive category formation when new topics arose.

The following table summarizes the central statements of the experts surveyed, differentiated according to content-related topics. The assignment was made in functional clusters. Anonymization is carried out by generic actor designations with the first letters of first and last names.

**Table 1**

*Table Statements of the Expert Interviews*

Actor (anonymized)	Central message	Context/Description	Interpretation	Implication
NT (Science)	“Smart city projects are increasingly benefiting from neural networks, especially in the area of	use of AI technologies in urban development, e.g. pattern recognition in traffic flow	AI is seen as a key technology for data-based optimization (cf. Kitchin, 2014).	Investments in AI skills and data infrastructure are necessary.

Actor (anonymized)	Central message	Context/Description	Interpretation	Implication
	traffic and energy management.”			
MW (Science)	“Smart cities and eGovernment can benefit from each other, but short-term subsidies make little sense because funding opportunities are too bureaucratic.”	funding structures, synergies between Smart City and eGov	criticism of short-term, project-related subsidies; Need for long-term, flexible programs (cf. Bogumil & Holtkamp, 2022).	Reform of funding practice, reduction of bureaucracy.
MR (Municipal representation)	“Bad investments and cost-intensive reuse are major risks in digital projects.”	cost-effectiveness, lifecycle of digital solutions	Subsequent use and sustainability are criticized as insufficiently planned (cf. Schuppan, 2020).	Development of exit strategies and reuse concepts.
MS (Science)	“Digital conferences facilitate collaboration, save resources and enable broader participation.”	digitization of communication, home office	Digital tools are perceived as drivers of efficiency (cf. Mergel et al., 2019).	Expansion of digital infrastructure and skills.
TK (Administration/Science)	“Municipal umbrella associations should work more closely together in order to exploit synergies and pool resources.”	cooperation, advocacy	Fragmentation is seen as an obstacle; Networking as a solution (cf. Kuhlmann & Wollmann, 2019).	Promotion of network structures and exchange platforms.
HR (Science)	“The workload for digitization is initially high, but merging municipal data centers can help to share resources.”	Resource Management, IT Infrastructure	Initial expenditure as an investment, shared services as an efficiency Strategy (cf. Lenk, 2017).	Promotion of joint IT structures.
DF (Science)	“Sustainability must be a central goal of digital projects, both ecologically and socially.”	sustainability, longevity	Sustainability as a leitmotif, not just technical progress (cf. Hilty & Aebischer, 2015).	Integration of sustainability criteria in project evaluation.
JV (Science)	“We are experiencing digital turning points, but the state is not acting professionally enough to leverage potential.”	digitalization, administrative culture	Lack of willingness to innovate and professionalism (cf. Mergel, 2016).	Professionalization and change management in administration.
KG (Administration)	“Digitization creates more time for substantive work if processes are consistently automated.”	process digitalization, efficiency	Automation as a means of relief (cf. Schuppan, 2020).	Focus on process optimization and automation.

Actor (anonymized)	Central message	Context/Description	Interpretation	Implication
HH (Administration)	“Conferences must make economic, social and technical sense in order to find acceptance.”	event formats, hybrid events	Holistic demand on digital formats (cf. Bryson et al., 2020).	Development of integrated event strategies.
HK (Economy)	“Many contacts with municipalities, state supports, fire brigade receives operational data in real time, but federalism makes reuse difficult.”	data management, federal structures	Real-time data as progress, but fragmented responsibilities as an obstacle (cf. Kuhlmann & Wollmann, 2019).	Harmonization of standards and interfaces.
HA (Science)	“Environmental databases and collaborations with Helmholtz and coastal research have existed for 25 years and form a valuable knowledge base.”	Scientific Cooperation, Data Management	Long-term cooperation as a success factor (cf. Hilty & Aebischer, 2015).	Strengthening research networks and data infrastructures.
VS (Science)	“Science takes over, administration is unattractive, modernization is necessary to attract talent.”	attractiveness of the administration, shortage of skilled workers	Administration as an unattractive employer, modernization as a solution (cf. Mergel, 2016).	Employer branding and modernization of working conditions.
WI (Administration)	“We see ourselves as a bridge builder between research and administrative practice in order to transfer innovations.”	knowledge and innovation transfer	importance of interface actors (cf. Bryson et al., 2020).	Funding for transfer offices and real-world laboratories.
VK (Economy)	“There are career changers from the business world and technical networking, but clear regulation and service management concepts are needed.”	Personal, Governance	Need for governance structures and service orientation (cf. Lenk, 2017).	Development of service management and regulation.
MR (Administration/Science)	“Federalism and digitization do not go together, nationwide structures would be better for scalability.”	structural debate, digitalisation	Criticism of federal structures, call for centralization (cf. Kuhlmann & Wollmann, 2019).	Discussion about centralization and standardization.

## Evaluation and Interpretation Logic of the Results

The evaluation of the guideline interviews was based on the qualitative content analysis according to Mayring (2015). Both deductive categories (pre-defined, e.g., “funding



structures”, “sustainability”, “governance”) and inductive categories (developed during the analysis, e.g., “employer branding”, “shared services”) were used. The transcripts were read several times, relevant text passages were coded and then condensed using text analysis (Mayring, 2015).

The statements were assigned to the following main categories:

- innovation and technology transfer (e.g., AI, neural networks, databases)
- funding structures and resources (e.g., funding practice, bureaucracy, shared services)
- governance and organization (e.g., federalism, cooperation, regulation)
- sustainability and reuse (e.g., ecological, social and economic aspects)
- Attractiveness and modernization of the administration (e.g., employer branding, professionalization)
- Process optimization and efficiency (e.g., automation, digital conferences)
- Transfer and interface management (e.g., bridge builders, real-world labs)

According to this categorization, the objects of interpretation can be aggregated into the following statements:

### ***Innovation and Technology Transfer***

The integration of new technologies such as AI and neural networks is seen as central to the development of smart cities. Scientific cooperation and long-term databases are emphasized as success factors (Hilty & Aebischer, 2015; Kitchin, 2014). The administration must build up competencies and infrastructures in order to exploit this potential.

### ***Funding Structures and Resources***

Short-term, bureaucratic funding programmes that make sustainable development more difficult are criticised (Bogumil & Holtkamp, 2022). Instead, long-term, flexible and less bureaucratic funding structures are demanded. Shared services and the merger of municipal data centres are mentioned as solutions for pooling resources (Lenk, 2017).

### ***Governance and Organization***

Federal structures are seen ambivalently: on the one hand, they enable local adaptations, on the other hand, they make standardization and reuse more difficult (Kuhlmann & Wollmann, 2019). The need for clear governance structures and service management concepts is emphasized.

### ***Sustainability and Reuse***

The sustainability of digital projects is highlighted as a central goal, both in an ecological and social sense (Hilty & Aebischer, 2015). Bad investments and lack of subsequent use are mentioned as risks. There is a need for life cycle management and reuse concepts (Schuppan, 2020).

### ***Attractiveness and Modernization of the Administration***

The administration is perceived as unattractive for skilled workers. Modernization, employer branding, and the improvement of working conditions are cited as central levers for attracting talent (Mergel, 2016).

### ***Process Optimization and Efficiency***

Digitization and automation are seen as a means of increasing efficiency and relieving the burden on employees (Schuppan, 2020). Digital conferences and tools are rated as resource and time savers.

### ***Transfer and Interface Management***

The role of bridge-builders between research and administration is emphasized as essential for innovation transfer (Bryson et al., 2020). Transfer points and real-world laboratories are identified as suitable formats.

### **Merging, Synthesis and Limitations**

The analysis shows that successful digitization in municipalities and administrations requires an interplay of various factors: technical willingness to innovate, sustainable funding structures, effective governance, attractive working conditions, and functioning interfaces between science and practice. The challenges lie particularly in overcoming bureaucratic hurdles, harmonizing federal structures, and developing sustainable reuse concepts.

Qualitative content analysis enables a systematic condensation of expert statements, but is dependent on the subjective interpretation of the researchers (Mayring, 2015). The selection of experts and the focus on certain topics can limit generalizability. Nevertheless, the insights gained provide valuable impetus for the further development of smart city and digitization strategies.

## **Conclusion**

In summary, digitalization can support the management of higher education institutions in many ways and help address governance requirements due to budgetary constraints. Some of them are:

- Increased efficiency: With automating processes and routine tasks, costs can be reduced and efficiency increased. More efficient management can help meet governance requirements even with limited resources.
- Improved information management: Digital platforms make it possible to manage information more effectively, which can be essential for compliance with governance regulations. With the help of digital systems, relevant information can be collected, stored and retrieved more easily.
- Transparency and accountability: Digital technologies can promote greater transparency and accountability, which also contributes to governance compliance. This can be achieved by tracking goals and achievements on digital platforms.
- Strategic decision-making: Digital data analytics tools can help management make strategic decisions by providing valuable insights into trends and patterns. This helps university managers make informed decisions and use resources efficiently.

In addition, it is important that university governance takes into account aspects such as data-driven governance, digital sovereignty and interoperability, as well as cooperation and networking. Finally, improved digital competence in management can better meet the requirements of governance by harnessing the full potential of digitalization. Implementing a

solid digital strategy can help address the multiple challenges of governance tasks in times of limited budgets.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

Generative AI and AI-assisted technologies were used in the writing process to improve the language and readability of this paper. The use of the technology was carried out under human supervision and control and all work was carefully checked and post-processed.

## References

- Alshaer, I. M. A., Al Shobaki, M. J., & Abu Naser, S. S. (2017). Governance of public universities and their role in promoting partnership with non-governmental institutions. *International Journal of Engineering and Information Systems*, 1(9), 214–238.
- Bentley-Goode, A., McMillan, J., & Raftery, A. (2017). Network ties and the internationalisation of accounting and law networks: An examination of global and business focus networks. *The British Accounting Review*, 49(3), 263–284.
- Berger, F., Galati, N., & Witteler, S. (2023). Interoperability in higher education. Key challenges and solutions for the further development of European university alliances. *Higher Education Forum Digitization: Working Paper No. 72*  
[https://hochschulforumdigitalisierung.de/wp-content/uploads/2023/09/HFD\\_Arbeitspapier\\_Nr.72\\_Interoperabilitaet.pdf](https://hochschulforumdigitalisierung.de/wp-content/uploads/2023/09/HFD_Arbeitspapier_Nr.72_Interoperabilitaet.pdf)
- Bircher, J. (2016). Leadership in academic health centers in the US: a review of the role and some recommendations. *Health Services Management Research*, 29(1), 2–9.
- Bogumil, J., & Holtkamp, L. (2022). *Local Politics and Administration* (4th ed.). Springer VS.
- Bryson, J. M., Crosby, B. C., & Bloomberg, L. (2020). Public Value Governance: Moving Beyond Traditional Public Administration and the New Public Management. *Public Administration Review*, 80(4), 665–674. <https://doi.org/10.1111/puar.13237>
- Burt, R. S. (2001). Structural holes versus network closure as social capital. In N. Lin, K. S. Cook, & R. S. Burt (Eds.), *Social capital: Theory and research*. Routledge.
- Clark, C. (2018). New version of coral erm. *Journal of Electronic Resources Librarianship*, 30(2), 99. <https://doi.org/10.1080/1941126X.2018.1465521>
- Crawford, J.; Percy, A.; Kelder, J. A. (2020). Connection, digital education, and student-centric teaching practice before COVID-19. *Journal of University Teaching and Learning Practice*, 17(3), 1–7.
- Federal Statistical Office (Destatis). (2018). *Finance and taxation*.  
[https://www.destatis.de/DE/Service/Bibliothek/\\_publikationen-fachserienliste-14.html](https://www.destatis.de/DE/Service/Bibliothek/_publikationen-fachserienliste-14.html)
- German Council of Science and Humanities. (2018). *Recommendations for the further development of the dual system of higher education and federal-state funding for research and innovation*. [https://www.wissenschaftsrat.de/download/2022/9699-22.pdf?\\_\\_blob=publicationFile&v=13](https://www.wissenschaftsrat.de/download/2022/9699-22.pdf?__blob=publicationFile&v=13)
- Gilch, H., Beise, A. S., Krempkow, R., Müller, M., Stratmann, F., & Wannemacher, K. (2019). *Digitalisation of universities: Results of a focus study for the Commission of Experts on Research and Innovation* (No. 14-2019). Studies on the German Innovation System.

- Hense, J., Buntins, K., & Hochbauer, M. (2023). *Digital Sovereignty in the Digitization Strategies of German Universities*. *Higher Education Forum Digitalization*: Working Paper No. 75 [https://hochschulforumdigitalisierung.de/wp-content/uploads/2023/12/HFD\\_AP\\_75\\_digitale\\_Souveraenitaet.pdf](https://hochschulforumdigitalisierung.de/wp-content/uploads/2023/12/HFD_AP_75_digitale_Souveraenitaet.pdf)
- Hilty, L. M., & Aebischer, B. (2015). *ICT Innovations for Sustainability*. Springer.
- Johnson, R. (2020). Enhancing Efficiency in Higher Education Through Interoperability. *Higher Education Policy & Management*, 42(1), 53–68.
- Karcianas, N., Koutsouris, N., & Stergiou, C. (2020). Digital sovereignty: Opportunities and challenges for public administrations. *Public Administration Review*, 23(4), 567–578.
- Kehm, B. M. (2020). Understanding Governance in Higher Education: International, National, and Institutional Perspectives. *International Journal of Educational Development*, 78, 102219.
- Kitchin, R. (2014). *The Data Revolution: Big Data, Open Data, Data Infrastructures and Their Consequences*. Sage.
- Kuhlmann, S., & Wollmann, H. (2019). *Introduction to Comparative Public Administration: Administrative Systems and Reforms in Europe*. Edward Elgar.
- Lenk, K. (2017). Shared Services in Public Administration: Potentials and Challenges. *Administration & Management*, 23(2), pp. 67–74. Shared Services in Public Administration: Potentials and Challenges. *Administration & Management*, 23(2), 67–74.
- Lübcke, M., Bosse, E., Book, A., & Wannemacher, K. (2022). *Future concepts in sight? Effects of the Corona pandemic on the strategic development of higher education*. *Higher Education Forum Digitalization*: Working Paper No. 63 [https://hochschulforumdigitalisierung.de/wp-content/uploads/2023/09/HFD\\_AP\\_63\\_Zukunftskonzepte\\_in\\_Sicht\\_Corona\\_HIS-HE.pdf](https://hochschulforumdigitalisierung.de/wp-content/uploads/2023/09/HFD_AP_63_Zukunftskonzepte_in_Sicht_Corona_HIS-HE.pdf)
- Mayring, P. (2015). *Qualitative Content Analysis: Fundamentals and Techniques* (12th ed.). Beltz.
- Mergel, I. (2016). Digital Transformation of the German State: Recent Developments and Future Directions. *Government Information Quarterly*, 33(3), 541–546.
- Mergel, I., Edelmann, N., & Haug, N. (2019). Defining Digital Transformation: Results from Expert Interviews. *Government Information Quarterly*, 36(4), 101385.
- Morley, L. (2013). The rules of the game: Women and the leaderist turn in higher education. *Gender and Education*, 25(1), 116–131.
- Öztemel, E., & Gursev, S. (2020). Literature review of Industry 4.0 and related technologies. *Journal of Intelligent Manufacturing*, 31(1), 127–182.

- Pritchard, A., Morgan, N. J.; Ateljevic, I. (2020). Hopeful tourism: A new transformative perspective. *Annals of Tourism Research*, 80, 102883.
- Roberts, T., & Fisher, T. (2017). Technological advancements and the impact of interoperability in higher education administration. *Journal of Management in Education*, 31(4), 160–175.
- Schulz, T. (2019). Digital sovereignty: An analysis of policy objectives and implementation problems. *Telecommunications Policy*, 43(9), 101823.
- Schuppan, T. (2020). *Digitization of Administration: Basics, Concepts and Practical Examples*. Springer VS.
- Selwyn, N. (2016). *Is technology good for education?*. John Wiley & Sons.
- Smith, R. (2018). Interoperability in Higher Education: Benefits and Challenges. *Journal of Computing in Higher Education*, 30, 317–334.
- Stensaker, B., & Vabø, A. (2013). *The past and future of knowledge and higher education: dynamics and changing problem agendas*. In *The Reform of Higher Education in Norway*. Palgrave Macmillan.
- Weisflog, W., & Böckel, A. (2020). *A student view of the digital turn. Evaluation of a nationwide survey by students for students*. Higher Education Forum Digitization: No. 54 [https://hochschulforumdigitalisierung.de/wp-content/uploads/2023/09/HFD\\_AP\\_54\\_Studierendenbefragung.pdf](https://hochschulforumdigitalisierung.de/wp-content/uploads/2023/09/HFD_AP_54_Studierendenbefragung.pdf)
- Weissinger, T. (2018). The Challenges of Digitization for the Administration of Universities. In H. Krcmar, R. Welker, & W. W. Wittig (Eds.), *Information and Communication Technologies in Public Administration: Innovations from Developed Countries* (pp. 57–74). CRC Press.
- Willcox, K. E., Sarma, S., & Lippel, P. H. (2016). *Online Education: A Catalyst for Higher Education Reforms*. MIT Office of Digital Learning.
- Zuiderwijk, A., Janssen, M., & Jeffery, K. (2020). Privacy by design in big data: A systematic review of privacy-preserving architectures. *Archives of Data Science, Series A*, 5(1), 1–28.

**Contact email:** christian.schachtner@hs-rm.de

## **Monologue in *Polyglot, How I Learn Languages* by Kató Lomb: Still a Viable Language Learning Strategy?**

Osaruese Oghogho Osawaru, University of Benin, Nigeria

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This empirical study examined the usability of monologue for improving oral expression in foreign language learning following the stance of Kató Lomb in her book: *Polyglot, How I Learn Languages*. Consequently, the study is a descriptive survey on the usage of monologues by university foreign language students who are currently undergoing a French language immersion program in an inter-university center. The essence was to ascertain whether they consider monologues as a useful strategy in developing oral expressive skills in French as a foreign language (FFL). The findings revealed that many of them depend on monologues for developing their oral expression. It was concluded that monologue should be expressly taught in the foreign language classroom as a strategy for developing oral expression skills.

*Keywords:* monologue, foreign language learning, oral expression, Kató Lomb

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Strategies for language learning appear to be invaluable considering how foreign language educators are constantly seeking ways to develop the language skills of learners in the target language. The essence of language is basically for communication, hence language learning should be pragmatic (Lomb, 2008). Whilst the oral and written comprehension as well as the written expression of the target language are also important in language development, the oral expressive skill also known as speaking, is more glaring and evidential that language learning is taking place. Usually, the high usage frequency and spontaneity linked to speaking make many language educators pay rapt attention to developing it. Moreover, the development of oral expression can also develop other communication skills. Learners can benefit from their speaking to better sift/identify sound, rhythm, intonation, liaison and other characteristics of the language for better oral comprehension. Through the development of oral expression, learners can achieve better pronunciation and understanding when they read. Plus, the conception and structuring of ideas that precede speaking can aid learners in developing their written expression.

In foreign language learning, many strategies are taught by teachers and learned by students in order to make the language learning process more concrete and practicable within and outside the classroom. Some of these strategies involve activities of quiz, repetitions, singing and debate, while some others explore dialogues and varying types of narrations during dramatization and role-playing activities. Clearly, the essence of these strategies and activities are geared toward making learners actively participate during learning activities while interacting more confidently in the target language with colleagues and teachers. Dramas and role playing observably rank very high in strategies and activities that develop oral expression because they promote verbal exchange in the classroom especially through dialogues. Consequently, dialogues are highly considered a drama/role play characteristic that greatly helps language learners develop their oral expression. Even though monologues also greatly help language learners with confidence, accuracy and fluency especially during personal preparations for oral production in class activities/presentations, little or no attention is given to its teaching or usage during class activities. It is often neglected as a language learning strategy, perhaps because it is mainly used in private. Still, some learners are seemingly oblivious that they get involved in it from time to time. Also, some other learners may need to be aware of monologues and how they can use it in improving their oral expression skill.

Often in foreign language learning classes, when learners are preparing for individual presentations, they are encouraged to rehearse on their own and before peers who can make meaningful contributions to the successful presentation. When learners do this, they are involving themselves in some form of monologue as they are solo speakers speaking to themselves or to a few persons. As Abishova (2022) puts it, "... A monologue is an organized type of speech, which is the product of an individual utterance of one person addressed to the audience in order to achieve the necessary impact on the listener ..." (p. 215). Thinking, rethinking, organizing and rehearsing formal or informal speech before the delivery day may be a general human activity that has found its way into foreign language learning. The goal of this is often for precision, accuracy and confidence in delivery of the presentation. For some people, practice with self, especially before the mirror is all they need to do for an excellent presentation delivery while for some others, they will require a small audience of a few persons. For instance, Kató Lomb in her book: *Polyglot, How I Learn Languages* (2008), talks about spending time tinkering with the target language every day and if time is short, at



least a 10-minute monologue could be done. Hence, “Monologues are manifold in their nature” (Pavliková, 2019, p. 89). Learners may therefore be involved in varying types of monologues without even being aware of it. It is observed that even though many foreign language educators are aware that learners practice the target language on their own, neither them or the learners may necessarily call this activity a monologue of some sort. The purpose of this study therefore is to know if and how learners of French as a foreign language consciously and consistently explore monologues with the aim of improving their oral expression in the target language.

### **Developing Oral Expression in Foreign Language Learning**

Oral expression is a basic language skill that cannot be ignored in language learning. Though Pavliková (2019) says a vast majority of conversations is through oral communication, in this paper it is seen that it is actually a vast majority of spontaneous and simultaneous conversations that is exclusively done through oral expression. Speaking is the ability to convey messages using verbal and non-verbal means with accuracy and fluency to listeners in order not to distort the meaning and understanding of the message transmitted. To Mohamed et al. (2020), accuracy involves using good grammar, pronunciation and vocabulary when speaking. While fluency is speaking smoothly with normal speed, without unnecessary pause, hesitations, repetitions or self-corrections. For learners to attain this level of accuracy and fluency, they must have mastered the linguistic and sociolinguistic aspects of language. In the linguistic aspect is where grammar and vocabulary are domiciled and in the sociolinguistic aspect, how the target language interacts with the society and culture where it is used becomes the focus. To Mohamed et al. (2020), as learners speak the target language, they learn the appropriate socio-cultural codes for each communicative situation. For some learners, acquiring all of these knowledge before speaking can be said to take place may seem daunting. Clearly, developing the speaking skill can be challenging due to these different elements of grammar, vocabulary, pronunciation, communicative/interactive ability, speech styles, language function and sociocultural norms (Karpovich et al., 2021; Mohamed et al., 2020). For this, foreign language educators consistently seek strategies to engage learners in many speech situations within and outside of the classroom. Clearly, the more learners participate in speech acts, the more opportunity they have to practice the knowledge they have acquired as well as gain new knowledge from who and what they are interacting with.

Speaking is done in a variety of situations and foreign language learners may not always be pre-informed about small talks or conversations that may come their way regularly. In other words, not many speaking scenes are planned for. Hence, language learners expose learners to many speech circumstances for them to practice, as well as to learn and unlearn misconceptions. However, in some of these speech situations, monologues may be missing because it does not quite give opportunity for verbal exchange. To corroborate this, Karpovich et al. (2021) reiterate that speaking skill needs much practice and exercise to be mastered. And, in a bid to encourage speaking, “teachers have continued to teach speaking just as a repetition of drills or memorization of dialogues” (Mohamed et al., 2020, p. 2). As important as drills and dialogues are in improving oral expression, they can hardly tackle the persistent challenges of speaking the target language outside the learning space. Learners can participate in the drills and dialogues in class but become unable to express themselves outside of the classroom structured dialogue arrangement. Major challenges of oral expression to foreign language learners are usually lack of confidence, anxiety and insufficient background knowledge of the language, (Pavliková, 2019). Even though Mohamed et al. (2020), assert that learners gain confidence when in any communication

circumstance, they are able to speak, monitor and control their speech, getting learners to the level where they can monitor and control their speech to gain confidence may not be effectively done outside without teaching and encouraging learners to engage in monologues before coming for lessons. To Lomb (2008), monologue may seem simple or obvious, but it is rarely incorporated into the foreign language learning program.

### **Monologue for Language Learning**

Monologue is a term largely associated with drama and whilst drama has for a long time been recognized and openly used as strategy for foreign language learning, some of its characteristics like intrigue, characterization, narration and dialogue have equally been except for monologue. It appears that many language educators are silent about using monologues for language learning even when they perceive that some learners rely on it when preparing for lessons and class activities. A monologue means many things and can be part of conversations as stories, speeches, reports or lectures (Abishova, 2022; Pavliková, 2019), and it could be that some learners may not be aware that they even use it in their independent and private study. Karpovich et al. (2021) define monologue as:

the individual oral work of students with the aim of practicing all the areas of the language system, which enhances both the language skills and the student's self-confidence. They require a clear task and time for preparation, which is followed by the performance. (2021, 3)

Whenever learners practice what to say or do with the target language before the real action, they are engaged in a monologue. The practice time may serve as an opportunity for the learners to take care of the linguistic and sociolinguistic aspects of the language, organize their thoughts and properly articulate them through oral expression. Abishova (2022) corroborates this by adding that through monologues, formulation of thoughts can take place. And these thoughts can become speeches. To Pavliková (2019), a monologue can be very helpful as it aids learners in all areas of the language system. In a research with adult learners of a foreign language, it was discovered that through monologues, the learners had sustained conversations, had no recourse to the mother tongue and could even think in the target language. They also broadened their knowledge on varying topics in the target language. Karpovich et al. (2021) also found monologues very helpful at improving first year students' use of the target language. However, the class presentations, where the product of monologue was displayed, was time consuming and some learners who had earlier presented became bored when ongoing presentations seemed unending (Pavliková, 2019).

Due to the benefits that accrue from monologue, it is now considered a strategy worth developing openly in the classroom. To Karpovich et al. (2021), a monologue speaking task where learners can systematically and independently work with language materials in order to receive information, process it, then produce and deliver their own thoughts orally from it in a logical and coherent manner is key. In achieving this, an up-to-date list of key vocabulary retrieved for each monologue is required. For Karpovich et al. (2021), these activities produce worthwhile and interesting successes within a short time because challenges bordering on shyness, fear, anxiety, lack of confidence and motivation on the part of the learner are largely eliminated. Abishova (2022), advocates retelling of materials read or heard as very helpful in developing monologue speech. Here, the learners listen to short and simple texts. Thereafter, they ask questions about each sentence, receive responses from themselves in full sentences and at the end, they retell the entire text. To Abishova (2022), the retelling

can also be a creative one where the learners listen to the beginning of a text and come up with an ending, tell the whole text and come up with a title for it. Consequently, whereas a monologue is an individual activity, also considered as an inner monologue (Karpovich et al., 2021; Pavliková, 2019), it can equally take place within a small group (Abishova, 2022).

### **Kató Lomb's Monologue for Learning Languages**

Kató Lomb (1909-2003), an enthusiast of monologues, who endorses inner monologues, is the author of *Polyglot, How I Learn Languages* was indifferent to foreign languages in secondary school and studied Chemistry at the University. She did not believe in the innate ability to learn languages. Rather, she believed that language learning is time-intensive, deliberate and born out of genuine interest as well as dedication. Her learning of foreign languages started off as an adult with English in 1933 when she wanted a job as a teacher. Afterwards, she learnt Russian and soon learnt about 16 languages in total. In these languages, she could do interpretation and translation jobs for business and state concerns. In the 1950s, she became one of the world's simultaneous interpreters. Even though she agreed to not having the same level of ability in all 16 languages and translation in some of them require more time and effort than the others, her achievements are enormous and many language researchers, educators as well as learners believe they would learn some strategies to language acquisition.

To Lomb (2008), “an excellent means to avoid failure in language learning is to practice monologues” (p. 125). As a suggestion for successful language learning, she suggests that learners produce a 10-minute monologue in the morning hours if time was short “tinkering with the language daily” (p.159). Among the many benefits of monologue, Lomb discovered she was able to learn vocabulary and their synonyms often competing with herself. Also, in the course of her learning, she would set her grammar right because “one learns grammar from language and not language from grammar” (p. x). Lomb practiced monologues as an individual activity. She enjoyed talking to herself a lot and prescribed silent/inner monologues to avoid learning bad pronunciation from self and worry of drunkenness from passers-by. To her, with willpower and self-discipline, discussing experiences with self in a foreign language can effectively take place and be a habit. Lomb (2008, p. 65) had some challenges practicing target languages with native speakers because she could rarely find them. Many times, even when she found native speakers, they were impatient with her and one time, the patient person she found was a Buddhist only willing to discuss Buddhism. Clearly, discussions with self can fill the void where nobody appears to be available to speak the foreign language with. Consequently, knowledge of languages can equally be preserved using inner monologue.

### **Research Questions**

The following research questions guided this study:

1. What activities for improving oral expressions do learners of FFL engage in?
2. How do learners of FFL prepare for presentations that require oral expressions?
3. What are the techniques learners of FFL use in preparing for oral expressions?

### **Research Methodology**

A descriptive survey was embarked upon using a google form questionnaire as instrument for the study to elicit data from the 630 students from 33 universities in Nigeria who are

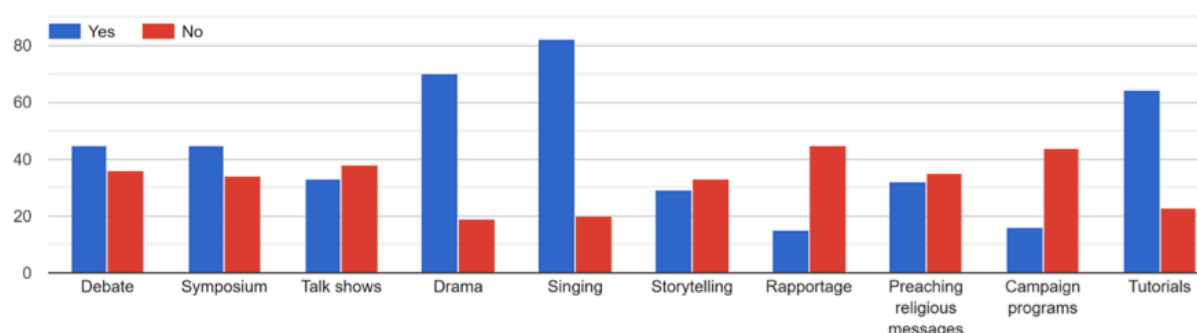
currently in their 5th out of 7 months French Language Immersion Program in a Nigerian Inter-University French Language Immersion center. All of these students have done at least 2 years' French study in their respective universities and the Immersion Program serves as the third year/penultimate year for all of them. Upon their return to their universities, they are expected to resume the final year of their French studies. The google form was sent to the students' WhatsApp platform that hosts about 620 of them. Following a sensitization on responding to the questionnaire once and anonymously, as well as a window of 3 weeks for responding, a total of 141 responses were retrieved.

## Presentation of Results

### Research Question 1: What activities for improving oral expressions do learners of FFL engage in?

**Figure 1**

*1. Please Tick the Speaking Activity/Activities That You Engage In*



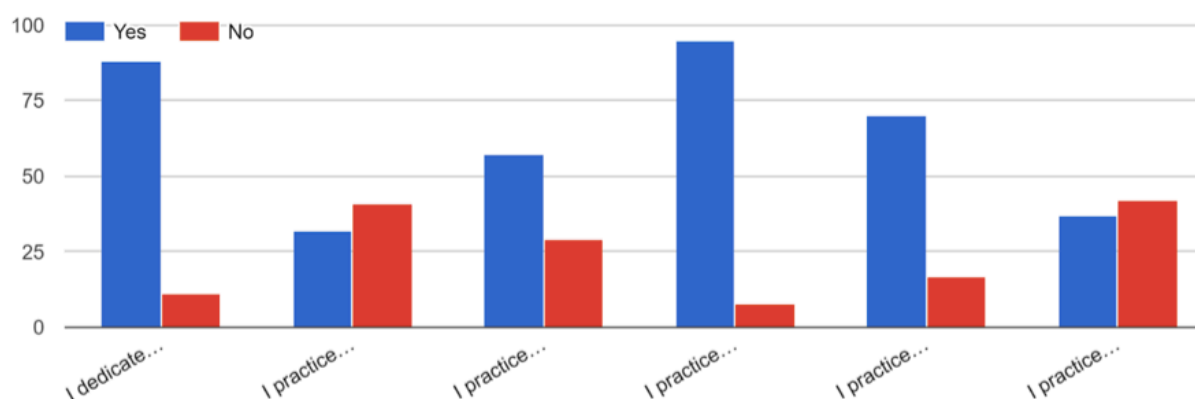
Out of the ten oral expression activities selected for the respondents to choose from, four (debate, symposium, drama and singing) are major socio-educative programs at the Immersion center. The other six are observed major Nigeria campus speaking activities that university students engage in. These data show that all the 141 respondents engage in at least one of the ten speaking activities listed. Only that they engage in varying levels. On a ranking of 1-10, the activities that learners of FFL engage in for improving oral expressions are: Singing, Drama, Tutorials, Debate, Symposium, talk show, preaching of religious messages, storytelling, campaign programs and rapportage.

In singing, 82 out of 102 respondents participate in it while 20 do not. Drama has 70 out of 89 participating in it, while 19 do not. 64 out of 87 respondents use French language for tutorials while 23 do not. The two activities of debate and symposium tie in the fourth position. Out of 81 respondents, 45 agree to participating in debate and 36 do not. In the same vein for symposium, 45 out of 79 participate in it, while 34 do not. In the sixth position for talk shows, 33 out of 71 respondents participate in it while 38 do not. For seventh position, 32 out of 67 respondents use French to preach religious messages and 35 do not. For eighth position, storytelling has 29 out of 62 participants who engage in it while 33 do not. And for ninth position, 16 out of 60 respondents use French for campaign programs, while 44 do not. Rapportage comes 10th in the ranking having 15 out of 60 respondents indicating that they participate in it and 45 saying they do not.

## Research Question 2: How do learners of FFL prepare for presentations that require oral expressions?

**Figure 2**

### 2. How I Prepare for Presentations That Require Speaking French

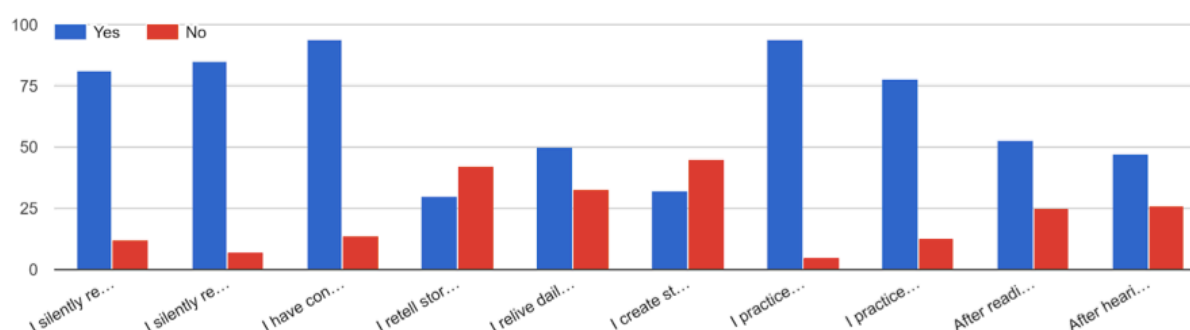


Six categories on how learners prepare for oral presentations were made for respondents to choose from and these data show that many of the respondents engage in at least one of the categories. In a ranking of 1-6, respondents who practice speaking French in front of friends who can correct them rank 1st with 95 out of 103 engaging in it while 8 do not. In the second position are respondents who dedicate some minutes/time every day to practice speaking French before stepping out. Here, 88 out of 99 respondents attest to doing it while 11 say they do not. Next are, 70 out of 87 respondents who practice speaking French in front of anyone willing to listen, while 17 do not. In the fourth position are 57 out of 86 respondents who practice speaking French privately in front of the mirror, while 29 do not. Followed by 32 out of 73 practice speaking French only during general rehearsals, while 41 do not. Finally, 37 out of 79 respondents practice speaking French only when they have oral presentation in class, and 42 do not.

## Research Question 3: What are the techniques learners of FFL use in preparing for oral expressions?

**Figure 3**

### 3. The Techniques I Use in Preparing for French Speaking



To enable the output of oral expression, learners usually develop a technique. 10 of such techniques were selected for the respondents to choose from. These data show that these techniques are well known and utilized by the respondents. In a ranking of 1-10, the techniques that learners of FFL use in preparing for oral expressions are thus:

Two techniques rank first: having conversations with self in French (94 out of 108 respondents) and pronouncing French words correctly to self before speaking out (94 out of 99 respondents). In the third position, 85 out of 92 respondents silently rehearse their speech before talking in French with their teachers and 81 out of 93 respondents silently rehearse their speech before talking in French with friends gets the fourth position. In the fifth position, 78 out of 91 respondents practice new French vocabulary correctly to self before speaking out and after reading a story in French, 53 out of 25 respondents ask and answer questions on it in French with self. In the seventh position, 50 out of 83 relive daily experiences in their thoughts using French and upon hearing a French recording, 47 out of 73 respondents discuss the issues raised in French with self. In the ninth position, 32 out of 77 respondents create stories using French in their thoughts and finally, 30 out of 72 respondents retell stories in French to self.

### **Discussion of Findings**

Singing and drama rank higher than other activities for improving oral expression among the students of French as a foreign language in the immersion center perhaps because, of all the activities, they involve more participants at a time due to their compartmentalization in groups. Hence, during both rehearsals and presentations in either of the singing or drama groups, participants are usually not few. Another factor that could have influenced the ranking of singing and perhaps drama is the number of female respondents in comparison with that of the males. A total of 108 females and 33 males responded to the research questions. Singing and dramatizing are activities that usually have more female than male participants. In other words, the high number of females may have adversely given a boost to the rankings of singing and drama as first and second before all other activities for improving oral expression. The other activities of tutorials, debate, symposium, talk show, preaching of religious messages, storytelling, campaign programs and rapportage are usually on an individual basis during rehearsals and classroom presentation time.

It is an observable common practice in some University Campus settings where students who have a better grasp of course content take time to help other course mates learn course content at their speed and in a more relaxed atmosphere. As tutorials rank third, it is evident that many learners brought into the center from their various universities, this common practice. The students with better knowledge of the language and course content are very intentional about helping their struggling colleagues succeed in the program and by extension, in the foreign language learning venture. For individual students to teach specific course content to the understanding of colleagues, a lot of preparation would have taken place. Perhaps, the type of personal practice would equal that of those who engage in the other activities of debate, symposium, talk shows, preaching of religious messages, storytelling, campaign programs and rapportage. In all of these activities, the individual leading the conversation/presentation is alert and intentional about making a flawless delivery using the target language. Consequently, it becomes imperative to ascertain how the learners prepare to make such deliveries in order to advance reinforcements.

Even though some learners would not be bothered by any class presentation, a majority of the respondents are not only preoccupied with making excellent presentations in class, they are equally very interested in improving their oral expression in the target language to the extent that they not only practice before those that can correct them or before the mirror, but they also practice speaking the target language before anyone available to listen. This appears as a desperate move to work on good pronunciation, make use of vocabularies and expressions as

well as to work on many other aspects of oral expression. It equally reiterates a persistent challenge that learners of foreign languages have. They are in need of more opportunities to practice their oral skills (Lomb, 2008). The learners, knowing that they may sometimes not have people to speak the target language with, are undaunted. They still engage in many inner monologues to enable and improve their overall FFL oral expression.

### **Conclusion**

The general human activity of monologue has found its way into foreign language learning. It is evidently practiced by learners whose consistent agenda is to keep developing expressive skills in the target language. This therefore makes monologue remain a viable tool for language learning that will remain in foreign language learning for a long time considering the few number of people that foreign language students can practice the target language with. Consequently, foreign language educators should consider the deliberate teaching of monologue tasks and features as a strategy for learning foreign languages in the classrooms.

## References

- Abishova, G. (2022). Monologue Speech in a Foreign Language Lesson. *International Journal on Integrated Education*, 5(5), 215–217.  
<https://doi.org/10.31149/ijie.v5i5.3070>
- Karpovich I., Sheredekina, O., Krepkaia, T., & Voronova, L. (2021). The Use of Monologue Speaking Tasks to Improve First-Year Students' English-Speaking Skills. *Education Sciences*, 11(6), 298. <https://doi.org/10.3390/educsci11060298>
- Lomb, K. (2008). POLYGLOT How I Learn Languages, Berkeley Kyoto.
- Mohamed, F. S., Eman Mohamed, A., Ahmed Helwa, H.S.A. (2020). Using Dramatic Monologue for Developing EFL Speaking Skills among Prospective Teachers. *Journal of Faculty of Education*, 121(3), 1–42.
- Pavliková, K. (2019). Use of monologues, games and problem solving activities for the development of speaking skills. *Educational Role of Language Journal*, 2019–1(1). Boosting the Educational Experience of Language.  
<https://doi.org/10.36534/erlj.2019.01.08>

**Contact email:** osaruese.iyamu@uniben.edu



## **SDGs in Cross-School Outdoor Learning: Water Resource Exploration via Cycling**

Cheng Hung Weng, National Taipei University of Technology, Taiwan  
Wen Liang Chang, National Taipei University of Technology, Taiwan

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

The purpose of this paper is to describe the development process of an outdoor education curriculum integrated with the Sustainable Development Goals (SDGs). It was developed by teachers concerned with SDG issues from two riverside schools located in the same river basin but on different tributaries in northern Taiwan. Using the ORID (Objective, Reflective, Interpretive, Decisional) focused discussion method as a framework, the teachers collaboratively developed and refined the curriculum. The course begins with guiding students through outdoor field observations to record findings and establish emotional connections with nature. It then raises awareness of sustainability issues related to the SDGs, using diverse perspectives and criteria to filter information. Finally, through cross-school sharing, discussions, role-playing, and debates, the course examines potential solutions to sustainability issues and encourages value-based judgments. The results show that (1) the course structure, combining outdoor investigations and the ORID discussion method, effectively achieves educational goals related to the SDGs; and (2) after this course, students can apply the method to other sustainability issues, further fostering their love for their homeland.

*Keywords:* SDGs, outdoor education, ORID, water resource, cycling

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Human beings are closely connected to the environment. Teaching programs—especially in science education that involves real-life contexts—are very important. Compared to traditional classrooms that focus heavily on knowledge acquisition and efficiency but lack real-world application, outdoor education facilitates the transformation of knowledge, emotions, skills, attitudes, and behaviors through direct engagement with the outdoor environment, benefiting individuals, families, society, and the planet. To help students develop their cognitive, emotional, and behavioral traits, it is strongly recommended to take them out of the classroom and guide them through inquiry as a problem-solving experience within natural surroundings (Lee, 2020). This approach also encourages students to develop problem-solving skills and make decisions collaboratively (Maesaroh & Sriyanto, 2022). International research also indicates that integrated outdoor curriculum programs, such as those implemented in Ontario, Canada, can significantly contribute to students' engagement and learning outcomes (Valkova, 2017).

The United Nations' 2030 Agenda for Sustainable Development provides guidance on designing curricula that connect students to real-life experiences and their surrounding environments (United Nations, 2015). It also supports educators in identifying sustainability-related issues to create appropriate teaching programs. In Taiwan, schools and educational authorities have increasingly emphasized outdoor education. The "Guidelines for the Establishment of the Outdoor Education Promotion Committee," issued by the Ministry of Education in January 2014, outlined the vision of outdoor education as “learning everywhere, with everyone as a teacher.” Furthermore, the "2016–2019 Outdoor Education Achievement Sharing Session," held by the Ministry of Education in 2019, highlighted Taiwan's alignment with the SDGs and emphasized the integration of outdoor education with history, humanities, subject knowledge, and natural ecology. However, both students and teachers often demonstrate limited ability to connect science with everyday life, highlighting the need for educators to strengthen this connection (Ummuhan & Salih, 2018). Sustainable ways of interacting with the environment are still not fully integrated into all levels of education, and educators continue to face numerous difficulties and challenges. Interdisciplinary, inquiry-based courses in outdoor education remain scarce in the current school curriculum. Students in urban areas have fewer opportunities to interact with nature, while those in rural areas often lack the necessary resources to support outdoor learning. Furthermore, during the COVID-19 pandemic, students around the world were required to stay home for learning, which significantly limited their interaction with the natural environment. On the other hand, both teachers and students have become increasingly familiar with online learning platforms. The implementation of asynchronous courses has enhanced students' data-mining skills and expanded opportunities for inquiry and collaboration. With the widespread use of mobile devices, students can now easily bring their own devices into outdoor learning environments. Therefore, this is an ideal time for educators to leverage mobile technology in outdoor education.

In the post-pandemic era, the role of teachers has shifted from that of lecturers to facilitators. Teachers can scaffold students' learning by guiding them through a process that begins with site selection and route planning and continues through field observations, recording and sharing findings, identifying problems, formulating hypotheses, and engaging in surveying, reasoning, argumentation, and decision-making. These steps all contribute to a comprehensive inquiry-based learning experience. Outdoor education is an inquiry-based learning approach that fosters a connection with nature. In this approach, students are

expected to actively explore the natural environment through observation, investigation, questioning, and problem-solving (Hmelo-Silver, 2004). As inquirers, students must first identify problems they genuinely care about and believe are worth solving. This initial engagement fosters motivation and supports deeper inquiry and research, helping them develop knowledge and skills through the problem-solving process. The ORID method, developed by Laura Spencer of the Institute of Cultural Affairs (USA), is grounded in Kolb's Experiential Learning Model (Kolb, 1984) and was first formally published in *Winning through Participation* (Spencer, 1989). It offers a structured framework for discussions and reflections by guiding participants through a sequence of questions. ORID stands for Objective, Reflective, Interpretive, and Decisional. These four stages help students make objective observations, reflect on their experiences and emotions, interpret the meaning behind their findings, and ultimately make informed decisions or draw conclusions (Institute of Cultural Affairs, 2001).

Therefore, the research question guiding this study was:

“What are the planning and implementation processes involved in developing cross-school collaboration on SDG-related issues using the ORID model?”

## **Theoretical Framework**

### **Outdoor Education**

Numerous research studies have shown that students can develop stronger cognitive, physical, social, and emotional skills when teachers take them outdoors. Teachers who use the natural environment as an extension of the indoor classroom can enhance students' academic achievement and promote lifelong positive behaviors (Ruether, 2018). Compared to traditional classroom-based instruction, students tend to be more active and engaged in outdoor settings (Dettweiler et al., 2015). Engaging in learning activities in outdoor environments not only leads to longer-lasting learning outcomes but also supports cross-disciplinary learning through direct interaction with the natural world (Becker et al., 2017).

1. Students can make meaningful connections between what they have learned and their daily lives.
2. Students learn through multisensory experiences.
3. Students participate in outdoor education with greater motivation.
4. Students have more opportunities to interact with one another through physical movement.
5. Students' social skills are developed throughout the learning process.
6. Students' behavior improves when they are in close contact with nature (e.g., students with ADHD).

Students who live in large cities often have limited access to natural environments. However, teachers can provide opportunities for them to engage with “semi-natural” spaces, such as riversides. It is highly anticipated that students will demonstrate different learning outcomes when participating in such outdoor courses.

### **Inquiry-Based Learning**

Inquiry-based learning can be described as consisting of five general phases: Orientation, Conceptualization, Investigation, Conclusion, and Discussion (Pedaste et al., 2015). It is also regarded as a teaching approach aimed at enhancing students' understanding of scientific

concepts and the nature of science. The learning of subject matter, principles, and critical thinking skills is integrated with scientific knowledge and practice (Kelly, 2008). Students engage in various inquiry-based activities, such as collaborative tasks involving reading, asking questions, planning investigative methods, collecting and interpreting data, drawing conclusions, and generating new insights. These activities extend beyond the sciences into fields such as the social and cognitive domains (Bybee, 2000; Furtak et al., 2012; Hmelo-Silver et al., 2007). According to a study on teachers' perspectives regarding inquiry-based learning, Tal et al. (2019) found that teachers highly valued the outdoor environment for learning and provided insightful suggestions on integrating in-school and out-of-school learning. Based on these findings, it is strongly recommended that educators design courses, implement them in practice, and take students outside the classroom to engage in inquiry-based learning—especially in subjects such as natural sciences and environmental education.

### **ORID Inquiry**

ORID inquiry is based on the four cyclic stages of Kolb's (1984) Experiential Learning Theory. The acronym ORID stands for:

- Objective – The facts: What does the group know about the issue or experience?
- Reflective – Emotional response: What did the group feel about the issue or experience?
- Interpretive – Meaning and learning: What has the group learned from the issue or experience? What do these learnings mean?
- Decisional – Response or evaluation: What conclusions or future actions should be taken?

The ORID process helps group members engage in focused conversations by considering each participant's opinions and evaluating the levels of agreement or disagreement on specific topics. It also facilitates feedback and reflection among participants. When a teacher acts as a guide during outdoor exploration, students may have diverse observational experiences, thoughts, feelings, and judgments. To harness these perspectives, teachers can apply the ORID framework to lead structured, in-depth class discussions and explorations. This helps students identify issues worth exploring and ultimately leads to appropriate solutions.

ORID provides educators with a strong scaffold for instructional design, and its steps should be followed sequentially. Coutts and Roberts (2014) proposed a set of guiding questions, as shown in Table 1.

**Table 1**  
*Workshop Notes on Methods*

ORID Elements	Focus	Suggested questions
<b>O</b> Objective	Getting the facts	<ul style="list-style-type: none"> <li>• What did we do today?</li> <li>• How did we do it?</li> <li>• What do you remember from today?</li> <li>• What did you hear or see?</li> <li>• How many people were there?</li> <li>• Who was involved, what was said?</li> </ul>
<b>R</b> Reflective	Emotions, feelings, associations	<ul style="list-style-type: none"> <li>• How did you feel?</li> <li>• What was your first response?</li> <li>• What other feelings did you experience?</li> <li>• Did you like this or not?</li> <li>• Where do you remember the whole group reacting?</li> <li>• How did your apprehension change or your confidence grow?</li> </ul>
<b>I</b> Interpretive	Value, meaning, purpose, learning	<ul style="list-style-type: none"> <li>• What would you say were the main points?</li> <li>• What did this mean?</li> <li>• What were the main messages?</li> <li>• What did you learn?</li> <li>• Which of these actions should be first priority?</li> </ul>
<b>D</b> Decisional	Future steps	<ul style="list-style-type: none"> <li>• In what ways can you apply what you saw today to your farm?</li> <li>• How might the things you observed today change what you do on your farm?</li> <li>• What can you or will you use or follow up from today?</li> <li>• What would you say about this event to someone who was not there?</li> </ul>

Source. Coutts J&R. (2014)

## Method

### Classroom Action Research

Action research is an interactive method used to gather information related to teaching, curriculum development, and students' behavior in the classroom. However, traditional educational action research often emphasizes personal reflection by educators, with research contexts largely confined to their own classrooms—therefore limiting generalizability. This study can be regarded as a cross-school Classroom Action Research (CAR) project, in which two researchers from different schools explored the same SDG-related sustainable development topic (i.e., water resource issues) through localized outdoor education programs tailored to their respective teaching contexts. Through online interactions, discussions, and exchanges between teachers and students from both schools, the study aimed to identify universally recognized values. Practitioner inquiry (Orland-Barak, 2009), teacher research (Cochran-Smith & Lytle, 1999; Zeichner, 2003), and technical action research (Kemmis, 2009) can be integrated within the CAR framework. CAR can be seen as a method for determining what works best in a given context to improve student learning. In this study, the researchers—who also served as classroom teachers—aimed to enhance students' learning outcomes related to localized outdoor education through changes in their instructional practices.

## Context of This Study

The two researchers in this study teach at junior high schools located in the metropolitan area of northern Taiwan. The schools are approximately 25 kilometers apart in a straight line and are situated near two tributaries—the Keelung River and the Daham River—both of which feed into the Tamsui River. Each researcher designed and implemented a localized curriculum focusing on water resource issues related to their respective rivers. Taking advantage of this action research opportunity, the two researchers collaborated to co-design the curriculum. Through outdoor education, they guided students to conduct field investigations along the riversides. Under the framework of the ORID inquiry model, students began with observation and documentation, shared their findings with peers, and participated in interactive exchanges between the two schools. Students posed in-depth questions based on their observations and reflections, formulated preliminary interpretations, and ultimately identified suitable solutions through data collection, interpretation, and discussion. In addition, the researchers engaged in ongoing discussions and revisions before, during, and after the implementation of each lesson unit, ensuring that the curriculum design was broadly applicable and suitable for joint implementation by both schools.


## Design

The researchers designed learning activities suitable for outdoor water resource investigations, taking into account the established teaching objectives as well as the learning environments and backgrounds of students from both schools. A teaching module was also developed to guide interactive exchanges between students at the two schools. After each session, the researchers refined the instructional design and adjusted activity details based on student feedback. The final research process design is as shown in Table 2.

**Table 2**

*Steps for the Final Course Implementation*

Researchers clarify educational objectives (refer to SDG issue)	
Researchers design instructional plans with ORID	
School A Local outdoor learning nearby Keelung river	School B Local outdoor learning nearby Daham river
Sharing Observations and Reflections after outdoor activities between schools	
Questions and ideas focused	
Discussion & Problem solving & Decision making between schools	
Researchers evaluate and reflect on the outcomes of students	



Time line



## Participants & Procedures

This action research project has been implemented continuously since 2020, involving approximately 120 eighth-grade students each year (two classes from each school). Despite the challenges posed by the COVID-19 pandemic, the program proceeded without interruption. Students from both schools utilized various online platforms to support collaborative learning: Facebook was used for discussions; Padlet and Google Sites were employed to organize and share findings and reflections from outdoor investigations; and Google Meet facilitated remote interactions, Q&A sessions, and synchronous class discussions. Initially focused on water resource issues, the curriculum expanded to include other SDG-related topics after two years of implementation. These additions introduced more complex inquiries and activities involving value-based judgments—for example, the topic of nuclear power generation. A summary of the course implementation is presented in the section titled Students' Achievement and Reflection.

## Students' Achievement and Reflection

The collaboration between the two schools began in September 2020. In the first year of the partnership, the researchers began by examining the existing curriculum structures of both schools and establishing a mechanism for student interaction. To support collaborative "science reading," the researchers created a Google Site platform where teachers from both schools shared key curriculum content for students to access and discuss (see Figure 1). In addition, a Facebook community was established to facilitate interactive discussions. The two researchers, who also served as subject teachers—one with a physics background (School A) and the other with a mathematics background (School B)—approached the same topics from different curricular perspectives. In addition to sharing course content, the researchers regularly introduced SDG-related sustainability topics on the Facebook platform, encouraging students from both schools to participate in discussions through the comment sections. Each school also hosted unique "highlight courses" through special "expert sessions." For instance, the teacher from School A conducted remote lessons with School B's students via Google Meet, while the teacher from School B led supplementary sessions on Facebook during after-school hours. This stage was considered the "foundational phase" of the collaboration between the two schools.

**Figure 1**

*Google Site Platform for Classroom Interaction Between the Two Schools*



The second stage of curriculum development (September 2021 to June 2022) marked a critical phase for refining and focusing the curriculum structure. During the summer of 2021, the researchers selected SDG-related topics from the existing course themes at both schools, with a specific focus on water resource and energy issues. In the early stages of this phase, several challenges emerged, including suboptimal internet connectivity and students' unfamiliarity with real-time online interaction tools. Interactions between the two schools were primarily conducted on a "class-to-class" basis. For example, during the same class period, the researchers used Google Meet to connect students from both schools (see Figure 2). Students presented pre-prepared reports on water resource topics using PowerPoint. The researchers facilitated interaction and guided Q&A sessions, while also providing feedback and critiques on each group's presentation.

In May 2022, Taiwan experienced a surge in COVID-19 cases, prompting all schools to shift to online learning. Although students involved in this project were more accustomed to remote instruction compared to their peers, it was their first time attending classes entirely from home. This transition introduced new challenges, including technical issues related to software, hardware, and internet stability, as well as difficulties with students' self-discipline and teachers' classroom management. However, after about a month of adaptation, students gradually became familiar with online self-study, digital assignment submissions, and participation in remote video classes and interactions. This experience laid a solid foundation for deeper curriculum collaboration in the future.

**Figure 2**

*Google Meet Connection for SDG6 Reports Between the Two Schools*





In the third year of the course collaboration (September 2022 to June 2023), the world gradually emerged from the threat of the COVID-19 pandemic. After several months of online learning, students—who had spent extended periods immersed in virtual environments via mobile devices and other digital tools—began to exhibit various aftereffects of prolonged online engagement. In response, Taiwan’s education system placed renewed emphasis on promoting outdoor education, enabling students to reconnect with nature. The two researchers, both outdoor sports enthusiasts, had prior experience leading students on bicycle trips to rivers for investigations at their respective schools. Drawing on the ORID-focused discussion method described in the literature, the researchers guided students on bicycle rides along riverside paths to conduct outdoor investigations on water resource issues. After completing their observations, recordings, and reflections, students were encouraged to share their findings, experiences, and questions for further discussion with their peers from the other school through remote collaboration.

The researchers observed that, despite the different routes taken due to the geographical separation of the two schools, this form of sharing not only connected information across different areas of the Tamsui River Basin, but also helped students focus on common water resource issues—such as wastewater treatment, flood prevention, disaster mitigation, and water use efficiency. At this stage, “bicycle outdoor investigations” were formally integrated into the curricula of both schools, serving as a core component of the “O” (Observation) and “R” (Reflection) phases within the ORID framework (see Figures 3 and 4). By this point, the curriculum had shifted from a teacher-led approach to a learner-centered model, in which students identified sustainability issues based on their own lived experiences. The habit of “riding shared bicycles” developed during these outdoor investigations evolved into an actionable plan aligned with the principles of sustainability, promoting the use of eco-friendly transportation. This practice reflects the spirit of sustainable development while fostering environmentally responsible habits among students.

**Figure 3**  
*Students Share Their Observation*



**Figure 4**  
*Bicycle Outdoor Investigations*



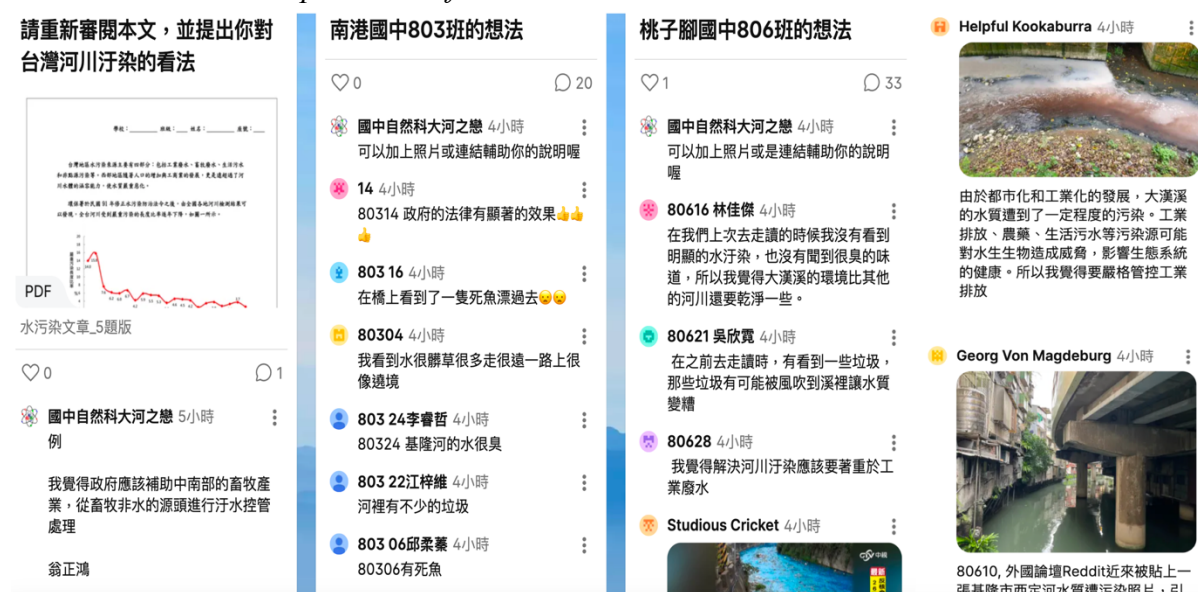
The fourth year of the course collaboration (September 2023 to June 2024) marks a critical year in which the course framework reaches full maturity. Junior high school students entering this academic year have already become familiar with operating online learning software during the COVID-19 pandemic. Their experience with building and using various learning websites has also equipped them with basic abilities for exploration and self-directed learning through the internet.

The Ministry of Education in Taiwan's "One-Tablet-Per-Student Initiative" policy has further enhanced schools' hardware infrastructure, such as mobile devices and internet connectivity. In addition, the development of artificial intelligence, led by tools like ChatGPT, has brought new opportunities to the implementation of this course.

Under the guidance of teacher-researchers, students can now leverage AI to refine the outlines of their reports, design PowerPoint presentations, focus more sharply on discussion topics, and propose more constructive problem-solving solutions as shown in Figure 5. At this point, the role of the teacher has shifted from being an "instructor" to a "facilitator." Similarly, instructional design has evolved from initially "providing inquiry questions" to "creating environments that inspire student inquiry."

**Figure 5**

*Students Use AI to Help Discuss of SDG 6 Issues and Share Them on Padlet*



The primary concern for instructional designers now lies in creating environments that enable students to begin with observation, generate emotional responses, identify issues, move into interpretation, and ultimately propose solutions through decision-making based on their insights.

This instructional model can be effectively adapted to a wide range of SDG-related sustainability issues, serving as a replicable and successful framework for designing SDG-integrated curricula.

## Conclusion

In summary, our findings suggest that implementing the ORID outdoor education inquiry process in a cross-school collaboration setting can effectively achieve the following instructional objectives:

1. Recognize SDG issues as cross-school, cross-regional, and global topics, fostering students' awareness of and concern for diverse environmental issues.
2. Enhance students' interaction with the surrounding natural environment, thereby improving their observational abilities and problem-identification skills.
3. Promote exploration of SDG issues from multiple perspectives through data interpretation and inter-school collaboration.
4. Enable students to conduct in-depth analyses of various dimensions and viewpoints related to SDG issues, helping them develop value-based judgment criteria and make informed decisions.

Based on the experience gained through this project, we propose the following recommendations for future course development:

1. Facilitate more face-to-face cross-school exchanges, such as collaborative outdoor education initiatives.
2. Organize community visits around school campuses to broaden curricular perspectives and strengthen ties to local culture.

3. Integrate bilingual education components to enhance students' readiness for future international collaborations.
4. Develop SDG-themed programs that are open to public participation, thereby raising awareness of environmental education and sustainable development among families and communities.

This course module centers on “water resource issues” as its primary theme, featuring the design and implementation of related outdoor education activities. Through practical classroom application, the module evaluates its feasibility and effectiveness. Moving forward, we welcome collaboration with additional educational institutions interested in SDG-related topics, to further explore curriculum optimization and expand issue-oriented inquiry.

## References

- Becker, C., Lauterbach, G., Spengler, S., Dettweiler, U., & Mess, F. (2017). Effects of regular classes in outdoor education settings: A systematic review on students' learning, social and health dimensions. *International Journal of Environmental Research and Public Health*, 14(5), 485. <https://doi.org/10.3390/ijerph14050485>
- Bybee, R. W. (2000). Teaching science as inquiry. In J. Minstrell & E. H. van Zee (Eds.), *Inquiring into Inquiry Learning and Teaching in Science* (pp. 20–46). American Association for the Advancement of Science.
- Cochran-Smith, M., & Lytle, S. L. (1999). The teacher research movement: A decade later. *Educational Researcher*, 28(7), 15–25.
- Coutts, J. & Roberts, J. (2014). *Workshop Notes on Methods: ORID Question Template*. In The ORID reflection process (pp. illustrate ORID framework and question examples). [PDF Document].
- Dettweiler, U., Ünlü, A., Lauterbach, G., Becker, C., & Gschrey, B. (2015). Investigating the motivational behavior of pupils during outdoor science teaching within self-determination theory. *Frontiers in Psychology*, 6, Article 125. <https://doi.org/10.3389/fpsyg.2015.00125>
- Furtak, E. M., Seidel, T., Iverson, H., & Briggs, D. C. (2012). Experimental and quasi-experimental studies of inquiry-based science teaching: A meta-analysis. Review of *Educational Research*, 82(3), 300–329. <https://doi.org/10.3102/0034654312457206>
- Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, 16(3), 235–266. <https://doi.org/10.1023/B:EDPR.0000034022.16470.f3>
- Hmelo-Silver, C. E., Duncan, R. G., & Chinn, C. A. (2007). Scaffolding and achievement in problem-based and inquiry learning: A response to Kirschner, Sweller, and Clark (2006). *Educational Psychologist*, 42(2), 99–107. <https://doi.org/10.1080/00461520701263368>
- Institute of Cultural Affairs. (2001). *The Technology of Participation: Methods and Tools for Community Change*. Chicago: ICA.
- Kelly, G. J. (2008). Inquiry, activity, and epistemic practice. In R. Duschl & R. Grandy (Eds.), *Teaching scientific inquiry: Recommendations for research and implementation* (pp. 99–117; 288–291). Rotterdam: Sense Publishers.
- Kemmis, S. (2009). Action research as a practice-based practice. *Educational Action Research*, 17(3), 463–474. <https://doi.org/10.1080/09650790903093284>
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.

- Lee, W. S. (2020). *Design and application of augment reality-enriched OLEST*. (Doctoral dissertation, unpublished).
- Maesaroh, M. & Sriyanto, S. (2022). Outdoor Learning with Outbond Variations 21st Century Social Studies Learning Alternative. *Proceedings Series on Social Sciences & Humanities*, 3, 283–287. <https://doi.org/10.30595/pssh.v3i.391>
- Ministry of Education, Taiwan, R.O.C. (2014, January). *Guidelines on the Establishment of the Outdoor Education Promotion Committee*. Taipei: Ministry of Education.
- Ministry of Education, Taiwan, R.O.C. (2019, October). True-world Learning! Outdoor Education Rooting in Curriculum Guidelines. *2016–2019 Outdoor Education Achievement Sharing Session*: Taipei: Ministry of Education.
- Orland-Barak, L. (2009). Unpacking variety in practitioner inquiry on teaching and teacher education. *Educational Action Research*, 17(1), 111–119. <https://doi.org/10.1080/09650790802667485>
- Pedaste, M., Mäeots, M., Siiman, L. A., de Jong, T., van Riesen, S. A. N., Kamp, E. T., Manoli, C. C., Zacharia, Z. C., & Tsourlidaki, E. (2015). Phases of inquiry-based learning: Definitions and the inquiry cycle. *Educational Research Review*, 14, 47–61. <https://doi.org/10.1016/j.edurev.2015.02.003>
- Ruether, S. (2018). Barriers to teachers' use of environmentally-based education in outdoor classrooms. *Walden Dissertations and Doctoral Studies*, 5776. <https://scholarworks.waldenu.edu/dissertations/5776>
- Spencer, L. J. (1989). *Winning through participation: Meeting the challenge of corporate change with the technology of participation*. Kendall/Hunt Publishing.
- Tal, T., Levin-Peled, R., & Levy, K. S. (2019). Teacher views on inquiry-based learning: The contribution of diverse experiences in the outdoor environment. *Innovation Education*, 1(2). <https://doi.org/10.1186/s42862-019-0004-y>
- Ummuhan, O., & Salih, C. (2018). Thematic review of relating science with daily life studies in science education. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education*, 12(2), 350–381. <https://doi.org/10.1016/j.edurev.2015.02.003>
- United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. <https://sdgs.un.org/2030agenda>
- Valkova, K. (2017). *Ontario Outdoor Integrated Curriculum Programs: more than just a "fun semester."* (Unpublished master's thesis). Queen's University, Kingston, ON.
- Zeichner, K. M. (2003). Teacher research as professional development for P–12 educators in the USA. *Educational Action Research*, 11(2), 301–326. <https://doi.org/10.1080/09650790300200211>

**Contact email:** p062@mail.nksh.tp.edu.tw

***O Desterrado* by António Soares dos Reis**  
**Exploratory Workshop With Secondary-Level Art Students**

Ana Lúcia Teixeira da Silva, University of Porto, Portugal

Emílio Remelhe, University of Porto, Portugal

Júlio Dolbeth, University of Porto, Portugal

The Paris Conference on Education 2025

Official Conference Proceedings

**Abstract**

We aim to present, analyze, and discuss the results obtained in an exploratory workshop with secondary-level art students centered in the sculpture *O Desterrado* by António Soares dos Reis, a sculptor who was a pensioner in Paris between 1867 and 1870, studying with professors like Jouffroy, Yvon and Taine. With this workshop, we intended to foster the ongoing research in Artistic Education's field mediated by the museum. For many of us, the Louvre Museum is practically the synonymous of *Gioconda*; the Uffizzi Gallery is *The Birth of Venus*; and the Museu Nacional Soares dos Reis is *O Desterrado*, as symbols of iconicity. We took the latter as our object of study, reclaiming it from its absent status in dominant discourses, shaped by habit and the effect of belief, into a space of scientifically qualified and socially sustainable knowledge, in dialogue with the public. Addressing school-based policies, we search experience to reflect on and develop Ingold's notion of work, considering it in educational practices as a "transmission" pedagogy, embedded in educational practices for "attention". The workshop included drawing and creative writing exercises — the first focused on memory drawing, and the latter based on brainstorming through question listing — stimulating curiosity, participation, and inquiry around the artifact. The dialogue between this workshop and the research project, which includes mediation exercises and other planned actions, proved to be fertile, as it allowed us to observe reactions, emotions, interests and perspectives toward artifacts, as well as the relationship between schools and museums.

*Keywords:* artistic education, workshop, drawing, creative writing, *O Desterrado*

**iafor**

The International Academic Forum

[www.iafor.org](http://www.iafor.org)



## Introduction

We believe that a critical analysis of the belief systems surrounding *O Desterrado* may foster the growth and expansion of perspectives concerning its scientific study. Personal experiences and every day, spontaneous realities can be seen as valuable contributions to cultural and social emancipation—where individuals feel integrated into the formalization of scientific knowledge about the sculpture, viewed through both an anthropological and educational lens.

Anthropology is committed to observing and describing life as we find it, but not to changing it, while art and architecture have the freedom to propose forms never before encountered, without first observing and describing what is already there (...). (Ingold, 2011, p.1)

Motivated by the desire to understand the material from which the scientific knowledge of sculpture is formed, and to distinguish it from the belief systems that shape its context, we developed a series of exercises aimed at approaching *O Desterrado* from a broader perspective—one that takes into account multiple viewpoints. Through the collection of a wide range of information, we aim not only to promote scientific knowledge around the sculpture, but also to foster an emotional and affective understanding of both the piece and its creator.

Recognizing the shared stages between art and anthropology—observing, describing, and seeking meaning—and driven by a proactive engagement with the sculpture *O Desterrado*, we participated in the workshop *O Desterrado de António Soares dos Reis*. The workshop was structured into three distinct phases: a brief introduction and presentation on the sculpture and the artist António Soares dos Reis; a memory-based exercise; and finally, a questioning exercise designed to stimulate critical thinking and analytical possibilities around the sculpture, driven by the power of inquiry.

In this way, the structured experience gathered insights and contributions that helped build knowledge around *O Desterrado*, grounded in the concerns and motivations of the participants. We believe that by encouraging a proactive and participatory attitude within the community, the resulting benefits extend beyond the sculpture itself—to the museum and its audiences as well.

## *O Desterrado*

*O Desterrado*, by António Soares dos Reis, is an iconic work housed at the Museu Nacional Soares dos Reis and a symbol of the city of Porto. Sculpted in Carrara marble, the piece was initiated in Rome but only completed in 1872 in Porto, the artist's hometown. In addition to the final marble version, one can also appreciate the preparatory studies in plaster and bronze, which are currently part of the collection of the Museu Nacional de Arte Contemporânea, in Lisbon.

*O Desterrado* is considered the masterpiece of Soares dos Reis and holds a significant place in art education, standing as one of the most important Portuguese sculptures of the 19th century. We believe its iconic status has been shaped not only by the numerous awards and recognitions received by Soares dos Reis throughout his career, but also by episodes from his tumultuous personal life. These include, for example, the controversy over whether *O*



*Desterrado* was a copy of the statue of Ares at the Baths of Diocletian in Rome, or the case of the *Bust of the Englishwoman*, which—despite having been paid for—was never claimed by the sitter, who did not identify with the austere portrayal created by Soares dos Reis.

For the making of this sculpture, Soares dos Reis was inspired by the poem *As Tristezas do Desterro* (The Sorrows of Exile) by Alexandre Herculano (1810–1877). The figure's solitary posture evokes the Romantic imagination, expressing a deep sense of *saudade* and nostalgia, and reflecting the close emotional and historical relationship between the Portuguese people and the sea. It is worth noting that the sculpture's interlaced hands were modelled from a cast taken of the artist's own hands.

### Figure 1

*O Desterrado* (1872), António Soares dos Reis



National Museum Soares dos Reis

## Methodology

### Public

The workshop was held at the Escola Artística Soares dos Reis, in the city of Porto (Soares dos Reis Artistic School), on January 16th, 2025, and involved 12th-grade students from the Communication Design course.

### Activities' Structure

*O Desterrado* was followed by a series of exercises involving the participants in hands-on experimentation—one focused on drawing from memory, and a second based on questioning, aimed at generating critical reflection on the various contexts surrounding the sculpture. In the final phase, the results were discussed among the participants in order to reflect on their perceptions and the directions taken by the students in response to the theme presented.

### Data Collection Methods

The method used for data collection in this workshop was observation, through which we gathered feedback on participants' reactions and the questions they raised, opening new avenues for reflection around the sculpture *O Desterrado* by António Soares dos Reis. Additionally, this experience allowed us to observe the diversity of relationships established by the participants—both with the sculpture and with its creator—enabling an assessment of

new and alternative materials within the scope of educational practices in museum settings. Finally, a photographic record was made of all the outcomes produced during the two exercises carried out by the students.

## **Framing**

Although it is constructed upon logical concepts and widely recognized by the community, some of the knowledge surrounding *O Desterrado* lacks scientific evidence or verification. Nonetheless, these beliefs are considered part of the conceptual framework and help sustain the relationship between the museum and its audiences, as well as between the public and the artefacts themselves.

It seems common for audiences to arrive at a museum with certain expectations—we encounter prominent pieces that, whether driven by our imagination or by campaigns developed by the museum itself, capture our interest in more subtle or immediate ways.

This workshop aimed to bring art and science closer together, while also distinguishing between them. Our intention was to propose a creative approach *with* and *of* science, contributing material that could make it more diverse and as comprehensive as possible. We understand scientific knowledge as an ever-evolving body of information that must be regularly updated. By merging reason and emotion, personal experiences and multiple perspectives, we discover new means and approaches to understanding the sculpture *O Desterrado*. Something that may appear static within the museum space is transformed within our imagination.

Acknowledging that human beings are shaped by the learning, relationships, creativity, and communication they develop with one another, we highlight the need for knowledge to be constructed in a structured and inclusive way, adapting to the prevailing conditions of contemporary society. In this sense, we believe that the sculpture *O Desterrado* reveals itself as unfinished. We maintain that opinions, beliefs, and all idealizations formed within the realm of imagination regarding a given object allow us to question and activate the necessary tools to assess its possible integration into the domain of science.

## **Objectives**

Our primary goal was to create a meaningful connection between the students, the museum, and the sculpture *O Desterrado*. To achieve this, we designed conditions that supported more independent and critical forms of interaction with art. At the same time, we provided tools intended to help students reflect on the sculpture in practical terms, encouraging an emancipated and autonomous approach. Finally, we also tested different strategies and exercises aimed at supporting the process of knowledge construction around the sculpture, using both visual and verbal methods.

## **Context**

The workshop took place at the Escola Artística Soares dos Reis, in Porto, as part of the celebration of the school's 140th anniversary. It was included in the programme of *Viva' Soares* week—an open week during which the school welcomes the broader community, inviting professionals from various disciplines and offering lectures, workshops, exhibitions, and a range of artistic interventions.

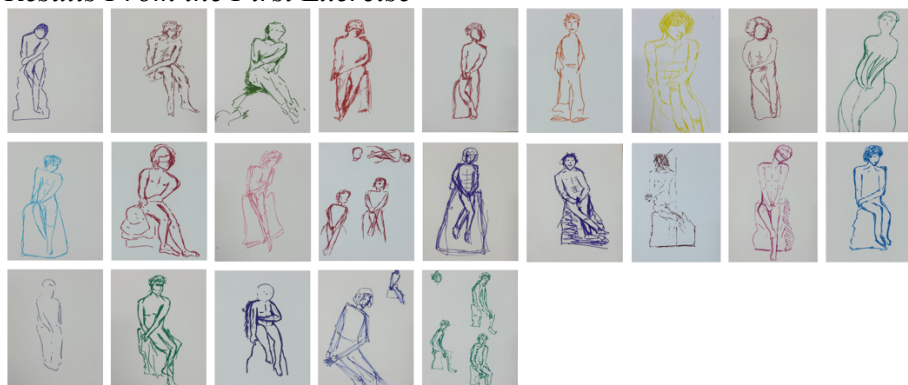
## First Exercise

Participants in the workshop were challenged to draw *O Desterrado* from memory, in a quick sketch lasting approximately three minutes. In doing so, we encouraged students to develop a personal and emotional connection with the sculpture, grounded in their own individual memory.

We observed several elements that persisted in memory and appeared consistently across most of the representations, such as the crossed leg, the bowed head, and the interlaced hands. Acknowledging the sculpture's plasticity and recognizing the importance and symbolism of the hand, we allowed space for speculation and ritualistic interpretations—pointing to the possibility that the hand stands as a symbolic marker in *O Desterrado*, one that bridges scientific knowledge and the realm of belief.

**Figure 2**

*Results From the First Exercise*

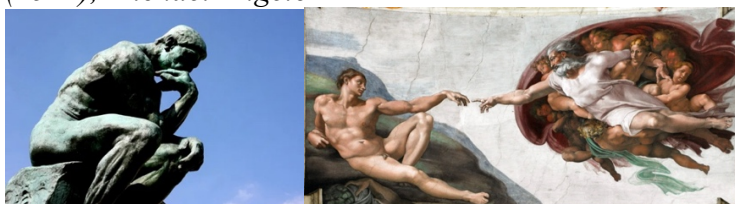


The students proposed the hypothesis that the hands of the sculpture might constitute the most significant symbolic element of the work, representing the delicate boundary between scientific knowledge and the beliefs that shape the symbolic universe of *O Desterrado*. These elements exist for concrete reasons, whether due to physical necessity or to discursive and/or thematic considerations related to the work itself. Indeed, by using his own hands as a mold for creating the sculpture, Soares dos Reis opened a space for the formation of beliefs and a collective imagination that transcend the technical aspects to be evaluated during the formalization of the sculpture as his final residency project.

*O Desterrado* is not an isolated case; there are numerous works that create a collective imagination around the positioning of bodies and, specifically, the expressiveness of hands—examples include Rodin's sculpture *The Thinker* and Michelangelo's painting *The Creation of Adam*.

**Figure 3**

Le Penseur [*The Thinker*] (1904), Rodin and Creazione di Adamo [*The Creation of Adam*] (1511), Michael Angelo



Considering the context and dating of *O Desterrado*, we understand that it is related to poetry and that its creation was conceived from molds—a common practice between the 18th and 19th centuries. However, by using his own hands as a mold, and given the affinity between the sculpture and its sculptor, additional substance is added that feeds into the spectrum of beliefs surrounding the work. It is important to note that the hand, as an organ, carries the marks of the past—such as scars—and serves as confirmation of one's own existence and individuality; it is in the hands that we find fingerprints, the irrefutable means of identification that we possess.

Drawing is not merely the control of hand muscles; it involves mental processes and, in this case, memory structuring. In agreement with Silva (2021), it constitutes a system of relationships between object and concept, container and content, meaning and signifier, matter and expression.

By privileging drawing as a dialogue and viewing it as a mode of reflection without concern for perfect lines, we consider it a representation of thought, promoting and facilitating the learning of knowledge about the subject. Thus, drawing can be part of the process in which the ability to present and develop a problem or idea is demonstrated, serving as a tool for problematization capable of capturing content and procedures. Consequently, the results supported the idea that form perpetuates itself in the present and future as an icon and representation of the collective imagination. Despite its materiality, *O Desterrado* finds part of its meaning in the language and signs it conveys to its viewers.

By adopting an active and interventionist stance, we can analyze these same symbols more deeply and expand the scope of study surrounding their context. It is incumbent upon us to explore the sculpture in a transdisciplinary manner and thus enrich the body of scientific knowledge surrounding it.

### Second Exercise

The second exercise developed from speculation around a central question: could questioning lead to a broader knowledge capable of benefiting all involved? Through the formulation of new perspectives, viewpoints, and idealizations, the students were encouraged to explore different dimensions of the sculpture, assuming an active role as observers.

According to Brun (1991), the possible origin of writing may stem from drawing, transformed into ideograms, then into characters or words formed by letters. We therefore decided to follow this very trajectory for this workshop. If the first phase was devoted to drawing, it seemed ideal to evolve it and organize a second phase centered on writing. Thus, the most challenging moment proved to be the most enriching.

Despite initial reluctance and doubts about completing the task, a considerable number of students managed to achieve the goal. Drawing on Michael J. Gelb's (1999) method of 100 questions, we opened space for exploratory questioning around *O Desterrado* by Antônio Soares dos Reis. Based on Leonardo da Vinci's curiosity and procedures, Gelb explains:

Why one hundred questions? The first twenty or so will be spontaneous. In the next twenty or thirty, themes will begin to emerge, and in the last part of the second half of the list you are likely to discover unexpected but profound material. (Gelb, M., 1999, p. 59)

Our intention here is not specifically to validate this estimate, but to place trust in a proactive and useful working tool through this assertion of effectiveness by the author.

Beyond formal and aesthetic questions related to the sculpture and its formalization, the lists proved quite diverse, revealing a general trend reflected by the participants: concerns about whether Soares dos Reis was financially stable or had other work complementing sculpture. Thus, we understand that as 12th-grade students, on the verge of choosing higher education paths, their own anxieties surfaced.

Our goal was to expand the universe of concerns, without any intention of having their questions answered. The only instruction given was that there were no limits to their questioning and that they could do so informally, whether directed at the sculpture or at Soares dos Reis. We also assumed that the time for the first phase would be determined by the participant who completed the list of 100 questions first. The exercise became a competition among all—three students finished the list simultaneously, so we moved on to the next phase: reducing the list to only 10 questions each considered most pertinent.

There was no criterion or constraint; each student chose according to their own method which questions would advance to the next phase. Some lists narrowed down to a single theme; others seemed more dispersed, with very different questions; some reflected personal concerns; others expressed disturbances that appeared to belong to the sculpture itself.

With the lists reduced to only 10 questions, these showed a closer relation to the realm of artistic education—they frequently associated the sculpture with painting and addressed formal, technical, and aesthetic issues.

**Figure 4**  
*Results From the Second Exercise*



Given the limited time and the growing enthusiasm of all participants, we quickly moved to the final phase — choosing the question they would most like to see answered by *O Desterrado* itself or by Soares dos Reis. The questions were related to the following categories:

Posture of the sculpture: Why are the hands crossed? Why is it bent over? Why is it not standing upright? Why is the head tilted? Was this position chosen by the artist or was it part of the exercise?

Materials, techniques, and creative processes: Why is the sculpture life-sized? Why does the rock include maritime elements? What materials were used? What tools were employed? How was the process carried out? How does light interact with the artwork? Since the piece is part of the Romantic movement, do people tend to think that Soares dos Reis wanted to portray his own emotions? Would you prefer it to be a painting? Why this name? Are there any records of Soares dos Reis's notes for the statue project? The cracks appear on the "shadowed" side of the statue — was this intentional? If so, does it lend a poetic aura to the work? Did you depict the character realistically or exaggerate facial and bodily features to achieve perfection?

Conservation status: Why are some parts yellowed? Has any restoration been carried out?

Social context: Why is the figure a man? What social class do you belong to? Do you think artificial intelligence influences art?

Aspirations, concerns, and mental health: Does the figure feel lonely? Why did you choose the arts? What are your life goals? What would you change in your life? What do you think of yourself?

Following the final list of questions, a brief discussion took place regarding the results. This approach reveals a balance between reason and emotion, as students posed questions from the spectrum of reason—such as composition, material, or form—as well as questions from the emotional realm, which could relate to the sculpture, the artist, or even personal interests or experiences.

Participants were able to reflect questions spanning very different spheres within social, economic, and/or political frameworks, developing discussions around the idea and formalisation of what truly constitutes an icon. This activity made it possible to observe the articulation of participants' critical discourse emerging from their individual curiosities. Our objective focused on creating an exploratory moment aimed at raising questions and expanding pre-existing spaces of reflection and/or creating new ones that might foster public interest in the sculpture and the institution that houses it.

### **Structure**

The experience we acquire throughout life is also influenced by the wisdom that is transmitted to us, since knowledge is information and individuals operate as mechanisms capable of processing it. Assuming that knowledge consists of learning skills, we can understand that, as human beings, we represent a field of perceptions that can be put into practice. In this way, we recognize that knowledge, beyond a set of accumulated representations, also reflects the concept of the education of attention, explored by Tim Ingold.

The author brings anthropology closer to education—and even to art—arguing that creative processes are continuous and require constant mutation. According to him, the goal of anthropology is to seek a generous, comparative, yet critical understanding of human beings and the knowledge about the world they inhabit.

Ingold criticizes the traditional view of teaching and learning as mere transmission of knowledge, as well as the conception of the school as the only space where knowledge can be

obtained. He considers the classroom more than an instruction space; it should be a place where the educator provides tools capable of inspiring, guiding, and encouraging critical thinking in the search for truth.

Modern education is governed by the ideal that the student, starting from a state of ignorance, should have access to explanations that will eventually empower and enable them to emerge as an independent thinker, emancipated from past conventions and prejudices. Education, as currently practiced, often presents itself as a passage from ignorance to intellect. However, from Tim Ingold's perspective, learning is only possible through the transformation of this state into an education of attention.

Education of attention is equivalent to tuning our perceptual system, as it is directed toward essential aspects of the surrounding environment. Assuming that the educational process is related to mental processes, it consequently reconciles intentionality and attention—that is, individuals associate mental content with physical features of the world. This process occurs gradually with experience; in other words, education is based on attention and not on transmission, as commonly understood, since it encompasses knowledge, values, beliefs, and practices perpetuated by society.

(...) transmission closes life off, confining it to the replication of existing routines. At best, it is a model of training, not education. (Ingold, 2018, p. 20)

Drawing on the concept of habit, explored by Dewey, Ingold shows that every experience modifies the one who undergoes it and the quality of subsequent experiences. Therefore, life is a process, and the way we conduct it reveals itself as a task of education—attention becomes a priority in how we find ourselves in the world, and it is through habit that our posture relates to others.

Ingold also points to the possibilities of formulating knowledge through experimentation, similar to how children learn their mother tongue. This same dichotomy is found between drawing and writing. From this approach, we consider the subject as an emerging participant in the construction of knowledge.

In educational practice, we find a mesh of lines under the concept of continuity, which differs from the idea of a network—where only connections are highlighted. Under the concept of a mesh, we follow the movement and relation that represents the path traced by a line among intertwined concepts—our own steps—in a given environment. The places where these lines meet or connect are contact zones, where knowledge moves and grows along them. Thus, solutions are not always predictable. Things constitute themselves in relation to the environment, so representing them as isolated lines is a simplified interpretation of understanding them.

## Conclusion

This workshop benefited from several contributions aimed at applying art education within both school and museum contexts. Within the drawing/writing binomial, common concerns emerged; that is, through different tools, we achieved the workshop's objective. By engaging new ways of thinking about the sculpture, we expanded its learning spectrum, seeking to broaden and diversify the mediating and educational tools. We believe that an interdisciplinary approach always benefits the interests and expectations of diverse audiences

in relation to an artifact—in this case, the sculpture *O Desterrado* by António Soares dos Reis.

We found that drawing served as an introductory step that led to questioning and sparked curiosity among the participants. Most participants focused on the object of study by raising questions about the sculpture's form and/or content, as well as conceptual and formal aspects. Additionally, questions related to loneliness, sadness, and feelings and/or sensations arose, both regarding the sculpture and its author. Participants also expressed personal concerns, wondering, for example, whether the sculptor had financial difficulties, if he had other sources of income besides sculpture, or if he saw the arts as a secure future path. Thus, we infer that beyond the specific context, the students' age group and background partially influenced their interpretations of the sculpture.

The dialogue between this workshop and the broader research project—which includes mediation exercises and other pre-planned activities—proved fruitful. It allowed us to observe reactions, emotions, interests, and perspectives related to the sculpture, as well as the relationship between the school and the museum. In this way, we created spaces, encouraged knowledge production, and provided tools that expanded the perspective on *O Desterrado*.

The activities were dynamic and engaging, and the discussions among participants significantly enriched the workshop, promoting critical thinking and encouraging the problematization of different frameworks. For these reasons, we believe we have broadened our understanding and improved the conditions for our ongoing research work and study, in favor of art education and mediation within the Museum.

### **Acknowledgements**

This work was supported by FCT – Fundação para a Ciência e Tecnologia, I.P. by project reference UID/04057: Research Institute for Design, Media and Culture.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

The author declares that Grammarly, an AI-assisted writing software, was used in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The author further declares that, apart from Grammarly, no other AI or AI-assisted technologies have been used to generate content in writing the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.



## References

- Brun, J. (1991). *The hand and the spirit*. Edições 70.
- Da Vinci, L. (1506). *Gioconda – Mona Lisa* [Painting]. Louvre Museum, Paris.
- Escola Artística Soares dos Reis – Artistic School Soares dos Reis*. (2025). EASR. <https://easr.pt/>
- Gelb, M. J. (1999). *Thinking like Leonardo da Vinci*. Planeta.
- Herculano, A. (1878). *Poemas [Poems]*. Viúva Bertrand & C<sup>a</sup> Successores Carvalho & C<sup>a</sup>.
- Ingold, T. (2007). *Lines: A brief story*. Taylor & Francis e-Library.
- Ingold, T. (2011). *Being alive: Essays on movement, knowledge and description*. Taylor & Francis e-Library.
- Ingold, T. (2018). *Anthropology and/as education*. Taylor & Francis e-Library.
- Michelangelo. (1511). *Creazione di Adamo – The Creation of Adam* [Painting]. Sistine Chapel, Vaticano.
- Museu Nacional Soares dos Reis [National Museum Soares dos Reis]. (2025). \*MNSR\*. <https://mnsr.museusemonumentos.pt>
- Paulo, A., & Reis, M. (2013). Do cérebro para a mão: Dialogar pelo desenho no processo criativo. *Revista Matéria: Práticas Artísticas no Ensino Básico e Secundário [From the Brain to the Hand: Dialoguing through Drawing in the Creative Process. Matéria Journal: Artistic Practices in Primary and Secondary Education]*, 142–150.
- Reis, S. (1872). *O Desterrado – The Exile* [Sculpture]. National Museum Soares dos Reis, Porto.
- Rodin, A. (1904). *Le Penseur - The Thinker* [Sculpture]. Rodin Museum, Paris.
- Silva, J. (2021). *Reflexões sobre escultura, matéria e técnicas: Um manual [Reflections on Sculpture, Material and Techniques: A Handbook]*. CIEBA.

**Contact emails:** [analucia.apteixeira.silva@gmail.com](mailto:analucia.apteixeira.silva@gmail.com)

[eremelhe@fba.up.pt](mailto:eremelhe@fba.up.pt)

[jdolbeth@fba.up.pt](mailto:jdolbeth@fba.up.pt)



## **Enhancing Critical Reading Skills Through Digital Tools: A Study on Business English Students**

Hanh Nguyen Thi Hien, Foreign Trade University, Vietnam

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Critical thinking is a fundamental skill in Critical Reading instruction, particularly for EFL learners in Business English contexts. With the increasing need for analytical reading strategies, traditional methods must be re-evaluated to incorporate technology-enhanced learning. This study investigates the effectiveness of using digital tools—including digital annotation platforms (Hypothesis), gamified quizzing (Quizizz) and AI-assisted reading applications (ChatGPT)—to improve students' ability to analyze arguments, evaluate reasoning, and engage with complex texts. Using a mixed-methods approach, the research collects data from first-year Business English students at Foreign Trade University through pre-tests and post-tests, surveys, and interviews. The study examines how students interact with digital tools and whether these technologies support deeper comprehension, critical engagement, and argument analysis. Findings suggest that digital tools facilitate a more structured and interactive approach to critical reading, helping students better identify logical fallacies, evaluate evidence, and engage in discussions. However, challenges such as over-reliance on AI-generated summaries and varying levels of digital literacy are also noted. This research provides insights into the role of digital technology in higher education pedagogy, offering practical recommendations for Business English educators on integrating digital tools into Critical Reading instruction to foster independent, analytical thinking skills.

*Keywords:* critical reading, digital tools, technology in education, business English

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Critical reading forms the foundation of Business English (BE) education, empowering students to adeptly engage with complex texts such as policy reports, marketing proposals, and academic articles. These materials demand not only comprehension but also the ability to critically evaluate arguments, detect biases, and scrutinize underlying assumptions (Wallace & Wray, 2016). In today's dynamic global business environment, the sheer volume and complexity of information necessitate a sophisticated approach to text engagement. Business professionals are continually tasked with interpreting market research, assessing financial statements, understanding legal documents, and responding to intricate communications. The ability to discern credible sources from unreliable ones, to identify the core message amidst extraneous details, and to challenge underlying premises is paramount for informed decision-making and strategic planning (Paul & Elder, 2008).

At Foreign Trade University (FTU), first-year BE students frequently encounter difficulties in these critical reading areas. Observations indicate a limited familiarity with logical reasoning, challenges in deciphering implicit meanings within specialized business texts, and a noticeable hesitation to question the perceived authority of published materials. These pedagogical challenges, combined with the increasing availability and sophistication of educational technology, inspired this action research. The study investigates the potential of integrating specific digital tools—namely Hypothes.is (a collaborative annotation platform), Quizizz (a gamified quizzing tool), and ChatGPT (an AI-assisted reading application)—to enhance the critical reading skills of BE students.

This study primarily aimed to quantify the improvement in first-year Business English students' critical reading skills—specifically their ability to identify argument components, logical fallacies, and evaluate evidence—following a 12-week intervention using digital tools like Hypothes.is, Quizizz, and ChatGPT. Beyond measuring skill enhancement, the research also sought to analyze student perceptions regarding the utility, engagement, and overall benefits of these tools in fostering their critical reading development. Finally, the study intended to identify practical implementation challenges when integrating digital tools into the Business English curriculum and, crucially, to propose pedagogical recommendations derived from these findings.

By exploring the purposeful integration of technology in fostering critical reading within a BE context, this research aims to contribute significantly to the evolving field of digital pedagogy. It seeks to provide valuable insights for educators on how to leverage digital tools to cultivate independent, analytical thinking skills, thereby better preparing students for the intellectual demands of both academic pursuits and future professional careers in business.

## Literature Review

### Critical Reading in Business English Education

Critical reading is an active, reflective process where readers interrogate texts, evaluate argument validity, and contextualize content within broader frameworks (Alderson, 2000; Wallace & Wray, 2016). It extends beyond mere comprehension, requiring readers to analyze, interpret, and synthesize information, as well as to identify biases, assumptions, and logical flaws (Kurland, 2000). For Business English students, this skill is not merely an academic exercise; it is vital for practical tasks such as analyzing financial reports, dissecting

market research, evaluating investment proposals, or crafting persuasive business communications. The nuances of language in business texts, often laden with specific terminology, implicit assumptions, and persuasive intent, demand a high level of critical engagement.

In the context of BE, critical reading enhances not only academic performance but also crucial professional competencies. Students equipped with strong critical reading skills are better positioned to make informed decisions in dynamic business environments, assess risks, understand complex contractual agreements, and effectively communicate their own well-reasoned positions (Facione, 2011). As Alderson (2000) elaborates, assessing reading involves understanding how readers construct meaning, and critical reading takes this a step further by evaluating the *validity* and *implications* of that meaning. Wallace and Wray (2016) reinforce this, emphasizing that postgraduate students, which BE students often aspire to be, must be able to critically engage with academic and professional literature to formulate robust arguments and contribute meaningfully to their fields. The capacity to engage with texts in a questioning, analytical manner is foundational for both academic success and professional acumen in the business world (Barnet & Bedau, 2008).

### Digital Tools and Learner Engagement

The landscape of education has been significantly reshaped by the advent of digital tools, which offer new avenues for boosting student engagement and improving learning outcomes (Liu & Chen, 2021). These modern platforms often integrate interactive elements, multimedia, and personalized feedback mechanisms that traditional teaching methods struggle to replicate. Gamification, a key digital application, powerfully fosters motivation by incorporating game-like features such as points, leaderboards, and immediate feedback (Kapp, 2012), tapping into intrinsic desires for achievement and mastery to make learning more enjoyable. Beyond engagement, well-designed digital tools also promote **cognitive, emotional, and social** development by enabling deeper information processing, reducing anxiety through clear progress indicators, and facilitating peer-to-peer learning (Owen & Licorish, 2020; Vygotsky, 1978).

Specifically, digital annotation platforms like Hypothes.is have become prominent in academic settings for cultivating critical reading. By allowing students to directly annotate, highlight, and comment on digital texts, these tools transform passive reading into an active, collaborative process (Kalir & Garcia, 2021). This “visible thinking” promotes metacognition, compelling students to engage more deeply with content and articulate their questions or disagreements. The collaborative nature of Hypothes.is further fosters peer interaction, creating a shared intellectual space where students can view, respond to, and discuss annotations. This collective engagement, as highlighted by Novak (2022), enhances academic literacy by exposing students to diverse interpretations and refining their analytical abilities, particularly crucial for Business English (BE) students dissecting complex business reports and evaluating evidence.

Similarly, gamified quizzing tools such as Quizizz effectively engage students through competitive formats, customizable quizzes, and instant feedback. Research shows Quizizz significantly increases student motivation and knowledge retention (Ismail et al., 2020), with its competitive elements transforming routine reviews into stimulating activities. However, for developing higher-order analytical reasoning essential for critical reading, the effectiveness of Quizizz depends on robust instructional scaffolding (Alfikri, 2023). Without

careful guidance, students might prioritize rote memorization over deeper understanding of logical reasoning. Therefore, educators must design quizzes that challenge critical thinking and supplement automated feedback with personalized discussions.

Finally, Artificial Intelligence (AI) tools, exemplified by ChatGPT, represent a significant shift, offering potential to enhance learning through on-demand analysis and content generation. These tools can rapidly summarize complex texts, identify key themes, and even generate critical inquiry questions (Floridi, 2023). For BE students, ChatGPT can streamline initial analysis by providing summaries or clarifying complex terms, allowing them to focus on deeper critical engagement. Nevertheless, a crucial warning from Floridi (2023) highlights the risk of over-reliance on AI-generated outputs, which could hinder independent reasoning if students uncritically accept information. Thus, in BE education, AI tools must be integrated carefully, with clear guidelines emphasizing their role as a supplement for verification and ideation, rather than a replacement for genuine intellectual effort. The aim is to foster AI literacy alongside critical literacy, teaching students to critically evaluate AI outputs like any other information source (Mollick & Mollick, 2023).

## **Methodology**

### **Research Design**

This study adopted an action research methodology, characterized by iterative cycles of planning, action, observation, and reflection (McNiff & Whitehead, 2010). This approach is particularly suited for educational settings, as it allows instructors to systematically investigate and refine their teaching practices based on real-time feedback and student outcomes. The cyclical nature of action research provides flexibility and responsiveness, enabling the researchers to adapt the intervention strategies based on emergent findings and student needs throughout the study period. This methodology aligns well with the exploratory nature of integrating new technologies into a curriculum, as it prioritizes practical problem-solving and continuous improvement within a specific educational context.

The action research cycle for this study involved:

- **Planning:** Identifying the problem (students' critical reading deficiencies), setting objectives (enhancing specific critical reading skills), and designing the intervention (integrating digital tools).
- **Action:** Implementing the 12-week intervention by integrating Hypothes.is, Quizizz, and ChatGPT into the BE critical reading curriculum.
- **Observation:** Collecting data through pre-tests, post-tests, surveys, and semi-structured interviews to monitor student progress, engagement, and perceptions.
- **Reflection:** Analyzing the collected data to understand the effectiveness of the digital tools, identify challenges, and formulate recommendations for future pedagogical practices. This reflective phase informed the discussion and practical recommendations presented in this paper.

### **Participants**

The study involved 25 first-year Business English students at Foreign Trade University (FTU). Participants were voluntarily selected from a single cohort to ensure a relatively homogeneous group in terms of academic background and exposure to the university environment. Their ages ranged from 18–19 years, indicating a common developmental

stage. All participants had an intermediate English proficiency level (CEFR B2), which ensured they possessed a foundational language ability to engage with the BE texts and digital tools without significant linguistic barriers, allowing the study to focus specifically on critical reading skill development rather than basic language acquisition. The homogeneity of the group helped minimize confounding variables, strengthening the internal validity of the study's findings regarding the impact of the digital tools.

## Procedure

The 12-week intervention systematically integrated three digital tools into the existing Business English critical reading curriculum. Hypothes.is was used for weekly collaborative annotations of BE texts, requiring students to identify assumptions, evidence, and logical fallacies, with clear guidelines to ensure analytical quality. This fostered discussion and engagement with diverse perspectives. Quizizz, a gamified platform, facilitated both pre-class reviews and in-class activities focusing on argument components, utilizing leaderboards and instant feedback to boost motivation and reinforce learning. ChatGPT was employed in out-of-class group work primarily for verifying student analyses and summarizing complex arguments, with strict ethical guidelines emphasizing its role as an aid for critical thinking rather than a content generator.

The intervention unfolded in three distinct phases. Weeks 1-4 provided a foundational introduction to critical reading concepts and hands-on training for all three digital tools. Weeks 5-8 marked an intensive application phase, where students actively applied these tools to a variety of BE-specific reading tasks, focusing on consistent practice. Finally, Weeks 9-12 involved reflection, summative assessment of critical reading skills, and comprehensive feedback collection, allowing researchers to refine future pedagogical strategies based on the students' learning journey.

## Instruments

To gather comprehensive data on the impact of the intervention, a mixed-methods approach was employed, utilizing both quantitative and qualitative instruments:

### *Pre- and Post-tests*

These standardized tests were designed to quantitatively assess students' critical reading skills before and after the intervention. Both tests were parallel in difficulty and structure, focusing on three key areas:

- **Recognizing argument components:** Identifying claims, evidence, warrants, backings, qualifiers, and rebuttals (Toulmin, 1958).
- **Identifying logical fallacies:** Recognizing common errors in reasoning such as *ad hominem*, appeal to authority, false dilemma, hasty generalization, etc. (Hurley, 2017).
- **Evaluating evidence:** Assessing the credibility, relevance, and sufficiency of supporting information. Each test comprised **10 multiple-choice and short-answer questions**, with a maximum score of 10.

## Surveys

A 20-item Likert-scale survey was administered post-intervention to measure student perceptions regarding the effectiveness, usability, engagement levels, and perceived challenges associated with each digital tool. The survey allowed for a broad quantitative assessment of student attitudes.

## Semi-structured Interviews

Conducted with a purposive sample of 10 students (selected to represent a range of pre-test scores and levels of engagement), these interviews aimed to gain deeper qualitative insights into their individual experiences, preferences, perceived benefits, and challenges encountered while using the digital tools. The semi-structured format allowed for exploration of emergent themes and detailed personal reflections.

## Data Analysis

Quantitative data from pre- and post-tests were analyzed using paired t-tests to identify statistically significant improvements in critical reading skills. Survey responses were summarized with descriptive statistics to gauge student perceptions of tool effectiveness and engagement. Interview data underwent thematic analysis, where recurring patterns were coded to provide rich qualitative insights. This triangulation of data sources significantly enhanced the study's validity and the robustness of its conclusions.

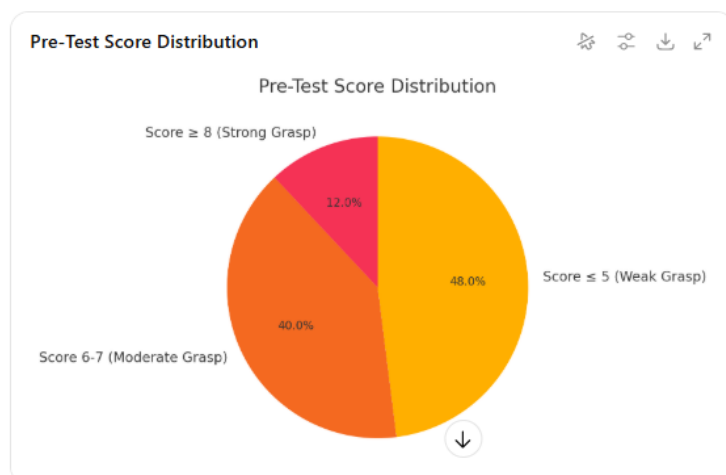
## Results

### Pre- and Post-test Findings

The pre-test results revealed significant baseline gaps in the critical reading skills of the first-year BE students. A substantial proportion of the cohort struggled with fundamental aspects of argument analysis:

**Figure 1**

*Pre-test Score Distribution*



This pie chart illustrates the distribution of student scores on the pre-test, revealing significant initial weaknesses in critical reading. Nearly half of the students, 48%, scored 5 or below,



indicating a weak grasp of fundamental critical reading concepts. A further 40% scored in the 6-7 range, while only a small minority, 12%, achieved scores of 8 or above. This baseline assessment underscored the urgent need for pedagogical intervention.

In contrast, the post-test results demonstrated substantial improvement across the cohort after the 12-week intervention, suggesting a positive impact of integrating digital tools into the curriculum:

**Figure 2**  
*Post-test Score Distribution*

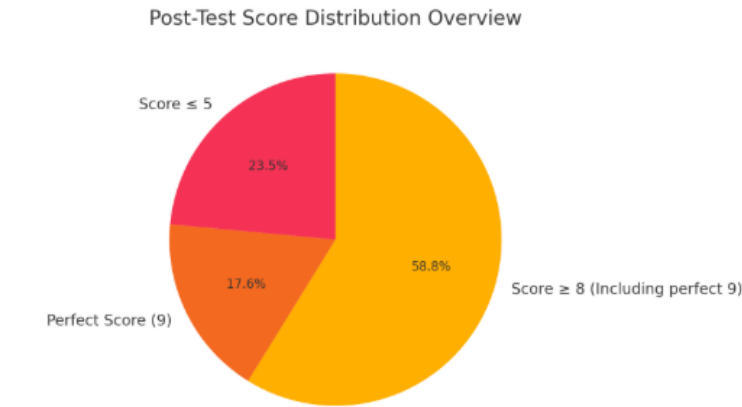


Figure 2 showcases the substantial improvement in student critical reading scores on the post-test, following the 12-week intervention. The percentage of students scoring 5 or below drastically reduced to 16% from 48% in the pre-test. Conversely, the proportion of students achieving strong scores (8 or above) more than tripled, reaching 40%. The group scoring 6-7 also saw a slight increase to 44%. These figures demonstrate a clear and positive shift in student proficiency, indicating the effectiveness of the digital tool integration.

Skill-specific gains were also evident and statistically significant:

**Table 1**  
*Skill-Specific Gains After Pre-test and Post-test*

Critical Reading Skill	Pre-test Average Score (out of 10)	Post-test Average Score (out of 10)	Absolute Score Change	Percentage Improvement	Statistical Significance (p-value)
Recognizing Argument Components	5	6.2	+1.2	+24%	p < 0.01
Identifying Logical Fallacies	4.5	5.45	+0.95	+21%	p < 0.01
Evaluating Evidence	5.2	6.14	+0.94	+18%	p < 0.05

The table details the specific gains in three core critical reading competencies, alongside their average scores before and after the intervention. Students demonstrated a remarkable 24%

improvement in “Recognizing Argument Components”, with the average score increasing from 5.0 to 6.2 ( $p < 0.01$ ). This indicates a significantly enhanced ability to dissect textual arguments. “Identifying Logical Fallacies” saw a 21% improvement, with average scores rising from 4.5 to 5.45 ( $p < 0.01$ ), showcasing increased proficiency in detecting reasoning flaws. Lastly, “Evaluating Evidence” improved by 18%, moving from an average of 5.2 to 6.14 ( $p < 0.05$ ), signifying better assessment of information credibility. These consistent and statistically significant gains across all targeted skills strongly underscore the measurable positive impact of the digital tools on students' critical reading competencies.

## Survey and Interview Insights

Post-intervention surveys provided quantitative insights into student perceptions, revealing high engagement with the digital tools. Hypothes.is was lauded by 88% of students for fostering “deep reading” through required annotations, highlighting its effectiveness in promoting active text engagement. Quizizz proved highly motivating for 92% of students due to its gamified format and instant feedback, underscoring its power in boosting enthusiasm. While ChatGPT was valued by 76% for out-of-class analysis, a significant concern about over-reliance was also noted, indicating awareness of its limitations.

Qualitative data from semi-structured interviews further illuminated these insights. For Hypothes.is, students consistently praised its collaborative nature, valuing the ability to see and respond to peers' annotations, reinforcing peer-driven learning (Novak, 2022). However, “annotation overload” emerged as a challenge, with excessive comments sometimes distracting from core reading tasks, suggesting a need for clearer guidelines on annotation quality and quantity.

Quizizz's competitive elements were widely engaging, with students appreciating leaderboards for motivation (Kapp, 2012). Despite valuable instant feedback, some desired more personalized explanations beyond automated scores, echoing the need for stronger instructional scaffolding (Alfikri, 2023).

Regarding ChatGPT, students found its verification utility helpful for checking their analyses and generating summaries. Yet, a common concern was its tendency to provide overly generic responses, limiting critical depth and requiring continued independent thought (Floridi, 2023). These insights collectively highlight the tools' benefits while pointing to areas for pedagogical refinement.

## General Challenges

Beyond specific tool feedback, students also highlighted some general implementation challenges. Internet connectivity issues frequently disrupted real-time activities, particularly for Quizizz, leading to noticeable frustration. This underscores a practical infrastructure limitation in some educational settings. Another significant observation was that some students engaged minimally with Hypothes.is annotations unless these activities were formally assessed or directly tied to graded tasks, suggesting that explicit accountability mechanisms are crucial for maximizing participation in collaborative annotation and ensuring consistent engagement across the cohort.

## Discussion

### Effectiveness of Digital Tools

The integration of Hypothes.is, Quizizz, and ChatGPT into the Business English critical reading curriculum demonstrated a significant and measurable enhancement of students' critical reading skills. These findings align strongly with existing literature on the benefits of digital tools in education (Liu & Chen, 2021; Owen & Licorish, 2020).

Hypothes.is proved instrumental in fostering collaborative analysis and promoting deeper engagement with texts. By requiring students to actively annotate and interact with peer comments, the platform encouraged them to question assumptions, identify underlying arguments, and engage in a visible, iterative process of textual analysis. This collaborative annotation process directly supported the development of skills in recognizing argument components and evaluating evidence, as students were prompted to justify their interpretations and critically assess the arguments presented in business texts. The observation that students appreciated the “deep reading” encouraged by Hypothes.is corroborates Kalir and Garcia's (2021) emphasis on annotation as a tool for visible thinking and peer interaction. The communal space created by Hypothes.is helped students move beyond passive reading to actively constructing meaning and engaging in intellectual dialogue.

Quizizz's gamified format was highly effective in boosting student motivation and reinforcing knowledge of critical reading concepts. By breaking down complex critical reading skills, such as identifying logical fallacies, into manageable, interactive quizzes, Quizizz facilitated repeated practice and immediate feedback. This gamified approach, as highlighted by Ismail et al. (2020), capitalized on competitive elements to sustain engagement, making the often-challenging task of identifying logical flaws more enjoyable and less intimidating. The instant validation or correction provided by Quizizz reinforced correct understanding and allowed students to quickly identify areas where they needed further practice.

ChatGPT, when used judiciously, supported students' independent analysis and offered a valuable resource for clarifying complex concepts or verifying their own initial assessments. Its ability to summarize arguments or help pinpoint logical fallacies provided a rapid means of cross-referencing and gaining alternative perspectives. This utility aligns with Floridi's (2023) view of AI as a tool that can support critical thinking by augmenting human cognitive processes. However, as discussed below, its effectiveness was heavily contingent on how it was integrated and supervised, reflecting Floridi's concerns about potential over-reliance. When framed as a tool for “verification” rather than “generation,” ChatGPT acted as a useful sounding board for students' developing analytical skills.

### Balancing Technology and Pedagogy

While the digital tools offered clear benefits, their optimal effectiveness was undeniably linked to deliberate pedagogical integration. The study revealed that merely introducing the tools was insufficient; their impact was amplified when coupled with structured guidance and instructional scaffolding.

The potential for over-reliance on ChatGPT emerged as a critical pedagogical concern. Students, while appreciating its utility, sometimes acknowledged that it could tempt them to

bypass genuine independent critical thinking. This corroborates Floridi's (2023) warnings about AI's potential to hinder independent reasoning if not managed carefully. To counteract this, educators must design tasks that require students to *critically evaluate* AI output, rather than simply accepting it. For instance, tasks could involve comparing AI-generated summaries with their own analyses, identifying potential biases in AI responses, or using AI to generate counter-arguments that students must then refute themselves. This shifts the focus from AI *doing* the thinking to AI *assisting* the thinking.

Similarly, Hypothes.is required structured guidelines to prevent superficial annotations or "annotation overload," as noted by students. Without clear objectives for annotation (e.g., "Identify three unstated assumptions," "Challenge one piece of evidence," "Connect this point to a real-world business scenario"), students might default to highlighting or making trivial comments. The finding suggests that active annotation must be explicitly taught as a critical thinking strategy, not just a technical skill. Integrating Hypothes.is with subsequent in-class discussions where students defend their annotations or challenge others' interpretations can further maximize its efficacy by encouraging deeper engagement and accountability. These findings underscore the critical need for educators to act as facilitators, guiding students on *how* to use these powerful tools to enhance, rather than diminish, their critical engagement with texts. Effective scaffolding strategies, clear task objectives, and well-facilitated peer discussions are paramount to maximizing the efficacy of these digital interventions.

## Challenges and Limitations

Despite the observed improvements, the study encountered several practical challenges and inherent limitations that warrant consideration for future research and implementation:

- **Technical Challenges:** Foremost among the practical issues were internet connectivity problems, which frequently disrupted real-time activities, particularly for Quizizz. In educational contexts where stable internet access cannot be guaranteed, this can severely impede the seamless integration and effectiveness of real-time digital tools. This highlights the importance of robust technological infrastructure as a prerequisite for successful digital pedagogy.
- **Limited Sample Size and Context Specificity:** The study involved a relatively small sample size (25 students) from a single university. While this is characteristic of action research, it limits the generalizability of the findings to broader populations or diverse educational contexts. Cultural and institutional factors could influence the adoption and effectiveness of digital tools.
- **Short-term Intervention:** The 12-week intervention provides insights into short-term gains. The long-term retention of enhanced critical reading skills and the sustained impact of digital tool use over a longer period remain unknown.
- **Self-Reported Data:** Student perceptions from surveys and interviews, while valuable, are self-reported and may be subject to social desirability bias.

## Practical Recommendations

Based on this study's findings and the identified challenges, several practical recommendations emerge for Business English educators aiming to effectively integrate digital tools into critical reading instruction.

First, clear guidelines and ethical frameworks for tool use are paramount. For platforms like Hypothes.is, educators should explicitly define annotation criteria, encouraging analytical comments that delve into rhetorical strategies, evidence critique, and intertextual connections, rather than mere summaries. Similarly, when using ChatGPT, strict ethical guidelines are crucial. It should be emphasized as a tool for verification and brainstorming, not a substitute for independent thought or original content. Tasks should be designed to require students to critically evaluate AI outputs and justify their own reasoning, fostering a discerning approach to AI-generated content.

Beyond guidance, incorporating formal assessments for digital activities is vital to enhance student accountability and ensure consistent participation. For instance, annotations on platforms like Hypothes.is could be subject to spot checks, graded selections, or integrated into broader participation metrics. To maximize the benefits of collaborative tools, combining them with structured peer discussions is highly effective. After annotating texts, students should engage in facilitated in-class or online discussions, defending their interpretations and collectively analyzing challenging passages, thereby reinforcing critical analysis skills.

Furthermore, it's essential to supplement automated feedback with targeted instructor comments. While gamified quizzes like Quizizz offer instant feedback, more complex critical thinking tasks benefit immensely from personalized instructor insights. This additional scaffolding helps guide students beyond superficial understanding to address individual learning needs effectively.

Finally, ensuring reliable technical infrastructure is a foundational requirement. Before implementing digital tools that rely on real-time interaction, such as Quizizz, educators must confirm stable and sufficient internet connectivity within the learning environment to prevent disruptions and student frustration. Pilot testing technology beforehand can proactively identify and mitigate potential issues. Concurrently, promoting digital literacy is key. Integrating mini-lessons on navigating digital platforms, critically evaluating online information, and understanding the capabilities and limitations of AI tools will equip students to be more autonomous and effective technology users in their learning journey.

## **Conclusion**

This action research study strongly demonstrates that the thoughtful and structured integration of digital tools—specifically Hypothes.is, Quizizz, and ChatGPT—can significantly enhance critical reading skills among first-year Business English students at Foreign Trade University. The quantitative findings from pre- and post-tests provide compelling evidence of notable improvements in students' abilities to recognize argument components, identify logical fallacies, and evaluate evidence. Qualitatively, survey and interview data indicate high levels of student engagement and perceived utility of these tools, fostering a more dynamic and interactive learning environment.

However, the study also highlighted crucial challenges that underscore the necessity of careful pedagogical design. Issues such as intermittent technical problems (internet connectivity), the risk of over-reliance on AI-generated content leading to superficial analysis, and varying levels of student accountability (especially when digital tasks are not formally assessed) all point to the need for educators to act as astute facilitators, not just implementers, of technology. The success of digital tool integration hinges on balancing

technological capabilities with robust instructional strategies that actively promote independent, analytical thinking.

Future research should explore the long-term retention of these enhanced critical reading skills beyond the immediate intervention period. Investigating the applicability and effectiveness of these digital tools across diverse cultural and educational contexts, including different language proficiency levels and academic disciplines, would also be valuable. Furthermore, exploring the utility of other innovative digital platforms, such as Padlet for collaborative brainstorming or Kahoot for interactive reviews, could further enrich critical reading instruction. Ultimately, by strategically leveraging digital technology and integrating it with sound pedagogical principles, educators can create dynamic, effective learning environments that truly prepare Business English students for both academic rigor and professional success in an increasingly information-rich world.

## References

- Alderson, J. C. (2000). *Assessing Reading*. Cambridge University Press.
- Alfikri, Z. (2023). The impact of gamification on students' analytical reasoning: A systematic review. *Journal of Educational Technology*, 18(2), 45–56.
- Barnet, S., & Bedau, H. (2008). *Critical Thinking, Reading, and Writing: A Brief Guide to Argument*. Bedford/St. Martin's.
- Facione, P. A. (2011). *Critical Thinking: What It Is and Why It Counts*. Measured Reasons and The California Academic Press.
- Floridi, L. (2023). Artificial Intelligence and Critical Thinking: Friends or Foes? *AI & Society*, 38(1), 1–12.
- Hurley, P. J. (2017). *A Concise Introduction to Logic*. Cengage Learning.
- Ismail, N., Mohamad, M. M., Nordin, N., & Hassan, S. I. (2020). The effectiveness of Quizizz in increasing students' motivation in learning English. *Journal of Advanced Research in Social Sciences and Humanities*, 5(1), 209–216.
- Kalir, J., & Garcia, A. (2021). *Annotation*. The MIT Press.
- Kapp, K. M. (2012). *The Gamification of Learning and Instruction*. Wiley.
- Kurland, D. (2000). *How to Read Critically*. David Kurland.
- Liu, X., & Chen, Y. (2021). Digital Tools in Language Learning: Benefits and Challenges. *Journal of Educational Computing Research*, 59(4), 745–762.
- McNiff, J., & Whitehead, J. (2010). *You and Your Action Research Project*. Routledge.
- Mollick, E. R., & Mollick, L. (2023). New frontiers in education: Delving into the potential of AI in teaching and learning. *Journal of Management Education*, 47(5), 651–664.
- Novak, E. (2022). Peer-Driven Learning in Digital Annotation. *Teaching in Higher Education*, 27(5), 832–848.
- Owen, H. E., & Licorish, S. A. (2020). Engaging Students with Digital Learning Tools. *Computers & Education*, 150, 103850.
- Paul, R., & Elder, L. (2008). *The Miniature Guide to Critical Thinking Concepts and Tools*. Foundation for Critical Thinking Press.
- Toulmin, S. (1958). *The Uses of Argument*. Cambridge University Press.
- Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press.

Wallace, M., & Wray, A. (2016). *Critical Reading and Writing for Postgraduates*. Sage.



## **Teachers' Instructional Design Skills, Students' Perception, and Mathematics Achievement**

Olutayo Toyin Omole, University of Ibadan, Nigeria  
Babatunde Kasim Oladele, University of Johannesburg, South Africa

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This study investigated teachers' instructional design skills, students' perceptions towards teachers' instructional design skills, and achievement in mathematics among senior secondary school 3 students in command secondary schools in Lagos State. The study employed a purposive sampling technique to select three districts and three local government areas that house Command secondary schools. A simple random sampling technique was used to select 10 Microsoft Certified Mathematics Educators and an intact class of 100 SS 3 students from each school. A total of 30 mathematics teachers and 300 students were sampled. The Teachers' Instructional Design Skills Observation Rating Scale ( $r = 0.79$ ), the Students' Perception towards Teachers' Instructional Design Skills Questionnaire ( $r = 0.82$ ), and the Mathematics Achievement Test ( $r = 0.78$ ) were used for data collection. The data were analysed using multiple regression at the  $p < 0.05$  significance level. The results revealed a positive association among teachers' instructional design skills, students' perceptions, and students' achievement in mathematics ( $R = 0.25$ ). Also, 5.6% of the composite contribution of the variance was observed in student achievement in mathematics, which was statistically significant ( $F_{(299)} = 9.94$ ). In addition, there is a relatively significant contribution of teachers' instructional design skills ( $\beta = 0.23$ ;  $t = 4.0$ ) and students' perceptions ( $\beta = 0.12$ ;  $t = 2.27$ ) to students' achievement in mathematics. It was concluded that Microsoft-certified training acquired by teachers enhances students' mathematics achievement. School authorities in Command secondary schools should periodically send teachers for training for innovative teaching strategies to aid students' assimilation and achievement.

*Keywords:* mathematics classroom observation, teacher instructional skills, achievement in mathematics, correlation of variables

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Mathematics achievement among students is linked to a country's future economic strength and competitiveness. Global policymakers and educators share a desire to uncover factors that correlate with mathematical ability. Educational systems aim to educate students to apply mathematics in many circumstances, which is universally acknowledged (Alotaibi & Alyahya, 2019). Students' academic success is influenced by several factors, including instructional efficacy, curriculum content, environmental conditions, and available resources (Ahmad et al., 2017). Instructional design remains a crucial component of teaching and learning. The most successful teachers spend their time carefully planning and continually looking for ways to improve their lessons. Having the right environment to do this is crucial because often, the time needed to plan creative and effective lessons is not available, or there are insufficient resources. Instructional design skills are crucial for creating effective learning environments. Teachers who implement discourse-related practices, such as engaging students in verbal communication and encouraging the use of mathematical vocabulary, have a positive impact on students' mathematics achievement (Byiringiro, 2024). The methods employed by educators to teach mathematical concepts directly impact students' understanding of mathematical knowledge (Oladele et al., 2022).

Educational research has the power to single-handedly improve the teaching profession for current and future practitioners and, importantly, raise student achievement levels in mathematics. Instructional design is a method of devising instruction that is usually based on some teaching models (Bakhshi et al., 2017). Hiebert and Grouws (2007) stated that to improve mathematics teaching using instructional design, a teacher will need to employ the given model in a planned or systematic way that includes goal-specific strategies and techniques, with better implementation through various forms of delivery and revision, leading to higher student achievement. An increase in teacher skills can raise the standards of mathematics, especially in understanding, analysis, and knowledge. The subsequent impact on grades, perceptions, and attitudes could potentially increase the uptake of higher levels of mathematics and dispel the negative stereotype of the subject. The premise of this study is that enhancing mathematics instruction can positively influence student achievement and perception of the subject.

Available evidence at the local, state, and national levels in Nigeria shows that student achievement in mathematics needs to be improved. Teacher survey results showed that most of the instructional techniques employed by teachers were more teacher-centred than student-centred. The evaluation techniques implemented by the public examining authorities could be one possible explanation for the slightly above-average performance of students in mathematics in recent times (Oladele, 2021).

This survey research aims to investigate the prevalence and practices of instructional design skills among mathematics teachers, as well as their application to teaching and their influence on student learning in Command Secondary Schools in Lagos. The survey will further investigate the relationship between teachers' instructional design skills and student perception and achievement in mathematics. We will also take steps to promote instruction that is of higher quality and more closely connected to student achievement. This study will help fulfil the requirements of the military initiative to improve the educational system in command schools. According to Hirumi (2014) analysing the quality of teacher instructional design skills is a crucial component of instruction. It represents a sequence of strategic planning to enhance students' understanding in a systematic and organised way. Instructional

design is oriented towards the achievement of goals determined by the teacher, and it is instrumental in creating learning experiences that facilitate the understanding of students in the learning of a particular topic. The theory of instructional design guides a qualified teacher in implementing planned stages of learning to achieve the desired learning outcomes (Reiser & Dempsey, 2018). Student achievement in learning serves as a demonstration of the effectiveness of such an instructional design. Student achievement refers to the attainment of learning outcomes about the predetermined goal. Increased understanding of the transmitted information from a learning experience can influence high student achievement. Instructional design with high-quality skills will stimulate student thinking in understanding a topic, which is caused by the activities and learning experiences provided by the teacher. This is indicative of a student's reasoning; he will have success in understanding if he can match the reasoning to the level of understanding he wants to achieve. An increased understanding by a student of a topic is the start of an improvement in their perception of the topic. A teacher's instructional design has implications for understanding students because the learning experience can increase a student's understanding to achieve the expected learning outcomes.

Teachers have an essential influence on students's academic achievement. High-quality, knowledgeable skills and adaptability in teacher instructional practice are prerequisites for high educational achievement among students. Despite the remarkable growth and changes that have occurred in the field of education worldwide, it is a regrettable fact that the level of academic achievement among students is still far below expectations. This condition is also relevant to mathematics learning in Nigerian schools. This study highlights indicators of instructional design skills conceptualised in terms of collaboration, knowledge construction, innovation, and real-world problem solving, as well as the use of ICT for teaching and learning.

Collaboration simply means that it brings the students together in and outside the classroom to solve mathematical problems without barriers. That is when technology comes into the classroom with digital tools to enhance collaborative study. Collaboration refers to different students working as a team or in pairs or groups, not independently but as a group, to negotiate their ideas, share work fairly, and make substantive decisions about the work to complete a task (Glazer et al., 2005). To exchange ideas or resources, students can collaborate in person or via technology. Working in a group without technology is not applicable outside of the classroom. Hence, collaborative apprenticeship is designed to help teachers learn and implement new teaching skills and strategies through four development phases, beginning with the implementation of best practices.

The dimension of this instructional design skill called collaboration is "What does it mean to bring the students to work together in and outside the classroom to solve mathematical problems without barriers?" That is when technology comes in. Without technology, there is a barrier to learning because the only people who can come together are those close to each other or within a particular environment. Hence, with the means of technology, you can connect with people far and wide to collaborate to solve and share tasks. This is made possible using Microsoft Teams, Zoom, Google Meet, OneDrive, Padlet, Jamboard, Edmodo, etc. With these tools, students can work with other students outside their environment and learn simplified methods to solve mathematics. It is practical, engaging, interactive, and offers a feedback mechanism. Collaboration among teachers enables them to share best practices, resources, and instructional strategies related to mathematics instruction via Teams, Zoom, and Google Meet.

Knowledge construction happens when students do more than reproduce what they have learnt in mathematics into a new idea. The skills of knowledge construction are often considered “critical thinking.” When students create new ideas based on what they have learnt in mathematics, they are engaging in knowledge creation. People frequently refer to knowledge construction abilities as “critical thinking.” When students interpret, analyse, synthesise, or evaluate data or concepts, they gain knowledge. Knowledge construction simply means that after a course of study, did the student generate ideas that were new to them? What assessment activity did they spend the most time on? Did they demonstrate conceptual understanding? Is their work interdisciplinary? Can they apply it in a new situation to solve a problem that is new to them? When students do more than merely replicate what they have learnt in mathematics, knowledge creation takes place. The skills of knowledge construction are often considered “critical thinking.” Students build knowledge when they interpret, analyse, synthesise, or evaluate information or ideas. The constructivist approach to learning emphasises that learners actively construct knowledge based on their prior experiences and mental structures (Dalgarno, 2001). In mathematics education, this means allowing students to build their understanding through hands-on activities, collaborative work, and meaningful problem-solving tasks. By constructing their knowledge, students develop a more robust and enduring understanding of mathematical concepts. Innovation and real-world issue-solving look at how well students solve problems and apply real-world information or scenarios to their work. In traditional education, students frequently generate work that has little to do with their experiences and observations in the real world. When students work to tackle a specific challenge, they exhibit problem-solving skills. Students who worked on problem-solving projects demonstrated their ability to solve new problems, finish tasks for which they had no instructions, or create intricate products that satisfied specifications.

The strongest student’s work for this skill demonstrates that the student did not already know a response or solution to the task given but developed a successful solution to a real-world problem using his or her prior ideas, designs, or solutions. Innovation and real-world problem solving simply say what ways a learner can infer classroom analysis and results from the real world and what digital tool supports the study of mathematics that can enable us to apply it in the real world. We have digital software tools such as Geogebra, Microsoft Mathematics (Ogunleye, 2021), Maxima, Speomathematics, Axiom, Gretl, SasEuler, AI, YouTube, etc. Real-world problem-solving and innovation are skills used to incorporate digital tools into the teaching and learning of mathematics (Paige et al., 2016). Other digital tools relevant to mathematics are MatLab, Sage Math, SciLab, Photo Math, SpeQ Mathematics, SymPy, etc. It is students’s confidence in their abilities to produce designed levels of performance that influence later events of their lives (Xu & Qi, 2019).

The use of ICT for teaching is a strategy that allows total lesson delivery using technological devices. An electronic interactive whiteboard, also known as an interactive smartboard, is one of the means of achieving interactive lesson delivery (Adeyemi & Olaleye, 2020). It is an advanced digital teaching tool that combines the function of a whiteboard surface with interactive capabilities and a built-in piece of software called “board.” It allows educators to deliver dynamic and engaging lessons by integrating multimedia content, interactive software, and digital resources (Cheung & Slavin, 2013). It has a touch-sensitive surface, digital ink, and a writing stylus. The Smartboard comes with interactive software called Board embedded with graphs, geometric shapes, etc. Smartboards allow for seamless integration of multimedia elements, such as images, videos, audio files, and interactive simulations, into lesson delivery. Smartboards facilitate collaboration and group activities by

allowing multiple users to interact with the board simultaneously. They are flexible and can be customised to a lesson's content. Educators can easily switch between different media, rearrange elements on the board, and customise the display according to their teaching needs. The interactive nature of a smartboard enhances student engagement and participation in the lesson. Students can use the board to solve problems, manipulate shapes and objects, and actively contribute to the lesson, fostering a more interactive and student-centred learning environment. Smartboards often have internet connectivity, allowing educators to access a wealth of online resources directly from the board. It can browse websites, share lesson notes using OneDrive or Office 365, access educational databases, stream educational videos, expand the range of content available for instruction, and much more.

In a connected world with unprecedented access to a vast array of digital information and experiences, the use of technology continues to transform how we live and work. The ongoing adoption of new advances in ICT has become more essential to both lifelong learning and lifelong learning. In today's globalised, knowledge-based economies, individuals increasingly need skills not only to intelligently consume information and ideas but also to design and create new information and ideas using ICT. Despite the increasing prevalence of ICT in classrooms and learning environments, its primary function is to present or consume information, not to fundamentally transform learning experiences. This rubric examines how teachers use ICT devices in lesson delivery. Within the context of this rubric, "ICT" refers to the entire spectrum of digital tools that are currently available, encompassing both hardware (computers and related electronics devices, including tablets and notebooks, e-readers, smartphones, PDAs, camcorders, graphing calculators, and electronic whiteboards) and software (ranging from social media and engineering applications to Internet browsers, multimedia development tools, and Internet utilities). Technology can be used as a potent tool to support and encourage a variety of 21st-century skills.

Student perception is another variable in this study and could be referred to as the student's view about the effective usage of instructional design skills among Microsoft-certified educators. It encompasses the teacher's lesson planning, development, and implementation of effective teaching strategies to facilitate meaningful learning outcomes. The relationship between teacher-student interactions and mathematics achievement is mediated by students' perceptions and self-efficacy. While the direct impact of teacher-student relationships may be insignificant, fostering positive perceptions and self-efficacy can enhance achievement (Appiah et al., 2023; Hascher et al., 2024).

Although teachers bear the primary responsibility for instructional design, it is crucial to assess students' perspectives on the application of these skills in the classroom. This study explores the importance of students' perceptions of teachers' instructional design skill usage and its implications for the learning process. Students' positive perceptions could contribute to enhanced learning experiences, higher levels of engagement, and improved academic achievement. Conversely, negative perceptions may hinder learning, leading to decreased motivation and suboptimal performance. Students' perceptions of teachers' teaching skills contribute significantly to their learning outcomes, with a strong correlation observed between these perceptions and mathematics achievement (Hascher et al., 2024).

Several factors may influence students' perceptions of teachers' instructional design skill usage. These include the clarity of communication, relevance of content, alignment with students' learning needs, and incorporation of active learning strategies. Additionally, the use of technology, the classroom environment, and teacher-student interactions could play crucial

roles in shaping students' perceptions. Feedback mechanisms, such as assessments and evaluations, also impact how students perceive the effectiveness of instructional design. Creating engaging, relevant, and well-structured learning environments, teachers could foster positive perceptions among students, leading to improved academic performance. Continuously assessing and refining instructional design practices based on student feedback is essential for promoting effective teaching and learning in educational settings.

Students' academic achievement in mathematics generally has witnessed a persistent low performance in some core areas of mathematics topics such as construction, graphs, mensuration, circle geometry, trigonometry, bearing and distance, etc. over the years. Observations from the WAEC Chief Examiner's reports for various years reveal that poor performance in mathematics among senior secondary school students is evident, which could pose a great challenge to students' abilities to cope with real-world situations after secondary school education, especially in nations like Nigeria where science is very important to engender development in society.

Nonetheless, using a variety of teaching strategies, including discussion, inquiry, problem-based, teacher-centred, student-centred, and case methods, contributes to the low mathematical achievement of students (Karakaya & Priyo, 2021). However, such efforts yield minimal positive outcomes and inconsistent results, but none of these studies focus on the use of instructional design skills by Microsoft-certified educators (2022) to improve students' achievement in mathematics. Also, how students feel about their teacher using such a method while teaching and learning mathematics is paramount.

This study concentrates on instructional design as it represents a significant domain where enhancements in teaching and learning can occur. This study therefore investigated the extent to which teachers who are Microsoft Certified Educators (MCE) deployed instructional design skills (collaboration, knowledge construction, innovation, real-world problem solving, and use of ICTs) in teaching and students' perceptions towards teachers' use of instructional design skills in Command Secondary Schools in Lagos State, Nigeria. This study addressed and answered the following research questions:

1. What is the extent to which teachers' instructional design skills and students' perceptions towards teachers' use of instructional design skills jointly contribute to students' achievement in mathematics in Command Secondary Schools in Lagos State?
2. What are the relative contributions of teacher instructional design skills and students' perceptions of teachers' use of instructional design skills to students' achievement in mathematics in Command Secondary Schools in Lagos State?

### **Methodology**

This study is a non-experimental, correlational research type. The study's population consisted of Microsoft Certified Educators (MCE) and SS 3 Mathematics students at Command Secondary Schools in Lagos State. The variables considered in this study include teachers' instructional design skills (collaboration, knowledge construction, innovation and real-world problem solving, use of information communication for teaching), student perceptions towards teachers' use of instructional design skills, and achievement in mathematics. The multi-stage sampling procedure was used, in which a purposive sampling technique was used to select three (3) districts (1, 5, and 6) and three (3) local government areas (LGA) where the command secondary schools are domiciled in Lagos State (each LGA

has one command secondary school). We used simple random sampling to select at least ten (10) Microsoft Certified Educators (MCE) in each school. Additionally, we selected an intact class of SS 3 students. From each school, 100 students in SS 3 Mathematics were selected. In all, a total of 30 mathematics teachers (MCE), 10 teachers from each school, and 300 SS 3 mathematics students were sampled. Three instruments were used for data collection: the Teachers' Instructional Design Skills Observation Rating Scale (TIDSORS), the Students' Perceptions towards Teachers Instructional Design Skills Questionnaire (SPTIDSQ), and the Mathematics Achievement Test (MAT). The reliability of the instrument (TIDSORS) was established using Ordinal Alpha, which yielded 0.79. The reliability of the instrument (SPTIDSQ) was established using Ordinal Alpha, which yielded 0.82. The reliability of the instrument's internal consistency (MAT) was estimated using Kuder Richardson (KR20), which yielded 0.78. We sought and obtained approval from the Command Secondary Schools authority in Lagos State to conduct the research. The consent of the participants was ensured by informing them about the purpose of the study before the administration of the instruments, and after the administration, the instruments were collected from the respondents for analysis. We collected data from both teachers and students. The data collected for this study was analysed using multiple regression at a 0.05 level of significance.

### Results and Presentation of Findings

**Research Question 1:** To what extent would teacher instructional design skills and students' perceptions towards teachers' use of instructional design skills jointly predict students' achievement in mathematics in Command Secondary Schools in Lagos State?

**Table 1**

*Regression Summary and Anova of Teacher Instructional Design Skill and Students' Perception Towards Teachers' Use of Instructional Design Skills on Achievement in Mathematics*

Multiple R	= 0.25				
R Square	= 0.06				
Adjusted R Square	= 0.06				
Standard Error	= 1.22				
<b>Analysis of Variance</b>					
<b>Source of Variance</b>	<b>Sum of Square</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>p-value</b>
Regression	29.79	2	14.90		
Residual	444.88	279	1.498	9.94	0.00
<b>Total</b>	<b>474.67</b>	<b>299</b>			

Significant at  $p < .05$

Table 1 presents the regression and ANOVA results of teachers' instructional design skills and students' perceptions towards teachers' use of instructional design skills on students' achievement in mathematics in Command Secondary Schools in Lagos State. The result in the table shows that the multiple correlation coefficients (R) of the combined independent variables with students' achievement in mathematics are 0.25. This implies that there is a positive and moderate association between teacher instructional design skills, students' perceptions of teachers' use of instructional design skills, and students' achievement in mathematics. The adjusted R<sup>2</sup> indicates that the combination of independent variables accounts for a variability of 0.056 in the dependent variable. This implies that the independent variables contributed 5.6% to the variance observed in students' achievement in mathematics. Furthermore, the regression of ANOVA was statistically significant ( $F_{(299)} =$

9.944,  $p = 0.00$ ). This implies that the joint contribution of the independent variables considered in this study positively influenced the students' achievement in mathematics.

**Research Question 2:** What are the relative contributions of teacher instructional design skills and students' perceptions towards teachers' use of instructional design skills to students' achievement in mathematics in Command Secondary Schools in Lagos State?

**Table 2**

*Relative Contributions of Teacher Instructional Design Skill and Student's Perception towards Teachers' Use of Instructional Design Skills in the Prediction of Students' Achievement in Mathematics*

Variables	Unstandardized Coefficients		Standardized Coefficients	t	p-value
	B	Std. Error	Beta		
(Constant)	42.968	3.220		13.344	0.000
Tea. Instru. Design Skill	0.075	0.019	0.226	4.008	0.000
Students Perception	0.013	0.006	0.128	2.274	0.024

Significant at  $p < .05$

Table 2 presents the relative contributions of the independent variables to the criterion variable (students' achievement in mathematics). The independent variables contributed significantly to students' achievement in mathematics. That is, teacher instructional design skill ( $\beta = 0.226$ ,  $t = 4.008$ ,  $p = 0.000$ ) and students' perception ( $\beta = 0.128$ ,  $t = 2.274$ ,  $p = 0.024$ ). The value of the standardised regression weight associated with the two variables shows that teacher instructional design skills are potent predictors of students' achievement in mathematics. This implies that teachers' use of instructional design skills positively influenced students' achievement in mathematics.

### Discussion of Findings

The findings of this study on the joint contribution of teachers' instructional design skills and students' perceptions towards teachers' use of instructional design skills on students' achievement in mathematics in Command Secondary Schools in Lagos State reveal a positive and significant relationship between the predictor variables and criterion variables. It was also found that the predictor variables contributed 5.6% of the total variance observed in the criterion variable, while the remaining 94.4% could be due to other variables not considered or controlled for in this study. The findings of this study are in line with those of Cheung and Slavin (2013), who found that the use of educational technology applications had a significant positive effect on student achievement in mathematics, with an overall effect size of 0.16. This finding was found to align with that of Hattie (2009), who found the relationship between teachers and students plays a significant role in shaping student perception. In other words, one could say that positive teacher-student relationships, characterised by mutual respect, trust, and open communication, foster a positive perception of learning experiences. The finding from this study also aligns with that of Trigwell et al. (1999) who assert that by understanding student perceptions, instructional designers can tailor their instructional strategies to better align with student needs, preferences, and learning styles. By this, one could say that the Command secondary school students had a better understanding and were aligned with the instructional design skills being used by the Microsoft Certified Educators. This could potentially explain why most of them demonstrated improved performance.



The findings of this study on the relative contributions of teachers' instructional design skills and students' perceptions towards teachers' use of instructional design skills to students' achievement in mathematics in Command Secondary Schools in Lagos State reveal that both predictor variables relatively and significantly influenced students' achievement in mathematics. However, teachers' use of instructional design skills was found to be a potent predictor. This study agrees with that of Freeman et al. (2014) and Mergendoller et al. (2006), whose studies consistently demonstrated that active learning strategies, such as collaborative learning and problem-based learning, enhanced student achievement in mathematics. Similarly, the findings of this study are consistent with those of Cheung and Slavin (2013), whose study found positive effects of technology-enhanced instruction on student achievement in mathematics when implemented with sound instructional design principles. Computational thinking skills, including problem-solving and critical thinking, are essential components of instructional design that can improve students' performance in mathematics assessments like TIMSS (Shone et al., 2023). Also, the findings of this study corroborate those of Li and Ma (2010), who found that the use of computer technology had a significant positive effect on student achievement in mathematics, with an overall effect size of 0.28. This study supports that of Selden and Selden (2005), who found that the use of real-world problem-solving tasks had a significant positive effect on student achievement in mathematics, with an overall effect size of 0.41.

Real-world problem-solving tasks are also one of the indicators of teachers' instructional design skills in this study. One can say that, comparing the variance observed in this study with the effect size of previous studies reported, the instructional design skills in this study had a greater contribution to students' achievement in mathematics. Furthermore, Students' perceptions of mathematics and their self-efficacy are strong predictors of their mathematics achievement. A study found that these factors accounted for 75.4% of the variance in students' mathematics achievement, highlighting their significant impact (Appiah et al., 2022). Positive perceptions of instructional quality, such as cognitive activation and effective classroom management, are associated with better mathematics achievement. However, negative emotions like boredom can also influence outcomes (Alotaibi & Alyahya, 2019).

## **Conclusion**

This study investigated teachers' instructional design skills, students' perceptions towards teachers' use of instructional design skills and students' achievement in mathematics in Command Senior Secondary Schools in Lagos State. In this study, it was found that teachers' use of instructional design skills in teaching and learning mathematics is a potent predictor of students' achievement in mathematics. This was also affirmed by the significant influence of students' perceptions on teachers' use of instructional design skills. The underlying assumption here is that Microsoft-certified training acquired by teachers at Command Senior Secondary Schools in Lagos State contributes to the improvement of students' mathematics achievement.

## **Recommendations**

The study's conclusions and findings led to the following recommendations:

1. Teachers in Command Senior secondary schools should adopt collaborative knowledge construction, innovation, real-world problem-solving, and the use of ICTs during the teaching and learning of mathematics and other subjects to stimulate learning.

2. Other teachers, especially those in the core sciences, should enroll in Microsoft training to enhance their lesson delivery with modern skills and technologies.
3. The school authorities should periodically send teachers for training that would equip them with innovative teaching strategies to aid students' assimilation.
4. The school management should embed activities that involve collaboration, knowledge construction, innovation, real-world problem-solving, and the use of ICTs in the school curriculum.

## References

- Adeyemi, B., & Olaleye, F. (2020). Technology integration and Nigerian teachers' self-efficacy: Knowledge drives curiosity. *International Journal of Instruction*, 13(3), 159–176. <https://doi.org/10.29333/iji.2020.13311a>
- Ahmad, N. A., Azizan, F. L., Rahim, N. F., Jaya, N. H., Shaipullah, N. M., & Siaw, E. S. (2017). Relationship between students' perception toward the teaching and learning methods of mathematics' lecturer and their achievement in pre-university studies. *International Education Studies*, 10(11), 129–134. <https://doi.org/10.5539/ies.v10n11p129>
- Alotaibi, A., & Alyahya, D. (2019). Computational thinking skills and its impact on TIMSS achievement: An instructional design approach. *Issues and Trends in Educational Technology*, 7(1). [https://doi.org/10.2458/azu\\_itet\\_v7i1\\_alyahya](https://doi.org/10.2458/azu_itet_v7i1_alyahya)
- Appiah, J. B., Arthur, Y. D., Boateng, F. O., & Akweitley, E. (2023). Teacher-student relationship and students' mathematics achievement: Mediating roles of students' perception of mathematics, students' self-efficacy, and cooperative learning strategies. *Journal of Mathematics and Science Teacher*, 3(2), em041. <https://doi.org/10.29333/mathsciteacher/13193>
- Appiah, J. B., Korkor, S., Arthur, Y. D., & Obeng, B. A. (2022). Mathematics achievement in high schools, the role of the teacher-student relationship, students' self-efficacy, and students' perception of mathematics. *IEJME-Mathematics Education*, 17(3), em0688. <https://doi.org/10.29333/iejme/12056>
- Bakhshi, H., Downing, J. M., Osborne, M. A., & Schneider, P. (2017). *The future of skills: Employment in 2030*. Pearson and Nesta.
- Byiringiro, E. (2024). Identifying factors affecting the mathematics achievement of students for better instructional design in UK. *World Journal of Educational Research*, 11(1), 18. <https://doi.org/10.22158/wjer.v11n1p18>
- Cheung, A. C. K., & Slavin, R. E. (2013). The effectiveness of educational technology applications for enhancing mathematics achievement in K–12 classrooms: A meta-analysis. *Educational Research Review*, 9, 88–113. <https://doi.org/10.1016/j.edurev.2013.01.001>
- Dalgarno, B. (2001). Interpretations of constructivism and consequences for computer assisted learning. *British Journal of Educational Technology*, 32(2), 183–194.
- Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, 111(23), 8410–8415. <https://doi.org/10.1073/pnas.1319030111>
- Glazer, E., Hannafin, M. J., & Song, L. (2005). Promoting technology integration through collaborative apprenticeship. *Educational Technology Research and Development*, 53(4), 57–67. <https://doi.org/10.1007/bf02504685>

- Hascher, T., Hagenauer, G., & Sacchi, S. (2024). Secondary students' emotions, perception of instructional quality, and achievement in mathematics: A representative study with Swiss students towards the end of compulsory education. *Contemporary Educational Psychology*, 102295. <https://doi.org/10.1016/j.cedpsych.2024.102295>
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
- Hiebert, J., & Grouws, D. A. (2007). The effects of classroom mathematics teaching on students' learning. In F. K. Lester Jr. (Ed.), *Second handbook of research on mathematics teaching and learning* (pp. 371–404). Information Age Publishing.
- Hirumi, A. (2014). Instructional design is a work-based learning paradigm. In V. C. X. Wang (Ed.), *Handbook of research on educational communications and technology* (pp. 363–378). Springer. [https://doi.org/10.1007/978-1-4614-3185-5\\_29](https://doi.org/10.1007/978-1-4614-3185-5_29)
- Karakaya, A. F., & Priyo, B. (2021). The journey of integrating innovation and real-world problems. In *Instructional theory for teaching problem-solving* (pp. 163–185). Routledge.
- Li, Q., & Ma, X. (2010). A meta-analysis of the effects of computer technology on school students' mathematics learning. *Educational Psychology Review*, 22(3), 215–243. <http://dx.doi.org/10.1007/s10648-010-9125-8>
- Mergendoller, J. R., Maxwell, N. L., & Bellisimo, Y. (2006). The effectiveness of problem-based instruction: A comparative study of instructional methods and student characteristics. *Interdisciplinary Journal of Problem-Based Learning*, 1(2), 49–69. <https://doi.org/10.7771/1541-5015.1026>
- Microsoft. (2021). *Microsoft Certified Educator programme overview*. <https://www.microsoft.com/en-us/education/educators/mce>
- Ogunleye, A. O. (2021). Fostering collaborative learning through Microsoft Teams in Nigerian higher education. *Journal of Educational Technology and Online Learning*, 4(1), 82–92.
- Oladele, B. K. (2021). *Comparison of secondary school students' ability in mathematics constructed response items under classical test and item response measurement theories in the Ibadan Metropolis, Nigeria* (Doctoral dissertation, University of Ibadan).
- Oladele, B. K., Omole, O. T., & Obiyo, O. E. (2022). Test models and dimensionality assessment of mathematics constructed response items. *International Journal of Academic Pedagogical Research (IJAPR)*, 6(9), 36–48.
- Reiser, R. A., & Dempsey, J. V. (2018). *Trends and issues in instructional design and technology* (4th ed.). Pearson.
- Selden, A., & Selden, J. (2005). Perspectives on advanced mathematical thinking. *Mathematical Thinking and Learning*, 7(1), 1–13. [https://doi.org/10.1207/s15327833mtl0701\\_1](https://doi.org/10.1207/s15327833mtl0701_1)

- Shone, E. T., Weldemeskel, F. M., & Worku, B. N. (2023). The role of students' mathematics perception and self-efficacy toward their mathematics achievement. *Psychology in the Schools*, 61(1), 103–122. <https://doi.org/10.1002/pits.23033>
- Trigwell, K., Prosser, M., & Waterhouse, F. (1999). Relations between teachers' approaches to teaching and students' approaches to learning. *Higher Education*, 37(1), 57–70. <https://doi.org/10.1023/A:1003548313194>
- Xu, Z. Z., & Qi, C. X. (2019). The relationship between teacher student relationship and academic achievement: The mediating role of self efficacy. *EURASIA Journal of Mathematics, Science and Technology Education*, 15, Article em1758. <https://doi.org/10.29333/ejmste/105610>

**Contact emails:** vicayoade@gmail.com  
boladele@uj.ac.za

**ORCID:** <https://orcid.org/0000-0002-6687-2923>  
<https://orcid.org/0000-0002-2165-5298>



## **Bridging AI Literacy, the AI Act, and Academia: An Interdisciplinary Approach to Embedding AI Literacy in Teaching Academic Writing**

Chrysanthi Melanou, Baden-Wuerttemberg Cooperative State University, Germany

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

The increasing use of generative artificial intelligence (AI) tools in higher education raises urgent pedagogical, ethical, and legal questions. At the same time, the introduction of the European AI Act in 2024 has reinforced the need for structured and responsible AI implementations. This paper presents the design, implementation, and empirical evaluation of an interdisciplinary course that equips students with technical, ethical, legal, and applied AI competencies, with a specific focus on academic writing. These competencies were defined in alignment with the requirements of the EU AI Act, ensuring that the course reflects both regulatory expectations and academic values. The course was launched in October 2024 and has since reached over 700 students across different faculties through a modular format, offering comprehensive, compact, and introductory versions. AI fundamentals, prompt design, and reflective practices are embedded into the academic writing process, enabling students to use AI tools critically and transparently across all writing phases. The course fosters not only operational proficiency but also a deeper understanding of the limitations and implications of AI technologies. A post-course quantitative survey was conducted with 52 students enrolled in the compact format to evaluate perceived learning outcomes. Results indicate increased confidence in planning, critical reflection, and source evaluation, as well as acceptance of the institutionally hosted chatbot. Students expressed a strong interest in further curricular integration of AI literacy and called for domain-specific adaptations. The study provides empirical insights into scalable, adaptable, and pedagogically meaningful ways of embedding AI literacy into higher education.

*Keywords:* AI literacy, academic writing, EU AI Act, higher education, interdisciplinary teaching

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The increasing use of generative artificial intelligence (AI) tools in higher education is reshaping academic practices, particularly in the domain of academic writing. Tools based on Large Language Models (LLMs), such as ChatGPT, are now easily accessible and often used by students with limited institutional guidance. While these systems offer opportunities for supporting idea generation, drafting, and revision, their uncritical or unsupervised application poses significant ethical, pedagogical, and legal concerns, especially considering academic integrity and authorship (Ros & Samuel, 2024). At the same time, the introduction of the European Union's Artificial Intelligence Act (European Parliament and Council of the European Union, 2024) in 2024 has established the world's first comprehensive legal framework for AI systems, extending obligations to both developers and institutional users, including universities (Thelisson & Verma, 2024).

The EU AI Act adopts a risk-based approach, classifying AI systems into categories ranging from minimal to unacceptable risk, and imposes strict obligations on providers and users of high-risk applications (Olimid, 2024). Education is not directly categorized as a high-risk sector. However, it is increasingly viewed as a sensitive domain, especially when AI tools are used to generate or influence academic work. AI-supported educational systems that affect student assessment or academic performance may fall into risk-sensitive categories. This classification depends on how the tools function and what types of data they use (Saarela et al., 2025, p. 8). In this context, educational institutions face a dual responsibility: to ensure compliance with evolving legal standards and to foster responsible, critical engagement with AI systems among students (Council of Europe, 2024, p. 29).

However, while the legal landscape is rapidly evolving, educational responses remain fragmented. There is a growing need for curricular models that integrate technical understanding with ethical reasoning and legal awareness. Existing discussions around AI literacy emphasize operational familiarity with AI systems, but often lack structured pedagogical frameworks that guide reflective and compliant use (Liu & Xiao, 2025, p. 486).

To address this gap, an interdisciplinary university course was developed that combines technical training in AI fundamentals with critical reflection on legal and ethical implications. It focuses specifically on the context of academic writing, aiming to help students understand how to use AI tools not as shortcuts, but as pedagogically valuable resources when applied with transparency, integrity, and methodological clarity. The course aligns with the governance ambitions of the EU AI Act and promotes responsible digital citizenship in academic contexts (Tadimalla & Maher, 2024, p. 2).

This paper presents the design, implementation, and evaluation of the course, which was offered in modular formats to accommodate diverse institutional needs. It also discusses empirical findings from a student survey, offering insights into how such training influences AI literacy, ethical awareness, and academic behavior.

## Teaching Concept and Course Design

The interdisciplinary course on AI literacy and academic writing was developed to address a dual challenge: the growing, often unguided and unsupervised use of generative AI tools by students for academic purposes, and the emerging legal responsibilities outlined in the EU AI Act. The course is designed to equip students not only with technical knowledge, but also



with reflective and ethical competencies required for responsible AI use in line with regulatory expectations of the EU AI Act (Tadimalla & Maher, 2024). With a specific focus on academic writing within university contexts, the course promotes the development of applied AI skills that support students in integrating AI meaningfully and responsibly into their writing processes. Rather than positioning AI tools as shortcuts, the curriculum emphasizes their pedagogical value when used with critical awareness, ethical sensitivity, and methodological clarity (Amini et al., 2025).

## **Technical Foundations**

The course begins by establishing a technical understanding of how generative AI systems, particularly LLMs, operate. Students are introduced to the inner workings of LLMs, including how they process human language through probabilistic prediction based on extensive linguistic datasets. Concepts such as tokenization, contextual embedding, and autoregressive Text generation are explored to help students grasp not only the logic behind the output, but also typical sources of errors and misunderstandings.

To support this, students engage with basic principles of computational linguistics and natural language processing (NLP). These insights help them understand how syntactic structures, semantic relationships, and statistical co-occurrences shape the behavior of AI models. The course also addresses typical weaknesses of such systems, including factual inaccuracies, hallucinated content, and cultural or epistemic bias.

An essential component of this technical foundation is prompt design. Students learn how the structure, wording, and intent of a prompt directly affect the quality and relevance of the AI's output. Different prompting techniques, such as zero-shot, role-based, or iterative prompting, are discussed and tested in applied exercises. By experimenting with varied input strategies, students begin to see AI not as an autonomous agent but as a responsive tool whose output quality depends heavily on human input and framing.

## **Ethical Competencies and Legal Dimensions**

Building on these foundations, the course addresses ethical and legal questions related to AI use in academia. This includes topics such as transparency and authorship, the boundaries of fair use in individual and group assignments, and the risk of over-reliance. Special attention is given to academic integrity, examining when AI assisted work may cross the line into misconduct.

In parallel, students examine legal considerations such as data protection under the General Data Protection Regulation (GDPR), institutional policies on AI tool usage, and the often-overlooked implications of agreeing to terms of service for commercial tools. By exploring these dimensions, students develop a deeper understanding of the broader regulatory and institutional context in which their AI use takes place.

## **Critical Reflection and Social Impact**

Another core element of the course is the cultivation of critical reflection and awareness of AI's societal implications. Students are encouraged to examine their own motives, usage patterns, and dependencies when working with AI tools. The curriculum invites discussion on

sustainability (e.g., energy consumption of LLMs), social equity (e.g., unequal access to tools), and algorithmic bias.

Through these discussions, the course fosters a reflective mindset that links AI literacy with broader questions of social responsibility and inclusive academic practices. Students are encouraged to view AI not only as a functional aid but also as a cultural and ethical phenomenon.

### **Applied Competencies: Prompting and the Writing Process**

A key objective of the course is to foster applied competencies among students, specifically, those needed to engage in academic tasks such as academic writing. These competencies are practiced using the structural framework of the academic writing process, based on Kruse's (Kruse, 2007) model outlining the key stages of scholarly writing.

To translate the course's conceptual and ethical foundations into practice, students are guided in the targeted use of a GDPR-compliant, university hosted AI assistant. The AI tool is integrated across all major phases, of the writing process; from identifying a topic and planning an outline to formulating a rough draft, revising arguments, and finalizing formatting and citations. This process-oriented approach provides a concrete framework for exploring how and where AI tools can support academic work meaningfully.

In each phase, students apply specific prompting techniques, experiment with different formulations, and compare AI generated outputs. They assess whether responses meet academic standards, identify strengths and limitations, and reflect on when AI support enhances learning. In doing so, students learn to distinguish between helpful and inappropriate AI use, developing key academic skills including critical thinking, structured argumentation, and source literacy.

Through this guided practice, students develop both competence and confidence in navigating AI-supported writing processes. The aim is not to replace human academic work with automated output, but to encourage intentional, transparent, and responsible use of AI aligned with academic values and institutional expectations.

### **Modular Course Formats**

To accommodate different institutional conditions and practical boundaries, the course was designed as a modular offering with three delivery formats. Although the core components (technical, ethical, legal, and applied competencies) remain the same in each version, the depth and intensity of instruction vary depending on the time available. The comprehensive format consists of 24 teaching units and allows for thorough exploration and extended hands-on practice. It is particularly suited for students preparing for their final thesis or working on advanced academic projects and has so far been completed by 37 participants. The compact version includes eight units and focuses on essential competencies and their application in academic writing, making it a practical fit for integrations into existing curricula. This version was attended by 52 students and serves as the basis for the evaluation presented in this paper. The introductory version comprises four units and offers a brief overview aimed at raising awareness among larger student groups. It is especially useful for early-stage students who are just beginning to engage with AI in an academic context and has already reached over 700 participants across different faculties. This modular design enables flexible

implementation across faculties while ensuring a coherent and consistent learning experience that reflects the course's overall pedagogical framework.

### **Empirical Evaluation**

To assess the effectiveness of the AI literacy course in academic writing, an empirical evaluation was conducted during the spring semester 2025. The evaluation focused on the compact course format consisting of eight teaching units, which was integrated into the curriculum of the Faculty of Business under IT Competencies and Academic Writing. A total of 52 students from the fourth semester, enrolled in the Digital Business Management and Banking programs, participated in the study.

The evaluation aimed to measure changes in students' self-perceived AI literacy and their ability to engage with AI tools in academic contexts. A post-course quantitative survey captured students' confidence levels in planning, critical reflection, source evaluation, and risk awareness. Additional items explored their practical use of AI tools, their experiences with the institutionally provided AI chatbot, and their perspectives on the future integration of AI literacy into subject-specific curricula.

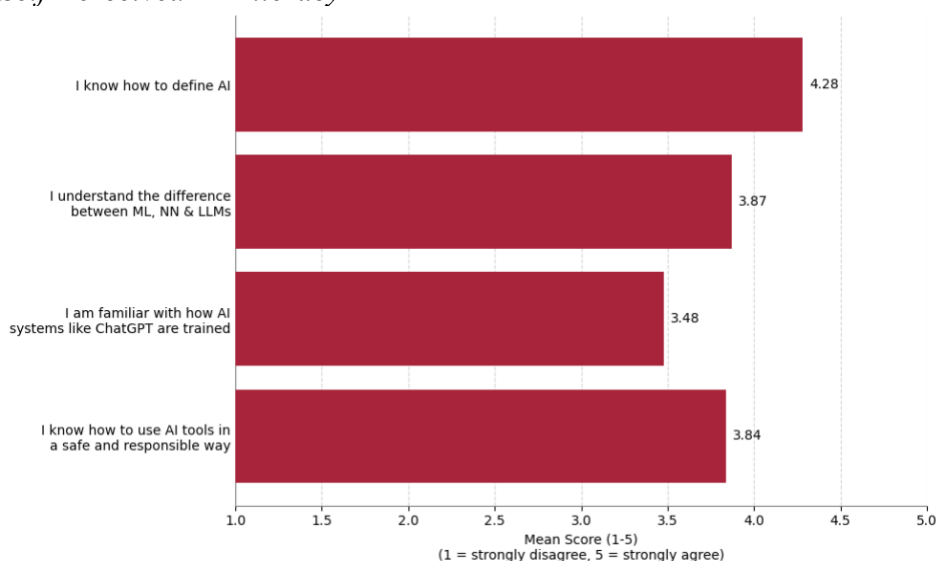
### **Results and Interpretation**

The results of the post-course empirical survey reveal a differentiated but overall positive picture of students' AI-related competencies and attitudes.

#### ***Self-Perceived AI***

As shown in Figure 1, students reported high levels of confidence in fundamental AI concepts. The ability to define AI received the highest average agreement ( $M = 4.28$ ), followed by understanding the difference between machine learning, neural networks, and large language models ( $M = 3.87$ ). Slightly lower ratings were found in items related to technical system knowledge, such as understanding how models like ChatGPT are trained ( $M = 3.48$ ). Confidence in responsible use was also strong ( $M = 3.84$ ), suggesting that students not only grasp foundational concepts but also show awareness of ethical aspects.

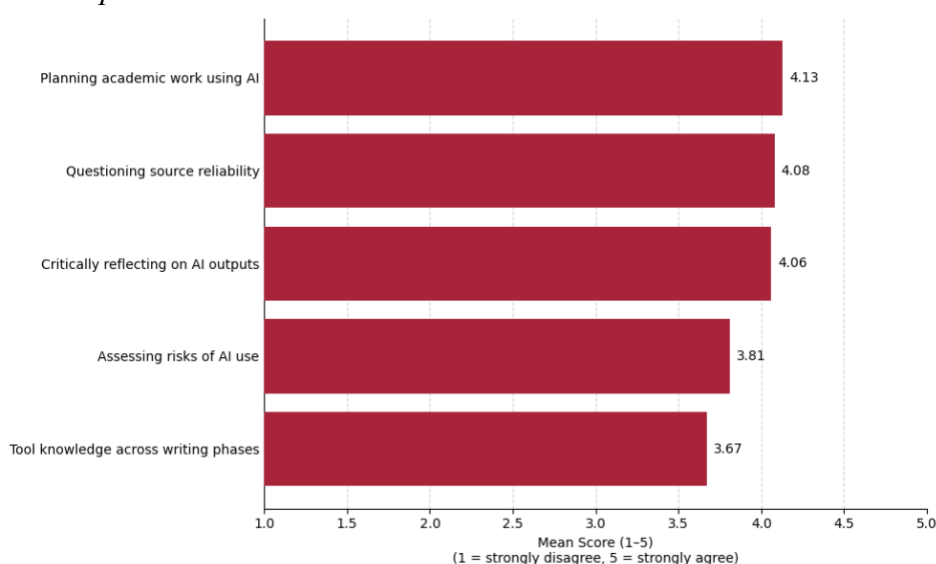
**Figure 1**  
*Self-Perceived AI-Literacy*



### *AI Competencies*

Figure 2 illustrates students' self-assessment across specific competencies. The ability to plan academic work using AI was rated highest ( $M = 4.13$ ), followed by source criticism ( $M = 4.08$ ) and critical reflection on AI outputs ( $M = 4.06$ ). These results highlight a high degree of metacognitive engagement. Slightly lower, but still positive ratings were given to assessing AI-related risks ( $M = 3.81$ ) and knowledge about AI tools across the writing process ( $M = 3.67$ ), suggesting potential for further practice-oriented integration.

**Figure 2**  
*AI-Competencies*

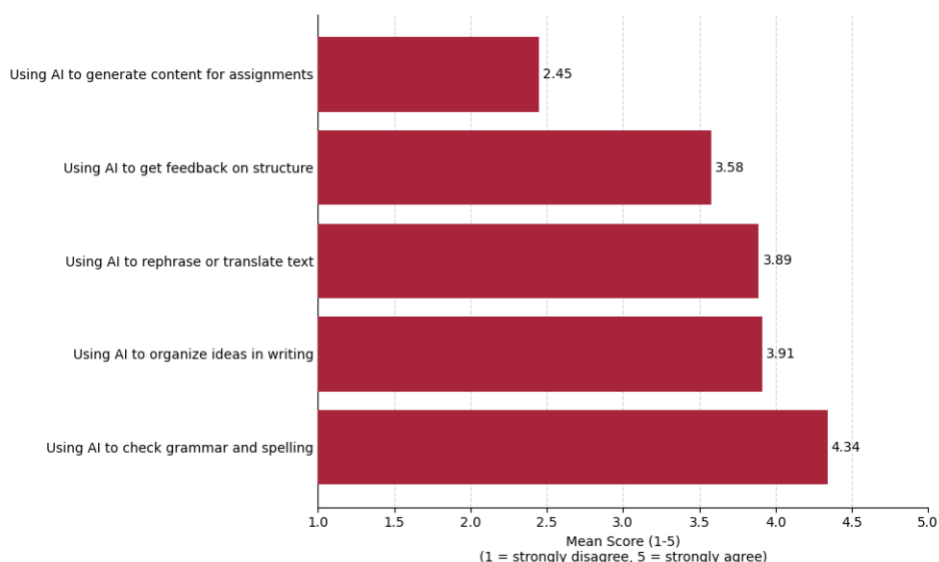


### *Use of AI Tools*

As shown in Figure 3, students indicated a varied pattern of tool usage. The most common use cases were checking grammar and spelling ( $M = 4.34$ ), organizing ideas ( $M = 3.91$ ), and

rephrasing or translating text ( $M = 3.89$ ). AI was used less frequent for structural feedback ( $M = 3.58$ ), and very low agreement was found in using AI to generate content for assignments ( $M = 2.45$ ). The results indicate that students engaged with AI as a supportive tool and not as a substitute for academic work. This reflects the course's intended learning goals.

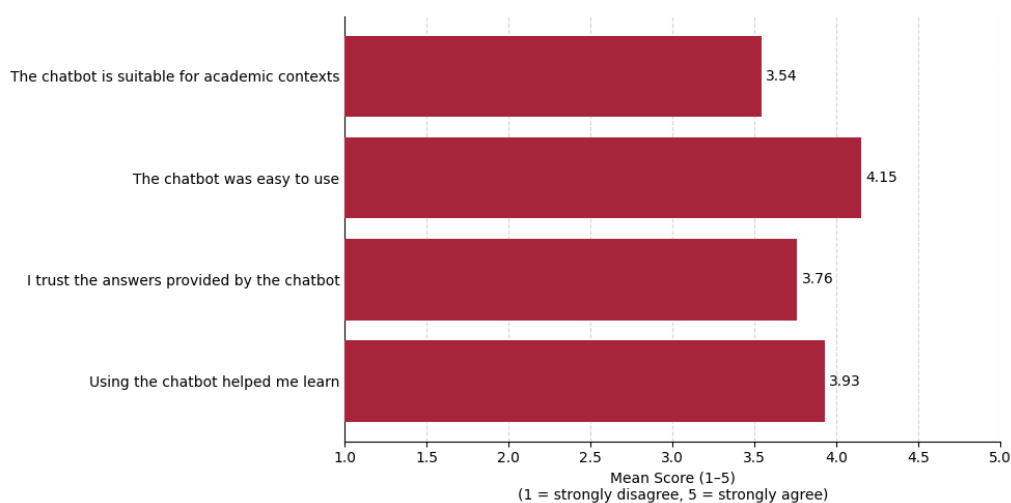
**Figure 3**  
*Use of AI Tools*



### ***Feedback on the Institutional Chatbot***

Figure 4 summarizes students' feedback of the university-provided chatbot. Overall ratings were positive. Students found the chatbot easy to use ( $M = 4.15$ ), helpful for learning ( $M = 3.93$ ) and generally trustworthy ( $M = 3.76$ ). Although the suitability for academic contexts was rated somewhat lower ( $M = 3.54$ ), the results indicate that the tool was accepted and effectively integrated into the learning process.

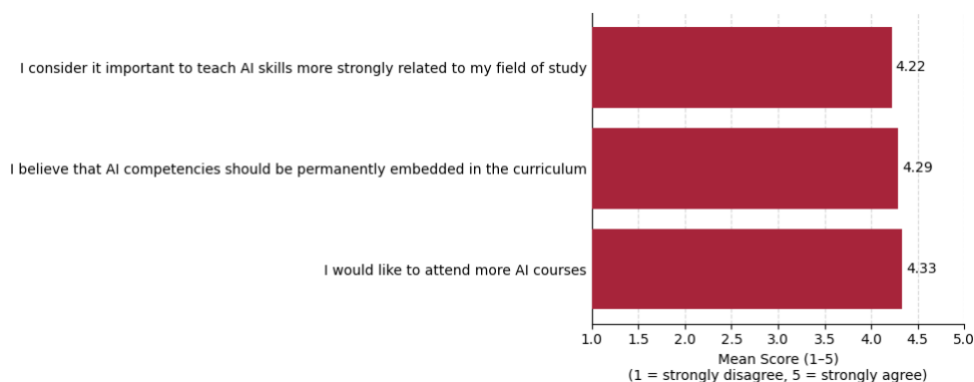
**Figure 4**  
*Feedback on the Institutional Chatbot*



## Integration Needs

Figure 5 shows a strong demand for further curricular integration of AI literacy. Students expressed a high level of agreement with statements such as the importance of domain-specific AI training ( $M = 4.22$ ), the need for permanent curricular embedding ( $M = 4.29$ ), and the desire to attend more AI-related courses ( $M = 4.33$ ). These responses underline that students not only value the course content but also see clear potential for its continued expansion across study programs.

**Figure 5**  
*Integration Needs*



## Standard Variations in Responses

Standard deviations across the surveyed dimensions ranged between approximately 0.4 and 0.7, indicating a generally consistent response pattern within the participant group. The lowest variability was observed in areas related to tool usage for grammar checking and the planning of academic work with AI, suggesting high agreement and shared practices. By contrast, slightly higher standard deviations were found in items concerning the suitability of the institutional chatbot and students' views on the future integration of AI in curricula. These findings may reflect differing prior experiences, individual academic needs, or levels of trust in institutional infrastructures. Overall, the limited spread of responses supports the interpretation that the course content was broadly accessible and relevant, while also pointing to specific domains where further differentiation or tailoring may be beneficial.

## Results and Implications

Considering all findings, the evaluation results suggest that the compact course format was effective in enhancing students' AI literacy, reflective awareness, and confidence in using AI tools in academic contexts. High mean values across all dimensions indicate that key learning goals were met, while the limited variation in responses supports the conclusion that the course structure and content were broadly suitable for the diverse student group.

The consistently high levels of agreement regarding future integration underline students' desire for sustained and subject-specific AI education. At the same time, slightly more varied responses in areas such as technical understanding and trust in institutional tools point to potential areas for refinement. These insights offer valuable basis for the future course development and institutional strategies to embed AI literacy in higher education in a scalable, adaptable, and pedagogically grounded way.

## Conclusion

The integration of generative AI into higher education, along with the new legal responsibilities introduced by the EU AI Act, requires a structured and responsible approach to AI literacy. To address this need, an interdisciplinary course on AI and academic writing was developed, implemented, and evaluated. The course aims to build technical understanding, raise awareness of ethical and legal questions, and support students in using AI tools in a thoughtful and appropriate way. Its modular structure makes it easily adaptable to different study programs and timeframes.

Evaluation results show that even a compact course format can help students become more confident and competent in using AI for academic purposes. Students used AI tools to support their writing rather than to replace their own thinking, which reflects the course's focus on responsible application. They also expressed a clear interest in further curricular integration and in more subject-specific examples, underlining the relevance of AI literacy across disciplines.

As AI continues to influence academic work and learning, universities have a key role in preparing students for its challenges and opportunities. AI literacy should not only be about using tools but also about understanding how they work, what their limitations are, and how to use them fairly and transparently. The course illustrates how legal, ethical, and pedagogical aims can be integrated into a flexible and transferable, and future-oriented teaching model.

Looking ahead, further development of the course may include enhanced disciplinary differentiation, extended prompting practice, and deeper integration into academic programs. In addition, future research could investigate long-term learning outcomes, students' reflective practices, and the institutional impact of embedding AI literacy into the broader curriculum. These steps will be essential to ensure that AI literacy becomes not just an individual competence, but a sustainable and embedded element of higher education.

Beyond regulatory obligations, universities also carry an educational responsibility to ensure that students can navigate a rapidly evolving knowledge landscape shaped by automated decision-making technologies, data-driven processes, and changing norms of authorship and assessment. Embedding AI literacy into higher education is therefore not only a matter of legal compliance, but also a prerequisite for academic equity, quality assurance, and inclusive participation.

Future Strategies may benefit from embedding AI literacy into broader digital competence frameworks at national and European levels, fostering coherence across institutions while allowing disciplinary and contextual differentiation.

## References

- Amini, M., Lee, K. F., Yiqiu, W., & Ravindran, L. (2025). Proposing a framework for ethical use of AI in academic writing based on a conceptual review: implications for quality education. *Interactive Learning Environments*, 1–25.  
<https://doi.org/10.1080/10494820.2025.2523382>
- Council of Europe. (2024). Artificial intelligence and education: 2nd working conference, regulating the use of AI systems in education (Provisional report DGII/EDU/AIED (2024)08). Directorate General of Democracy and Human Dignity, Education Department, Digital Transformation Unit. Council of Europe Headquarters, Strasbourg.
- European Parliament and Council of the European Union. (2024). Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act). Official Journal of the European Union. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32024R1689>
- Kruse, O. (2007). Keine Angst vor dem leeren Blatt. Ohne Schreibblockaden durchs Studium. Frankfurt: Campus.
- Liu, X., & Xiao, Y. (2025). Chinese university teachers' engagement with generative AI in different stages of foreign language teaching: A qualitative enquiry through the prism of ADDIE. *Education and Information Technologies*, 30(2), 485–508.  
<https://doi.org/10.1007/s10639-024-13117-9>
- Olimid, A. P. (2024). Legal analysis of EU Artificial Intelligence Act (2024): Insights from personal data governance and health policy. Access to Justice in Eastern Europe.
- Ros, T. J., & Samuel, A. (2024). Navigating the AI Frontier: A guide for ethical academic writing. *ELearn Magazine*, 2024(10). <https://doi.org/10.1145/3703094.3694981>
- Saarela, M., Gunasekara, S., & Karimov, A. (2025). The EU AI Act: Implications for ethical AI in education (p. 8). [https://doi.org/10.1007/978-3-031-93979-2\\_3](https://doi.org/10.1007/978-3-031-93979-2_3)
- Tadimalla, S. Y., & Maher, M. L. (2024, October). AI literacy for all: Adjustable interdisciplinary socio-technical curriculum. 2024 IEEE Frontiers in Education Conference (FIE). <https://doi.org/10.1109/FIE61694.2024.10893159>
- Thelisson, E., & Verma, H. (2024). Conformity assessment under the EU AI act general approach. *AI and Ethics*, 4, 113–121.

**Contact email:** [chrysanthi.melanou@dhbw.de](mailto:chrysanthi.melanou@dhbw.de)



## ***Slow Torture, Magic Books* or Potentially Worth Further Exploring: Mapping Young Students' Thoughts About Reading and Creative Alternatives**

Anna Martín Bylund, Linköping University, Sweden  
Linnéa Stenliden, Linköping University, Sweden  
Mattias Arvola, Linköping University, Sweden

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Amid discourses that portray young people's changing relationships to text as jeopardizing democratic society and warranting urgent interventions, this paper maps primary students' conceptions of reading through three cartographies—simple, complex, and potentializing—using survey responses, logbooks, and co-creation sessions with 10–11-year-olds. Drawing on two Swedish Research Council–funded projects (“The Heart of Reading” and “How Hot Is the Book-Bot?”), it reveals how a simple, abstract cartography reinforces normative binaries of readers as either enthralled or disengaged. The complex cartography, grounded in students' concrete experiences, uncovers the spatial, temporal, bodily, and emotional dimensions shaping classroom reading. Potentializing cartographies capture students' curiosities, affirmations, problematizations, and individual variations in bodily and spatial preferences, showcasing diverse ways reading might unfold. Employing an interdisciplinary, post-qualitative cartographic approach, the study problematises and pluralises the concept of reading, moving beyond narrow literacy discourses and the perceived “reading crisis”. It argues that leveraging students' openness to develop embodied, self-directed reading practices can enrich primary reading instruction. Ultimately, this work emphasizes the transformative power of questioning and reimagining conventional definitions of reading.

*Keywords:* young readers, reading and the body, cartographies of reading, primary education, literacy instruction

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Young people's reading is a matter of societal importance. Trends that repeatedly indicate that younger generations are consuming less literature evoke concern, debate, and prompt action. A myriad of reading promotion initiatives involve both public and private stakeholders in a shared vision of the crucial role that reading plays in various aspects of societal development. School is, in many respects, an obvious arena for these efforts; however, as Sundström Sjödin et al. (2024) demonstrate, the school often becomes “an object that is talked about and formed into opinions yet is not invited to become a subject with its own voice and agency” (p. 387). In this study, the school practice and the desired readers' own views is our focus.

As a part of that focus, we also choose to problematize reading as a bodily practice that is disciplinary of the reader's senses (McLaughlin, 2015). There is, often an overseen, bodily code of physical book reading that prescribes certain postures of the upper body (hands and arms) enabling the work of the eyes (McLaughlin, 2015). The design of classrooms and academic furniture mostly facilitate such, what could be labelled ergonomic reading postures, and hereby reaffirm a bodily reading code that is sedentary and quiet. In this paper, while we do recognize the physical and sensory relation between the reader and the text, we scrutinize the implicit discipline of young readers and hitherto narrowing conceptualization of how reading takes place that emerge in classroom reading, both today and historically (Elam & Widhe, 2015; Fatheddine, 2018). We argue that further consideration of what the body may and may not (want to) do while reading may have an impact on young students' views of reading and themselves as potential readers.

Seeking to meet this need for further problematization and pluralization of what reading is all about to young people in their early careers as readers, the study is motivated by the following remarks. First, it can be stated that rigorous effort is made, to foster students' reading development, within the framework of Swedish language instruction during the early school years. The focus is on decoding and language comprehension as entirely central aspects. An insightful effort to deepen and develop students' interest, engagement, and self-confidence in reading is equally crucial, although it does not receive the same self-evident prominence. Second, reading as a phenomenon is surrounded by norms and boundaries that narrow the understanding of what reading is and who qualifies as a reader. For reading instruction to be truly inclusive and reach all students, it requires a norm-conscious evaluation of pedagogical reading practices. Last, reading instruction must be grounded in students' own driving forces, which are influenced and evolve through multidimensional, social, and materially embodied interplay. Accordingly, this study scrutinizes what primary students associate to reading as an abstract idea, concrete reading experiences and experimental practice. The aim is to advance knowledge on what reading is all about to young people in their early careers as readers. We address the aim by the following research questions (RQ):

1. What ideas do students associate to “reading” in general?
2. How do students express their experiences of personal, concrete reading activities in school?
3. How do students co-create reading when encouraged to explore it differently?

## Literature Review

The centrality of decoding and language comprehension in early reading development has long been recognized as foundational to literacy acquisition (Hoover & Gough, 1990; Wren, 2001). These cognitive processes are essential for enabling students to access and understand written texts, forming a core of reading instruction (Kempe et al., 2011).

Nevertheless, inclusive pedagogical research has increasingly problematized traditional notions of reading by exposing the norms and boundaries that govern literacy practices. Street's (2003) critical framework reconceptualizes literacy, not as a decontextualized set of technical skills but as a social practice embedded in specific times and places. Building on this, New Literacy Studies (NLS) scholars have long argued that literacy emerges through interactions with local conditions, making it inherently heterogeneous (Hamilton, 2012). Moreover, NLS research draws attention to the hierarchies and power relations that privilege certain literacies over others. Hull and Schultz (2002), for example, demonstrated how schools often assume a singular model of reading that aligns poorly with many students' out-of-school experiences, thereby excluding those whose practices lie outside institutional frameworks. This literature underpins efforts to broaden the concept of reading in inclusive pedagogies by challenging entrenched literacy hierarchies and embracing multiple, context-sensitive ways of reading. Despite this nowadays long research tradition, the dominant understanding of reading is often shaped by normative frameworks that delineate who qualifies as a 'reader' and what constitutes reading, often neglecting students' own perspectives on reading and teachers' professional work in schools (Sundström Sjödin & Rahm, 2025).

Martín-Bylund et al. (forthcoming) illustrate how classroom reading in early years can be conceptualized as a sensory tug-of-war between individual reading and collective participation. This tension manifests physically in students' bodies and influences their capacity to engage in school-based reading activities. To students for whom reading remains a demanding activity, this contest presents additional challenges. Consequently, the social and bodily-material dimensions of reading are integral to understanding how students relate to and develop their literacy skills and themselves as reading subjects (Fatheddine, 2018; Glenberg, 2011; Kontovourki, 2014; Nielsen, 2011).

Furthermore, McLaughlin (2015) provides a detailed account of how reading must be understood as a bodily practice that requires sensory discipline. Historically, the body has often been regarded as an obstacle in relation to reading—a perspective rooted in the traditional dichotomy between body and mind that underpins Western educational practices. Classroom reading has at times been a disciplining activity aimed at eliminating the body as a disruptive element, thereby allowing the mind to work undisturbed, a topic discussed by Elam and Widhe (2015). Concurrently, the disciplining of vision—necessary for visual interaction with texts—does not necessarily entail sedentary behaviour. Early-year students, for instance, express that it is both possible and sometimes desirable to read while moving their bodies to some extent (cf. Bro Trasmundi et al., 2021; Mangen, 2013). Similarly, in a qualitative analysis of the multiplicity of dimensions that affect young bodies while practicing reading in classrooms, Martín-Bylund & Stenliden (2023) suggest a theorization of reading as a rhythmical practice, where students need to find ways of synchronizing various spatial, temporal, and bodily rhythms. The authors discuss the importance of primary reading instruction to provide students the opportunity of actively practicing such synchronization as a means of exploring and adapting individual reading styles.

Arvola et al. (2024) present a quantitative study indicating that students who move the most during the school day tend to value reading the least, whereas those who move the least tend to appreciate reading the most. There is a negative correlation between physical activity and enjoyment of printed books, whereas a positive correlation exists between physical activity and appreciation of screen-based reading. The study underscores the importance of considering the convergence of movement and reading and allowing students to explore different (bodily) ways of reading, thereby fostering the development of diverse ways of becoming a reader. What the body does while reading is shown to have an impact on the reading experience (Mangen, 2016).

Additionally, research indicates that affective factors such as comfort, safety, and motivation are crucial for developing positive reading experiences (Marinak et al., 2010; Verhoeven & Snow, 2001). As an example, interventions involving non-judgmental environments, such as reading with dogs, has demonstrated potential to enhance feelings of security and reduce anxiety associated with reading (Hall et al., 2016). Sundström Sjödin and Rahm (2025) discuss the paradox that, unlike teachers, dogs are deemed suitable for fostering such conditions. While creating a relaxed, inclusive atmosphere supports the development of confidence and autonomy in young readers, how this is reinforced within everyday practices of early literacy education still needs further attention.

Similarly, play-based and drama-informed literacy activities have been shown to promote authenticity, engagement, and social interaction, which in turn can drive literacy development (Fadool, 2009). Honeyford and Boyd (2015) demonstrate that the inventive space created through play- and drama-based literacy activities in leisure-time settings enables students to be more creative and autonomous, potentially increasing their confidence in reading and writing. These strategies highlight the importance of understanding students' intrinsic motivations and social interactions, aligning with the view that literacy development is a cognitively, bodily, and socially situated process.

In sum, while decoding and comprehension remain central, the recognition of the need to broaden our understanding of students' reading practices to include their bodily and sensory experiences, as well as their interest, engagement, and self-confidence still needs more attention. Such an inclusive perspective underscores the importance of allowing students to explore the concept and practice of reading in multiple ways, to develop their own individual styles and views of what reading may be all about to them (cf. Deleuze, 1995). To date, bodily, affective, and motivational dimensions of reading have struggled to gain visibility within often polarized debates on literacy (Sundström Sjödin, 2019).

### **Methodology**

The present study builds on data from two different projects concerning reading activities in middle schools; project A was conducted 2021 – 2024 and project B, which builds further on the former, was conducted in 2023 - 2025. Classroom fieldwork is the base for both projects focusing on reading activities and co-creation with students. Project B, as part of a larger Research-through-Design project (Ylirisku et al., 2016) employed a Wizard of Oz (WOz) prototype. However, that part of project B is out of the scope regarding the present paper.

## Participants

Project A involved two teachers, and their two school classes identified via municipal education administration. Initially, 55 students were connected to the study, of which 53 students participated. Project B involved four teachers, and their four school classes were identified via the same procedure as in project A. Initially, 94 students were connected to the study, of which 81 students participated. None of the participants in project B had participated in project A. In total 6 teachers and 149 students participated.

## Data Production

Data used in this study was produced by two different field works (project A and B). The focus was on activities related to L1 teaching and co-creation activities. The first was performed during a period of 4-5 weeks where the researchers spent 3 days a week at the two schools respectively. The second fieldwork field work was carried out through 3 rounds of 3-5 days at each of the school.

A survey was conducted with all students ( $n = 149$ ) to assess students' associations with reading in general (RQ1). Students expressed their experiences of personal concrete reading activities during their schooldays by writing in logbooks ( $n = 53$ ) (RQ2). Through three different co-creation sessions the students ( $n = 149$ ) explored reading differently compared to ordinary reading activities performed in the classroom; a) The *body* and *reading* by exploring bodily postures and motion while reading; b) the *space* and *reading* through "walk and talk" while visiting different spaces outside the classroom, and c) *attitudes* and *imagination* of reading by creating with Lego.

## Research Ethics

The Swedish Ethical Review Authority (Dnr 2021-03319 and Dnr 2022-06914-01) decided that an ethical approval was not necessary for neither project A nor B. Study details were explained to guardians/parents via information sheets, and consent was obtained. Only those with their own and parental consent participated and they were also informed that they could take breaks or interrupt. All personal data was stored securely, and personally identifiable information was removed.

## Cartographic Analysis

Inspired by post-qualitative research (Jackson & Mazzei, 2012; Lather & St Pierre, 2013) we employ an analysis based on cartography (Braidotti, 2010, 2019). As discussed by Deleuze and Guattari (2004 [1988]) cartographies are critical and creative processes that produces new assemblages of thought and practice. Rather than seeking to represent realities, a cartographic method is employed to produce temporal maps for experimentation and critical scrutiny. In this study, such temporal maps are constructed to scrutinize and experiment with the concept of reading as viewed by young students. As discussed by Lenz Taguchi (2017), the value of a cartographic analysis, is that it opens for broadening and shifting transformations of our understanding of certain phenomena and concepts. This way, cartographies entail both dominant, normative perspectives of a phenomenon, as well as ramifications that may challenge these perspectives.

Working with the data of young students' first thoughts of reading as an abstract phenomenon, their expressed experiences regarding concrete reading activities in school, as well as of how they would potentially construct reading otherwise, three different cartographies are created as assemblages of thought and discussion.

## Results

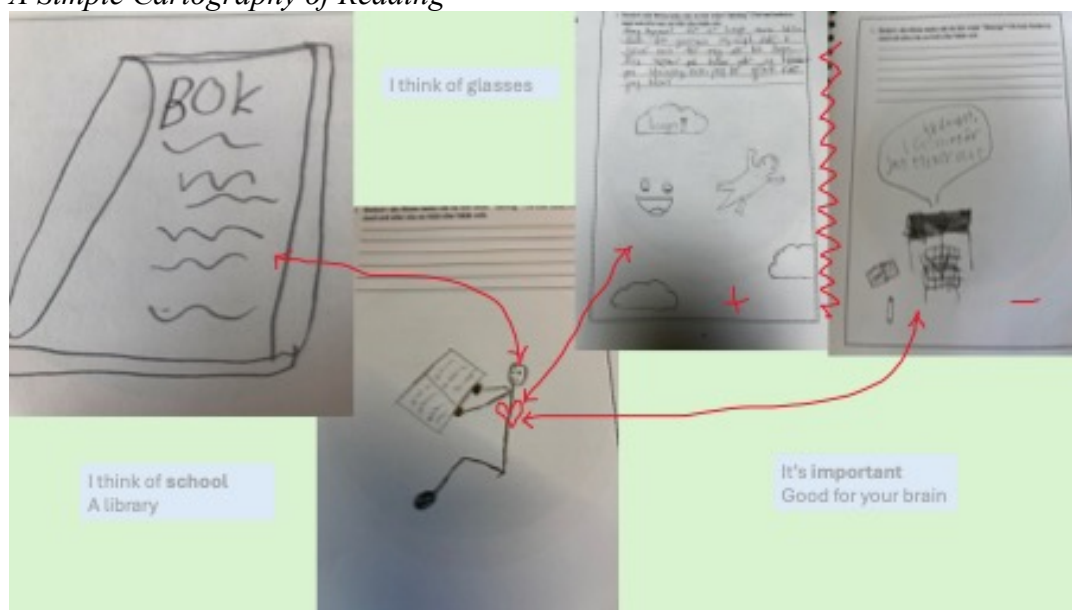
We present the cartographic analysis in relation to the three research questions, as follow.

### Mapping Students' Abstract Ideas of Reading

This section presents the results regarding RQ1, *What ideas do students associate to "reading" in general?* To answer this question, we mapped reading as it may occur to students when thinking about it in abstract terms and rather fixed ideas, building on students' verbal and visual answers to the survey question "What is your first thought when you hear the word 'reading'?" With the students' answers, we created an initial map, a temporal cartography of reading, around three main clusters that were associated to each other as a collective reading imaginary.

**Figure 1**

*A Simple Cartography of Reading*



Students' first thoughts about reading clustered around the reading object, represented in Figure 1 by a student's drawing of a book. In the survey it was also expressed verbally in terms of "book", "a book", "books", "a good book", "I think of a book", or, as one student put it, "an often rectangular thing that contains a lot of letters and paper". Words like "paper", "letters", "front page", "document", specific book titles and the name of a digital application for e-reading were also traced and added part to this cluster. The reading stick figure drawn by one student represents a different cluster in students' answers, around the reading act and its subject, where students wrote things like "you read", "I read" "we read together", "I think of someone who reads". Yet another cluster emerged around attitudes, feelings and preferences regarding reading, represented in Figure 1 by the two drawings to the right. The way these attitudes were emotionally expressed in words and drawings invites to tracing a

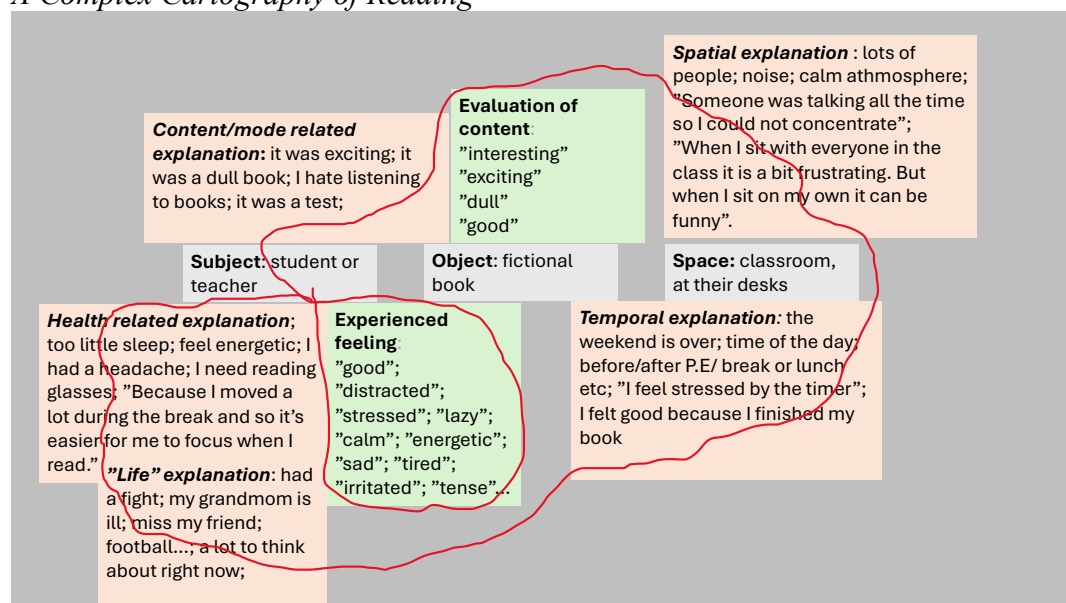
sharp division between students who are passionate and those who are reluctant about reading. While several students express their thoughts about reading in terms of “magic and imagination”, “so much fun”, “cool”, “good”, “cozy”, “easy” or “it’s my favourite thing”, others think of reading as “slow torture”, “boring”, “I don’t like it”, “I thought I was going to die” “not again” or “difficult”. One student brought up both poles when writing “It can be funny or boring but it’s important”.

Thus, following students’ first thoughts on reading we create a simple cartography of reading, including relations of an object (a book) a subject (the reader) and to the reader attached feelings or attitudes. This simple cartography invites to rather normative categorizations of readers as passionate or reluctant. It is important to also mention the minor variations in the map, that reflect voices of students thinking of “school” and “library” as related to reading, thus bringing the place for reading as potentially part of the cartography. Likewise, motives for reading, “it’s good for your brain” and resources, “glasses” are associated by single student voices. This cartography, based on students’ first associations to the word “reading”, invites to thinking of reading and young readers as entrapped in expected behaviours of reading and binary logics. In the next section we shift to mapping concrete reading experiences, creating a different cartography.

### Mapping Students’ Reading Experiences in School

The second research question, *How do students express their experiences of personal, concrete reading activities in school?* was addressed by working with students’ logbook entrances as made after different reading activities in class. In the log books, the activities clustered around the reading object being most often a fictional book that students say they find “interesting” (but also, “exciting”, “boring”, “tiring”). The mostly used space is the classroom where students sit at their desks and students express, they feel “good”, “distracted” etc. The cartography in Figure 2 is made with these entrances, as they gathered as repetitive ingredients in students’ documentation of their experiences. This cartography also entails students’ open-ended explanations (orange) of their feelings, as also expressed in the log-books.

**Figure 2**  
*A Complex Cartography of Reading*



In Figure 2, the reading subject, object and space (light grey) are temporally fixed as repetitive ingredients of the reading activities in school. Students' explanations (orange) of their expressed feelings and evaluations (green) are associated both to fixed ingredients, as content- and mode related (object), health related (subject), spatial- and temporal (space) but also to other phenomena – like having had a fight, worrying about grandmom, missing a friend - that are not logically/rationally, but rather bodily associated to the reading situation.

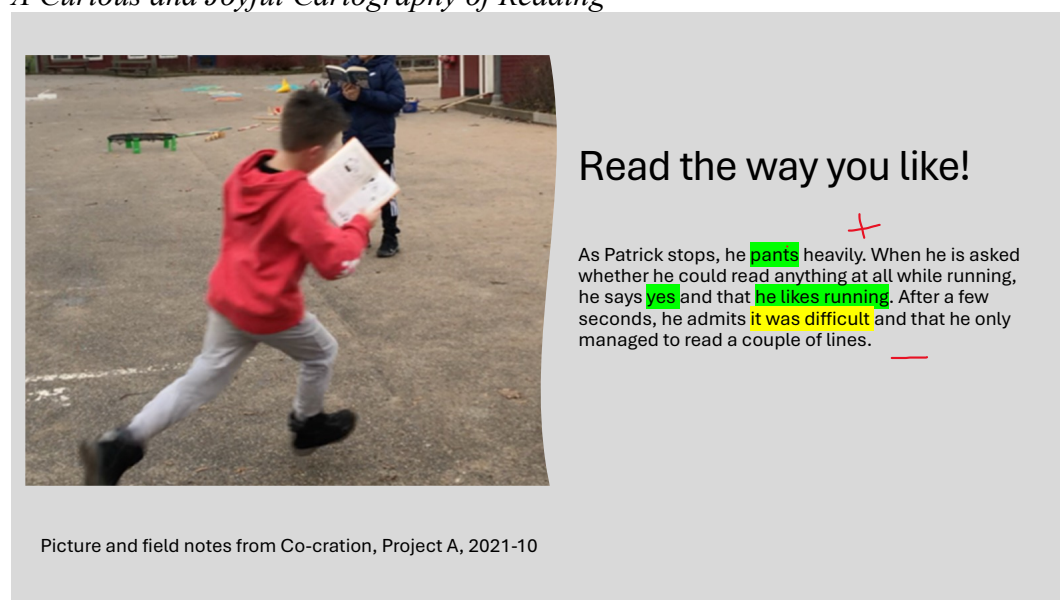
Thus, through mapping concrete experiences of reading activities in school, this cartography, compared to the first one, gets more complex, adding several different relations and dimensions playing a pragmatic role in the expressions of how reading is affectively experienced. The cartography in Figure 2 can this way be seen as involving both entrapment in normative practices and potential empowerment, when opening for a consideration of how reading does not occur between subject and object in a vacuum but as an entanglement with space, time and bodies. This potential empowerment will be further elaborated upon in the next section.

### Mapping Students' Reading – As It Could Be

*How do students co-create reading when encouraged to explore it differently?* is the research question we employed to three different co-creation sessions as presented in this section (Figure 3a, b, c). The sessions all have a different focus and in creating a common cartography, we map them one at a time, starting with an episode from a session in project A, where students were encouraged to read the way they liked, in the school yard. One of the students directly opened his book and started running around the school yard, while keeping the book open, facing his eyes, as showed in Figure 3a.

**Figure 3a**

*A Curious and Joyful Cartography of Reading*



The student, Patrick, like almost all students from both projects, demonstrated great openness, curiosity and joy towards experimenting with different – and what could be deemed both realistic and unrealistic – ways of reading. This is an important dimension of this third cartography, that recognizes students' willingness as a part of what and how reading or readers in early reading instruction could be. The green marks highlight the affirmative




approach as expressed by Patrick as he explores the conjunction of reading and running in the school yard. Patrick is optimistic about his attempt, but, as highlighted in yellow, he also admits it was difficult to read this way while running. There are both “pros and cons”, thus the combination of running and reading – may it be with audio books, a tread mill or something else – could still be worth a further, and more nuanced exploring.

The following episode from another co-creation session in project A, constituted a walk-and-talk around the school facilities, imagining what reading would be like in different spaces. This is illustrated in Figure 3b which reflects a stop with one group in the PE-hall.

**Figure 3b**

*A Wondering and Problematizing Cartography of Reading*

**What would reading be like here?**



Transcript of recording and picture from co-creation, Project A, 2021-10

Researcher: What would reading be like here?

Max: I would **lie down, put out the carpets and relax.**

Peter: take a lot of blocks and **build a hut**

Max: Yes, and, and, **sit and chill there...and read** +

Peter: It would have been **fun to climb the wall bars** and **sit up there and read**, but, although **it's scary**, I **don't think I would like to** do it. -

Max: But yes, **build a hut, that would have been so good.** +

Researcher: Why would that have been good?

Hanna: **Comfortable/Nice**

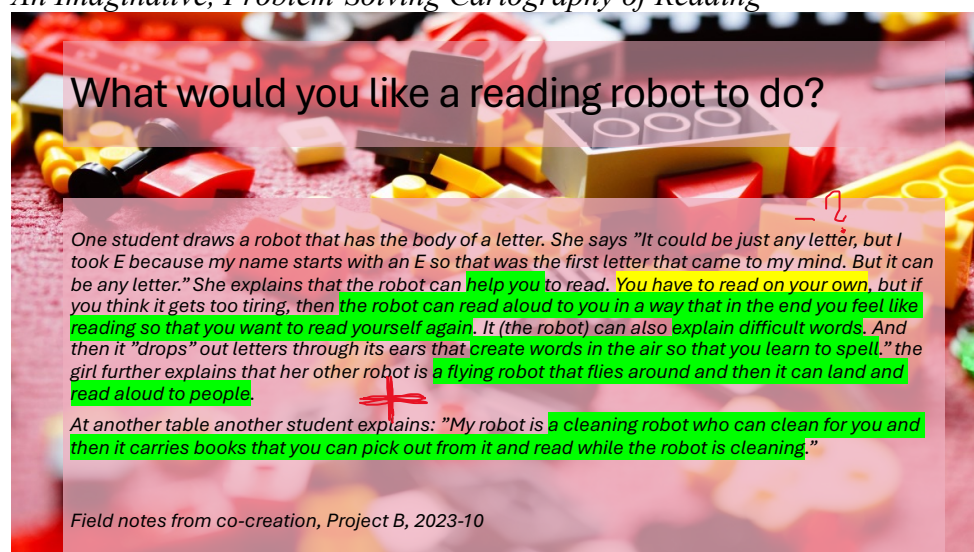
Max: **You can lie on a carpet** +

Researcher: What do you think? Would you like to read in the PE-hall?

Hanna: **Rather not...it's rather big, and then you can look around and...then you can get stuck in that.** I think it's better to be outside, or something smaller maybe. -

In Figure 3b, the green highlights show students engagement with the spatial potentials for reading in the PE hall. All students seem attracted to the “chilly”, relaxed, comfortable and perhaps cozy setting for reading that they imagine creating with the gymnastic equipment. On the other hand, as highlighted in yellow, both Peter and Hanna also express some hesitation to the high altitude and big size of the hall, which they relate to scare and distraction. Importantly, not all students express the same thoughts, and there is no common conclusion to be made about the PE hall being an apt or unapt space for reading. Rather, the walk-and-talk, it can be argued, sparks students’ thoughts about themselves as individual readers with different, spatial needs or priorities.

Finally, we make a last figure from a co-creation session in project B, where students were encouraged to work with Lego and/or drawings, imagining desired possibilities with a reading robot. Crafting the robots, students were asked to talk about their creations, explaining their abilities. In Figure 3c, the ideas of two different students are expressed.

**Figure 3c***An Imaginative, Problem-Solving Cartography of Reading*

The green colour in Figure 3c highlights potentially positive competences of the created reading robots. The sentence that is in yellow, however, provides the negative sounding condition to the first student's robot, that "you have to read on your own". The problem that is addressed, is related to reading as a demanding activity. Thus, from this perspective, the positive dimension of the robot's competences is that it would help to make reading on your own less tiring, triggering the student's motivation like a reading buddy, helping to explain difficult words, and modelling spelling through creating words "in the air". The same student's other robot may address the same problem but does not seem to build on the same negative condition, since it just flies around and reads aloud to people. The second student in Figure 3c, builds a cleaning robot that carries books. For this student, the imagined problem that the "reading robot" solves, is different. Perhaps it is about not having enough time for reading and thus, not being able to read when you must clean up your mess. If the robot cleans for you, you have more time for reading.

In sum, with the outcomes of co-creation sessions with students, a different cartography of reading is mapped. The three different Figures 3a-c show just a few potential dimensions of such a cartography, where we have highlighted students' affirmative approach to experimenting with reading in (un)conventional ways as well as the variations in why, what and how different students may want to approach such an exploration. Figure 4 is an attempt of illustrating the multiple dimensions by which students may engage in similar explorations of reading in school.

**Figure 4**  
*A Potentializing Cartography of Reading*

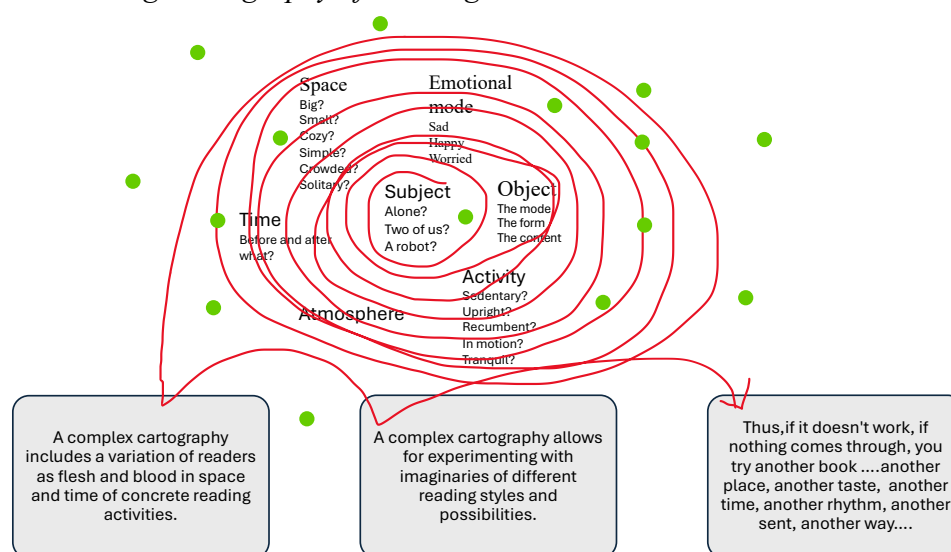


Figure 4 seeks complexity but can never become complex enough. Therefore it should be read as open ended, potentially including multiple possibilities for experimenting with and doing reading in various, both conventional and unconventional ways. This is an invitation to thinking with the concept of reading but also to practicing reading – and reading instruction – in multiple ways, which will be further discussed in the following.

## Discussion

This study has mapped reading in terms of simple, complex, and potentializing cartographies. It underscores the limitations of traditional decoding-and-comprehension models and the value of a broader, more inclusive understanding of literacy. The simple cartography mirrors longstanding instructional emphases on decoding and language comprehension as the bedrock of early reading development (Hoover & Gough, 1990; Kempe et al., 2011; Wren, 2001). By collapsing reading into an either-or category of “enthralled” or “spark-lost” readers, it reproduces normative binaries that can marginalize students whose embodied and contextualized reading practices deviate from institutional expectations (Hamilton, 2012; Hull & Schultz, 2002; Street, 2003). The fact that the simple cartography is created with students’ own first associations to the word “reading”, shows how students early on absorb and repeat a stereotypical image of what reading is and categorize themselves as either part of that image or as non-readers. Anyone concerned with fostering new generations of readers, should counteract this trend, for a greater amount of students to stay longer with the potential of becoming a reader.

In contrast, a complex cartography resonates with New Literacy Studies’ reconceptualization of literacy as socially and materially situated. Students’ logbooks from diverse reading activities in school, revealed the spatial rhythms, temporal flows, bodily movements, and emotional fluctuations that shape their engagement with texts. These findings align with recent work framing reading as a rhythmical, body-mind practice requiring sensory discipline and synchronization (Bro Trasmundi et al., 2021; Martín-Bylund & Stenliden, 2023; McLaughlin, 2015). Created with students’ concrete experiences from everyday reading activities in school, the complex cartography includes rather expected experiences, but as

these are contextualized, the cartography invites to scrutinizing whether there is room for adaptation and improvement. This way, the complex cartography could also support the view that movement and reading are not inherently opposed but can co-exist in diverse ways that honour student agency (Arvola et al., 2024; Mangen, 2013).

A potentializing cartography of reading, extends this perspective by mapping students' curiosities, affirmations, and individual variations in reading through bodily, spatial and material imagination and experimentation. It foregrounds affective and motivational dimensions, such as comfort, safety, and intrinsic interest (Marinak et al., 2010; Verhoeven & Snow, 2001), and echoes research on non-judgemental interventions—from reading with dogs (Hall et al., 2016; Sundström Sjödin & Rahm, 2025) to play- and drama-based activities (Fadool, 2009; Honeyford & Boyd, 2015)—in fostering positive, empowering reading experiences. In relation to reading as we know it, some experiments, like running while reading a physical book, may be considered too “crazy” or unrealistic. However, the same example may also be considered as too stuck to a stereotyped practice of traditional book reading. The point is that what may come about through working with a potentializing cartography of reading, is not any best or better general practice of reading. Rather, it is the process of open and non-judgemental exploring of multiple, (im)possible reading practices, that may embrace more young students to stay longer with the idea of themselves as readers.

Collectively, these cartographies illustrate that primary reading instruction must transcend narrow technical skill-driven frameworks and embrace the heterogeneity of student experiences. Pedagogically, this suggests designing learning environments that integrate flexible spaces, movement-friendly practices, and co-creative text engagements. Such environments can harness the social, bodily, and affective dimensions of reading, thereby cultivating each child's unique trajectory as a reader.

At the policy level, our findings caution against reductive interpretations of large-scale assessments and alarmist “reading crisis” narratives. When quantitative metrics overshadow qualitative nuances, they risk entrenching monolithic literacy standards that fail to account for the rich, embodied practices of diverse learners. Policymakers should, therefore, include cartographic and post-qualitative approaches alongside standardized measures to capture the full spectrum of early reading development.

## Conclusion

Guided by an interdisciplinary cartographic lens within a post-qualitative framework, we generated three “maps” of reading:

1. A simple, abstract cartography that collapses reading into a binary—young readers are either enthralled or have already “lost their spark”.
2. A richer, experience-based cartography, grounded in students' concrete encounters with texts, which exposes reading's spatial, temporal, bodily, and emotional dimensions and invites more empowering imaginaries.
3. A cartography of reading's potentialities—how it could (or must) be—that captures students' affirmations, curiosities, and varied bodily-spatial priorities alongside their frustrations.

We argue that leveraging students' openness to discover their own embodied reading practices is crucial to primary-level instruction. More broadly, continually questioning what

reading is—and what it might become—opens transformative possibilities for reading pedagogy.

This study is limited by its focus on 10-to11-year-olds within Swedish schools and by the scope of its co-creation activities. Future research should apply cartographic analysis to younger and older cohorts, diverse cultural contexts, and digital reading environments. Longitudinal investigations could reveal how students' cartographies evolve over time and in response to targeted pedagogical interventions. By continuing to question what reading is—and could be—education can move toward a more inclusive, dynamic, and humane literacy practice.

### **Acknowledgements**

We are deeply grateful to the students and teachers who generously shared their time, experiences, and insights throughout this study. Their openness to engage with the research activities and to reflect on their own reading practices has been invaluable in shaping the research. Without their enthusiasm and honest input, this work would not have been possible.

We acknowledge the financial support by the Swedish research council of the research projects 2020-03966 and 2022-04171.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

In preparing this manuscript, the authors made use of OpenAI's ChatGPT (GPT-4) solely for language refinement, phrasing suggestions, and stylistic polishing. All substantive intellectual contributions, including conceptual framing, data analysis, interpretation of results, and overall argument, were developed entirely by the authors. The authors take full responsibility for the content of the paper, and confirm that no AI system played a role in the generation of the core ideas, analyses, or conclusions.

## References

- Arvola, M., Martín Bylund, A., & Stenliden, L. (2024). Jump Around or Sit Still and Reading in Primary School. *Journal of Literary Education*, (8), 49–67. <https://doi.org/10.7203/JLE.8.28815>
- Braidotti, R. (2010). Nomadism: Against methodological nationalism. *Policy Futures in Education*, 8(3–4), 408–418. <https://doi.org/10.2304/pfie.2010.8.3.408>
- Braidotti, R. (2019). A Theoretical Framework for the Critical Posthumanities. *Theory, Culture & Society*, 36(6), 31–61. <https://doi.org/10.1177/0263276418771486>
- Bro Trasmundi, S., Kokkola, L., Schilhab, T., & Mangen, A. (2021). A Distributed Perspective on Reading: Implications for Education. *Language Sciences*, 84. <https://doi.org/10.1016/j.langsci.2021.101367>
- Deleuze, G. (1995). *Negotiations: 1972–1990*, trans. M. Joughin, New York: Columbia University Press.
- Deleuze, G., & Guattari, F. (2004 [1988]). *A Thousand Plateaus: Capitalism and Schizophrenia*. London: Continuum.
- Elam, K., & Widhe, O. (2015). Läslust och litterär förståelse ur ett kroppsligt perspektiv. [Reading pleasure and literary understanding from a bodily perspective.] In M. Tengberg & C. Olin-Scheller (Eds.), *Svensk forskning om läsning och läsundervisning*. [Swedish Research on Reading and Reading Instruction] (pp. 171–182). Gleerups.
- Fadool, M. C. (2009). “We Don't Serve No Ice Cream!”: Enhancing Children's Understanding and Use of Literacy through Play Events. *Journal of Reading Education*, 34(3), 23–29.
- Fatheddine, D. (2018). *Den kroppsliga läsningen: Bildningsperspektiv på litteraturundervisning* [The bodily reading: Educational perspectives on literature instruction]. Dissertation, Karlstads University.
- Glenberg, A. M. (2011). How reading comprehension is embodied and why that matters. *International Electric Journal of Elementary Education*, 4(1), 5–18.
- Hall, S. S., Gee, N. R., & Mills, D. S. (2016). Children reading to dogs: A systematic review. *PLoS ONE*, 11(2), 1–22. <https://doi.org/10.1371/journal.pone.0149759>
- Hamilton, M. (2012). *Literacy and the politics of representation*. Routledge.
- Honeyford, M. A., & Boyd, K. (2015). Learning Through Play. *Journal of Adolescent & Adult Literacy*, 59(1), 63–73. <https://doi.org/10.1002/jaal.428>
- Hoover, W. A., & Gough, P. B. (1990). The Simple View of Reading. *Reading and Writing: An Interdisciplinary Journal*, 2, 127–160.

- Hull, G., & Schultz, K. (2002). *School's Out: Bridging out-of-school literacies with classroom practice*. Teachers College Press.
- Jackson, A. Y., & Mazzei, L. A. (2012). *Thinking with theory in qualitative research: Viewing data across multiple perspectives*. Routledge.
- Kempe, C., Eriksson-Gustavsson, A. L., & Samuelsson, S. (2011). Are There any Matthew Effects in Literacy and Cognitive Development? *Scandinavian Journal of Educational Research*, 55(2), 181–196.
- Kontovourki, S. (2014). Reading (through) bodies: students' embodied performances of poetry and testing. *Pedagogies: An International Journal*, 9(2), 133–154. <https://doi.org/10.1080/1554480X.2014.899545>
- Lather, P., & St Pierre E. A. (2013). Post-qualitative research. *International Journal of Qualitative Studies in Education*, 26(6), 629–633.
- Lenz Taguchi, H. (2017). Ultraljudsfosterbilden: En feministisk omkonfigurering av begreppet posthumanism [The ultrasound fetal image: A feminist reconfiguration of the concept of posthumanism]. In B. Bergstedt (Ed.), *Posthumanistisk pedagogik: Teori, undervisning och forskningspraktik*. (pp. 167–190). Gleerups.
- Mangen, A. (2013). Putting the body back into reading: Kropp og hjerne, lesing og grensesnitt. [Body and brain, reading and interface.] *Skriftserien Cursiv*, 11, 11–31.
- Mangen, A. (2016). What Hands May Tell Us about Reading and Writing. *Educational Theory*, 66(4), 457–477.
- Marinak, B. A., Malloy, J. A., & Gambrell, L. B. (2010). Engaging Readers: Research-based Practices that Nurture the Motivation to Read. *The International Journal of Learning: Annual Review* 17(5), 503–512. <https://doi.org/10.18848/1447-9494/CGP/v17i05/47070>
- Martín-Bylund, A., & Stenliden, L. (2023). The running reader and the rhythm of reading. Paper presented at *Nordic Education Research Association, NERA* Oslo, March 2023.
- Martín-Bylund, A., Stenliden, L., Arvola, M. & Reimers, E. (Forthcoming). Classroom Reading as a Battle of the Sensory. Bodily Dimensions of Unshared Reading in Primary Education.
- McLaughlin, T. (2015). *Reading and the Body: The Physical Practice of Reading*. Palgrave Macmillan.
- Nielsen, C. (2011). Kroppen läser och skriver? Läsningens och skrivandets kroppslighet i ljuset av Merleau-Pontys kroppsfilosofi. [Does the body read and write? The corporeality of reading and writing in light of Merleau-Ponty's philosophy of the body.] *Educare*, (1), 65–90. <https://doi.org/10.24834/educare.2011.1.1217>

- Street, B. V. (2003). What's "new" in New Literacy Studies? Critical approaches to literacy in theory and practice. *Current Issues in Comparative Education*, 5(2), 77–91. <https://doi.org/10.52214/cice.v5i2.11369>
- Sundström Sjödin, E. (2019). *Where is the critical in literacy? Tracing performances of literature reading, readers and non-readers in educational practice*. (Doctoral dissertation) Örebro University.
- Sundström Sjödin, E., Persson, M., & Pettersson, D. (2024). Läsning, ekologi och siffror: sanningspraktiker hos en läsfrämjande aktör. Språk och litteratur: En omöjlig eller skön förening? [Reading, ecology and numbers: Truth practices of a reading promotion actor. Language and literature: An impossible or beautiful association?] SMDI-15. *Studia Rhetorica Lundensia* 8 (pp. 377–390).
- Sundström Sjödin, E., & Rahm, L. (2025). Robots, Dogs and Drags: The Politics of Reading and Being Read. *Postdigital Science and Education*. <https://doi.org/10.1007/s42438-025-00540-5>
- Verhoeven, L., & Snow, C. E. (eds) (2001). *Literacy and motivation: reading engagement in individuals and groups*. Erlbaum associates.
- Wren, S. (2001). *The Cognitive Foundations of Learning to Read: A Framework*. Southwest Educational Development Laboratory.
- Ylirisku, S., Jacucci, G., Sellen, A., & Harper, R. (2016). Design Research as Conceptual Designing: The Manhattan Design Concept. *Interacting with Computers*, 28(5), 648–663. <https://doi.org/10.1093/iwc/iwv040>

**Contact email:** [anna.martin.bylund@liu.se](mailto:anna.martin.bylund@liu.se)



## Levels of Authenticity of Word Problems in Turkish Mathematics Textbooks

Ali Sabri Ipek, Recep Tayyip Erdogan University, Turkey

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

Textbooks are the most important component of the intended curriculum and have a crucial role in the teaching of mathematics. The extensive use of word problems in mathematics textbooks provides strong clues about the learning/teaching opportunities available to students/teachers. The authenticity levels of the problems in textbooks, which are the basic materials of mathematics courses, affects students' problem solving skills. Based on the fact that students' reasoning and solving skills can be developed more effectively through authentic problems, this study analyzed the authenticity levels of a total of 486 word problems in a mathematics textbook used extensively at the 5th grade level in Türkiye according to a two-phase model. In the model developed by Vicente and Manchado (2017), word problems are examined first in terms of event, question, purpose, existence and specificity of the information, and then in three different levels, characterized as poor-fit, stereotyped and good-fit. The word problems in the 5th grade Turkish mathematics textbook are organized by the learning domains of numbers&operations, geometric shapes&quantities, algebraic thinking and statistics&probability. Non-parametric statistics are used for the significance of differences in the level of authenticity of word problems and learning domains. The results indicated that the word problems in statistics&probability were mostly at the good-fit and stereotyped level (39.8% and 47.7% respectively). On the other hand, the proportion of good-fit problems in numbers&quantities, geometric shapes&quantities and algebraic reasoning is quite low (19.4% in numbers&quantities, 6.4% in geometric shapes & quantities and 13.5% in algebraic reasoning). Moreover, statistically significant differences are found between the three levels of authenticity and the four learning domains. The results are discussed in the context of the design of authenticity of word problems in mathematics textbooks.

*Keywords:* word problems, authenticity, mathematics textbook

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Although there is a consensus on the importance of relating school mathematics to daily life, little is known about how and to what extent this actually happens in classrooms (Gainsburg, 2008). One of the most commonly used tools for this purpose in mathematics lessons is word problems. As in many countries, the updated mathematics curriculum in Turkey and, consequently, mathematics textbooks emphasize the use of authentic word problems that enable mathematical content to be related to daily life situations (Ministry of National Education [MoNE], 2024).

### Authentic Word Problems in Mathematics Textbook

Word problems are used extensively in mathematics classes because they provide opportunities and facilitate the connection of mathematical knowledge and concepts to everyday situations. Verschaffel et al. (2000) generally consider word problems as verbal introductions to problem situations. While word problems serve as a bridge between mathematical content and daily life, Chapman (2006) emphasizes the contributions of such problems to the development of students' critical thinking and problem-solving skills. However, Vicente and Manchado (2017) point out that the tasks or problems solved in mathematics classes contain abstract information disconnected from concrete contexts.

Word problems are used extensively in mathematics textbooks because they make it easier to relate mathematical content to daily life. Although the main reason for including word problems in textbooks is to make concepts and operations more meaningful and relate them to real life, this approach has turned into a direction dominated by unreality and repetition (Vos, 2018). Using real or realistic word problems in mathematics textbooks can make mathematical content more meaningful. However, Verschaffel et al. (2000) point out that word problems that are far from authenticity can lead students to use unrealistic thinking in solving tasks. School mathematics, and therefore mathematics textbooks, are full of problems with unrealistic contexts and standard applications. Enriching problems in terms of authenticity can make an important contribution to solving this problem. This is because working with authentic problems can make students' perception of mathematics more meaningful and interesting (Hernandez-Martinez & Vos, 2018). At the same time, problems and/or tasks that are rich in realism also contribute to students' problem-solving and reasoning skills. Palm (2008) points out that originality offers a broad framework of opportunities to integrate both mathematical content and students' participation in meaningful learning situations.

The purpose of this study is to examine the levels of authenticity of word problems in a widely used 5th grade mathematics textbook in Turkey according to learning domains. The authenticity levels of the 486 word problems in the textbook were analyzed according to a two-stage model. The word problems were first evaluated in terms of event, question, purpose, presence and specificity of information, and then in terms of three different authenticity levels: poor-fit, stereotypical, and good -fit.

## Method

This study is a quantitative study that examines the authenticity of word problems in the most widely published and intensively used mathematics textbook for 5th grade students in Turkey. The topics in this textbook are organized under four learning areas: numbers and quantities, geometric shapes and quantities, algebraic thinking and statistics and probability. The

authenticity of the arithmetic word problems in these four learning domains was examined comparatively.

## Data Collection

In Turkey, textbooks are reviewed and approved by the relevant units of the Ministry of National Education (MoNE) in a centralized system. The data for this study were obtained from a 5th grade textbook designed according to the middle school mathematics curriculum updated in 2024 and widely used in schools in Turkey. The word problems in the textbook and their corresponding learning domains are presented in Table 1.

**Table 1**

*Word Problems Examined and Learning Domains*

Learning Domains	Word problems examined
Numbers&quantities	185
Geometric shapes&quantities	124
Algebraic thinking	89
Statistics&probability	88
Total	486

## Data Analysis

In this study, the model developed by Vicente and Manchado (2017) was used to assess the authenticity of word problems in mathematics textbooks. Palm and Burman (2004) identified a total of nine aspects for evaluating the authenticity of word problems: event, question, purpose in the figurative context, data/information, language, availability of solution strategies, external tools, guidance and solution requirements.

They developed a binary evaluation model in which “1” points are given for dimensions that fully simulate each of these aspects and “0” points for those that do not. Vicente and Manchado (2017) expanded this evaluation system to a three-point scale. In this study, the authenticity of the word problem was examined in five dimensions: event, question, purpose, existence, and specificity of the information. If the probability of encountering the word problem outside of school is very high, it is given a score of “2”; if the probability of encountering it outside of school is low, it is given a score of “1”; and if it is impossible, it is given a score of “0”. Accordingly, the authenticity levels of word problems are divided into three categories: poor-fit, stereotyped, and good-fit.

*Good-fit problems:* At this level, the above five aspects are well simulated, and the total score that can be obtained is between 9 and 10.

*Stereotyped problems:* Although the above five aspects are not well simulated in problems of this level, the total score that can be obtained is between 5 and 8.

*Poor-fit problems:* In problems of this level, the above five aspects are simulated in a weak form, and the maximum total score that can be obtained is 4.

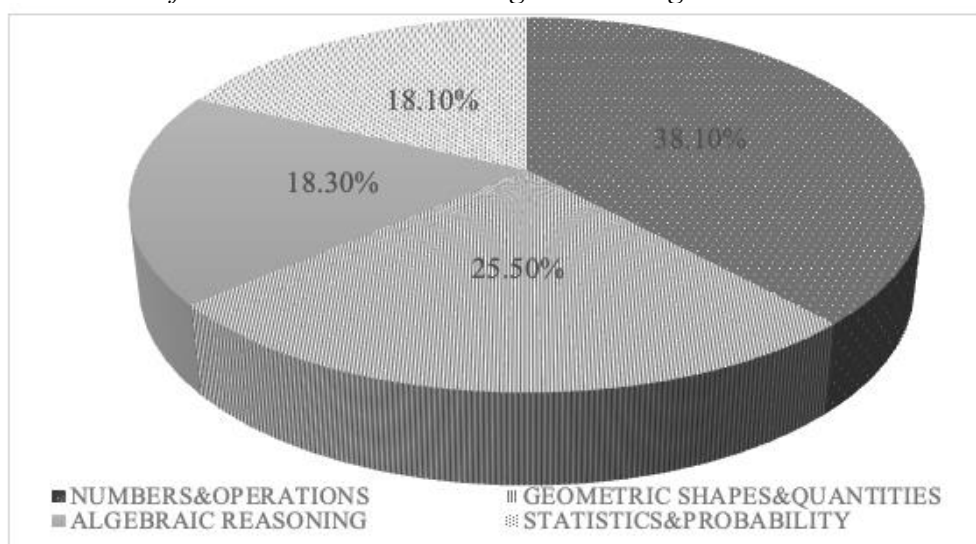
However, chi-square statistics from nonparametric statistics were also used to analyze the levels of authenticity of the word problems in the Turkish 5th grade mathematics textbook in terms of learning areas and levels of authenticity.

## Results

First, the distribution of word problems in the Turkish mathematics 5th grade textbook according to learning domains was examined (Figure 1). Figure 1 shows that 38.1% of the total word problems analyzed belong to numbers & operations, 25.5% to geometric shapes & quantities, 18.3% to algebraic reasoning, and 18.1% to statistics & probability.

**Figure 1**

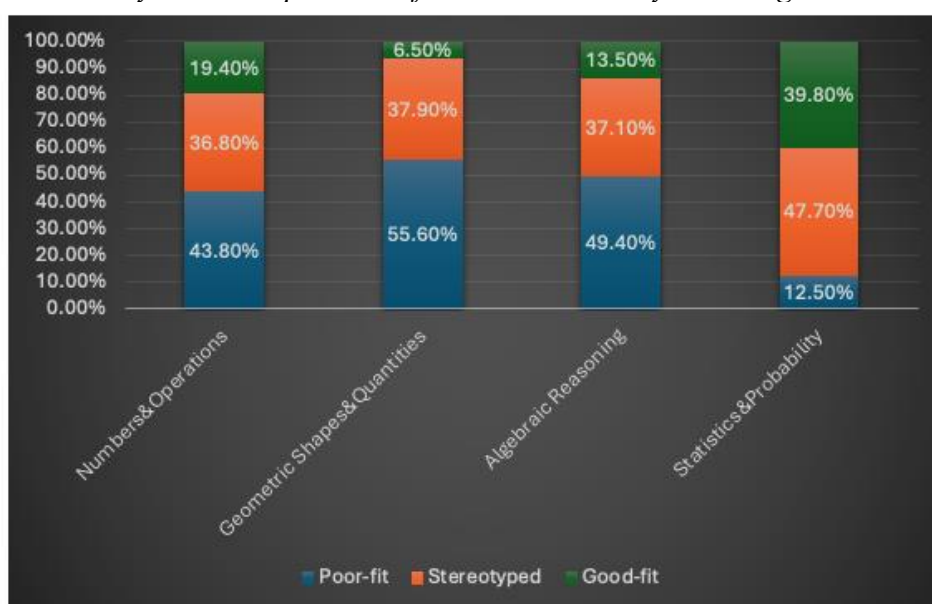
*Distribution of Word Problems According to Learning Domains*



Of the total 486 word problems examined in the mathematics textbook, 42.2% ( $n = 205$ ) were poor-fit, 39.1% ( $n = 190$ ) were stereotyped, and only 18.7% ( $n = 91$ ) were good-fit. Therefore, it was determined that the authenticity of the word problems in Turkish mathematics textbooks remained at a low level. The distribution of the authenticity levels of these problems in the textbook according to learning domains is shown in Figure 2.

**Figure 2**

*Authenticity Level Proportions of Word Problems by Learning Domains*



The highest levels of authenticity in word problems are found in the field of statistics and probability (Figure 2). Of the word problems in this domain, 39.8% are at the good-fit level, 47.7% are at the stereotyped level, and only 12.5% are at the lowest level, poor-fit. Except for statistics and probability, the authenticity of word problems in the remaining learning domain remains low. Approximately half of the word problems in the remaining three learning domains are at the poor-fit level. The lowest levels of authenticity in the word problems in the textbook are in geometric shapes & quantities. Only 6.4% of the word problems in this learning domain are at the good-fit level.

The chi-square test for independence was used to assess whether the levels of authenticity differed across the four learning domains. Table 2 shows the distribution of learning domains in the mathematics textbook and the levels of authenticity of the word problems. The result of the chi-square test reveals that there is a significant relationship between word problems and the four learning domain areas ( $X^2(6, 486) = 59.16, p < .05$ ). This result shows that the levels of authenticity of word problems in the four learning domain areas of the textbook differ significantly from each other.

**Table 2**

*Cross-Tabulation of Authenticity Levels and Learning Domains With Adjusted Residuals*

Category	Good-fit	Stereotyped	Poor-fit	Total(n)
Numbers&Quantities (n)	36	68	81	185
%	19.40%	36.80%	43.80%	
Adjusted residual (z)	0.33	-0.83	0.56	
Geometric Shapes&Quantities (n)	8	47	69	124
%	6.40%	37.90%	55.70%	
Adjusted residual (z)	-4.06	-0.32	3.52	
Algebraic Reasoning (n)	12	33	44	89
%	13.50%	37.10%	49.40%	
Adjusted residual (z)	-1.40	-0.43	1.53	
Statistics&Probability	35	42	11	88
%	39.80%	47.70%	12.50%	
Adjusted residual (z)	5.59	1.83	-6.23	
Total (n)	91	190	205	486

The word problems with the highest level of authenticity were most concentrated in the Statistics & Probability learning area ( $z = 5.59, 39.80\%$ ), while the word problems with the lowest level of authenticity were predominantly found in the Geometric Shapes & Quantities area ( $z = 3.52, 55.70\%$ ). In other words, comparisons between learning domain reveal that Statistics & Probability has more problems designed at both the good-fit (39.80%) and stereotyped (47.70%) levels, while Geometric Shapes & Quantities has more problems designed at the poor-fit (55.70%) level. In this context, it was found that word problems in the Statistics & Probability learning domain were better designed in terms of authenticity, while those in the Geometric Shapes & Quantities domain were weak in this regard. In the areas of algebraic thinking and numbers & operations, there are no significant differences between the levels of authenticity of word problems.

## Discussion and Conclusion

This study, which investigates the authenticity levels of word problems in the most widely used mathematics textbook in 5th grade classrooms in Turkey according to learning areas, reveals

some notable findings. When textbooks do not have sufficient and rich content in terms of relating to daily life, the development of the expected skills in students is hindered (Kim, 2004). At the same time, the weak content of textbooks in this regard has important implications for how teachers can shape their lessons. This limits students' opportunities to make sense of real life. The relevant literature shows that operational understanding dominates word problems in school mathematics (Thompson et al., 1994) and that authentic aspects are not sufficiently taken into account (Dewolf et al., 2015). Palm and Burman (2004) also found that high school-level problems in Finland and Sweden are significantly inadequate in simulating real-life contexts, particularly in terms of purpose and data/information characteristics. The results of this study are similar: The results obtained show that a significant portion of the word problems in Turkish textbooks are weak or moderate. In other words, there are very few word problems that are authentic. In other words, more than four out of five word problems in the textbook examined are poor-fit and stereotyped. This result also means that Turkish students may have more limited opportunities for developing their problem-solving skills. In parallel with this, Vicente et al. (2021) report that Spanish textbooks contain a high proportion of stereotypical problems that do not encourage students to think outside of school and poor-fit problems that may hinder their ability to understand the real world.

The second conclusion of the study is that the realism of word problems in textbooks varies according to learning domains. The learning area Statistics & Probability contains more word problems at the good-fit level, while Geometric Shapes & Quantities contains more at the poor-fit level. A more balanced distribution among learning areas will contribute to the textbook offering stronger opportunities to both students and teachers. İncikabı (2025) states that the authenticity of problems can be raised to the desired level of suitability by making adjustments to aspects of textbooks that reduce their level of authenticity.

The results of this study provide some clues for the design of textbooks in terms of the authenticity of problems and/or tasks. In addition, further research is needed on the effects of improving the authenticity of word problems in textbooks on teachers and students.

## References

- Chapman, O. (2006). Classroom practices for context of mathematics word problems. *Educational Studies in Mathematics*, 62, 211–230.
- Dewolf, T., Van Dooren, W., Hermens, F., & Verschaffel, L. (2015). Do students attend to representational illustrations of nonstandard mathematical word problems, and, if so, how helpful are they? *Instructional Science*, 43, 147–171.
- Gainsburg, J. (2008). Real-world connections in secondary mathematics teaching. *Journal of Mathematics Teacher Education*, 11, 199–219.
- Hernandez-Martinez, P., & Vos, P. (2018). “Why do I have to learn this?” a case study on students’ experiences of the relevance of mathematical modelling activities. *ZDM*, 50, 245–257. <https://doi.org/10.1007/s11858-017-0904-2>
- İncikabı, S. (2025). Investigating the contextual realism levels of the mathematics contents in curriculum resources in Türkiye, *Kastamonu Education Journal*, 33(2), 276–285. <https://doi.org/10.24106/kefdergi.1683443>
- Kim, T. (2004). *Shadow education: School quality and demand for private tutoring in Korea*. Working paper. Seoul, South Korea: KDI Institute of Public Policy and Management.
- Ministry of National Education (MoNE). (2024). *Middle school mathematics teaching program*. Ankara.
- Palm, T. (2008). Impact of authenticity on sense making in word problem-solving. *Educational Studies in Mathematics*, 67(1), 37–58. <https://doi.org/10.1007/s10649-007-9083-3>
- Palm, T., & Burman, L. (2004). Reality in mathematics assessment: An analysis of task-reality concordance in Finnish and Swedish national assessments. *Nordic Studies in Mathematics Education*, 9(3), 1–33.
- Thompson, A., Philipp, R., Thompson, P., & Boyd, B. (1994). Calculational and conceptual orientations in teaching mathematics. In D. Aichele & A. Coxford (Eds.), *Professional development for teachers of mathematics, 1994 yearbook of the national council of teachers of mathematics* (pp. 79–92). National Council of Teachers of Mathematics.
- Verschaffel, L., Greer, B., & De Corte, E. (2000). *Making sense of word problems*. Swets & Zeitlinger Publishers.
- Vicente, S., & Manchado, E. (2017). Dominios de contenido y autenticidad: un análisis de los problemas aritméticos verbales incluidos en los libros de texto españoles [Content domains and authenticity: an analysis of verbal arithmetic problems in Spanish textbooks]. *PNA*, 11(4), 253–279. <http://hdl.handle.net/10481/47547>
- Vicente, S., Verschaffel, L., & Múñez, D. (2021). Comparison of the level of authenticity of arithmetic word problems in Spanish and Singaporean textbooks. *Culture and Education*, 33(1), 106–133, <https://doi.org/10.1080/11356405.2020.1859738>

Vos, P. (2018). How Real People Really Need Mathematics in the Real World-Authenticity in Mathematics Education. *Education Sciences*, 8(4), 195.  
<https://doi.org/10.3390/educsci8040195>

**Contact email:** ali.ipek@erdogan.edu.tr



## **Integrating AI Into Accounting Education: Innovations, Ethical Considerations, and Pedagogical Shifts**

Nadia Sbei Trabelsi, American University in Dubai, United Arab Emirates

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

The integration of Artificial Intelligence (AI) into accounting education is significantly transforming both pedagogical practices and research methodologies within the field. This paper examines how AI-driven tools are influencing teaching methods, curriculum development, and student learning experiences. It also explores AI's expanding role in academic research, highlighting its potential to streamline literature reviews, enhance data analysis, and support the development of new research frameworks. Key themes include AI's capacity to increase student engagement, personalizing instruction, and automate routine educational tasks, enabling educators to focus more on developing students' higher-order cognitive skills. At the same time, the paper addresses growing concerns related to over-reliance on AI, ethical challenges, and the risk of eroding essential accounting competencies. The findings underscore that while AI offers considerable promise for advancing accounting education and research, its successful implementation depends on maintaining pedagogical integrity, fostering critical thinking, and navigating ethical complexities. Finally, the paper considers how the evolving role of AI in scholarly inquiry invites reflection on the balance between automation and human judgment in knowledge creation. By situating these developments within the accounting domain, the paper contributes to broader discussions on the responsible adoption of AI in education.

*Keywords:* artificial intelligence, business education, accounting pedagogy, AI in academic research

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Artificial Intelligence (AI) is increasingly influencing the landscape of higher education, transforming how knowledge is delivered, acquired, and evaluated. In accounting education, the integration of AI represents both an opportunity and a challenge. While early concerns focused on the potential misuse of AI tools by students seeking shortcuts, the growing prevalence and capability of these tools have prompted a more thoughtful reexamination of pedagogical approaches. Rather than resisting this change, educators are now considering how to effectively incorporate AI into their teaching, learning, and research frameworks (Akinwalere & Ivanov, 2022; Fachrurrozie et al., 2025).

This paper explores how AI is reshaping accounting education by focusing on three interrelated dimensions: innovations in curriculum design and pedagogy, transformations in student learning and experience, and the evolving landscape of academic research. It also highlights ethical considerations and the need for responsible integration. Drawing upon recent studies, the paper aims to provide a critical synthesis of emerging practices and debates within this dynamic field.

## Curriculum Design and Pedagogical Shifts

AI is facilitating a profound transformation in the way accounting courses are structured and delivered. Traditionally, instruction in accounting has centered on lecture-based teaching and manual problem-solving activities. However, the adoption of AI tools is prompting educators to redesign their approaches by incorporating interactive and simulation-based modules. These intelligent learning environments are capable of adapting to student inputs in real time, thereby fostering greater engagement and allowing for more personalized learning experiences (Fachrurrozie et al., 2025; Valcea et al., 2024).

A growing number of instructors are utilizing AI-powered platforms that support automated data analysis, customized learning paths, and adaptive assessment techniques. These technologies not only streamline instructional delivery but also free up instructional time for more advanced, discussion-driven exploration of complex accounting problems. AI can, for example, be used to generate tailored financial scenarios for students to analyze—offering a practical, real-world dimension to classroom exercises and helping to cultivate critical thinking and professional judgment (Valcea et al., 2024).

This shift, however, requires that faculty themselves be equipped to engage with these emerging tools. The successful integration of AI into accounting education depends on instructors receiving appropriate training, not just in the operation of AI technologies but also in understanding their pedagogical and ethical implications. As Chan (2023) emphasizes, professional development efforts must extend to include support in instructional design, AI-supported assessment practices, and the responsible integration of technology into educational contexts. Without this parallel investment in faculty readiness, the pedagogical benefits of AI risk being unevenly implemented or misunderstood.

## Student Experience and Learning Processes

AI has also introduced new levels of personalization into student learning experiences. Adaptive learning systems analyze individual progress and adjust content difficulty accordingly, which has been shown to increase motivation and retention (Akinwalere &

Ivanov, 2022). These platforms offer immediate feedback and recommendations, helping students navigate complex accounting concepts more effectively (Janaki & Mariyappan, 2024).

Automated grading systems and AI-generated study aids, such as content summaries and flashcards, improve efficiency but also pose risks. Students may become overly reliant on these tools, reducing their cognitive engagement with course material. Hooda et al. (2022) caution against the potential for surface-level learning when students bypass deeper analytical thinking.

Overuse of AI tools may hinder students' development of essential accounting competencies such as judgment, skepticism, and ethical reasoning. Kovari (2025) notes that dependency on AI-generated responses can weaken problem-solving skills and inhibit self-directed learning. To address this, guided use of AI tools must be embedded in pedagogical strategies.

### **AI in Accounting Research**

AI has significantly changed the research process in accounting. Large Language Models (LLMs) like ChatGPT can perform rapid literature reviews, identify theoretical gaps, and assist with drafting scholarly texts (Agarwal et al., 2024). While promising, these capabilities also demand critical oversight to ensure academic rigor.

AI enables the automation of complex data analysis, facilitating advanced research in areas such as audit risk, financial forecasting, and fraud detection (Ballantine et al., 2024; Liu, 2024). Predictive models based on machine learning have been applied to massive datasets, allowing for more nuanced interpretations and timely insights.

Although AI can expedite the research process, Du Toit (2024) questions whether AI-generated research outputs can match the analytical depth of human-authored work. Scholarly integrity must be maintained through rigorous validation, triangulation of sources, and transparent methodology.

### **Ethical Considerations and Institutional Challenges**

The increasing use of AI in academic contexts introduces complex ethical questions that requires attention from educators, administrators, and policymakers. One of the most pressing concerns relates to authorship and the originality of student work. Kovari (2025) highlights growing unease among faculty members regarding the ability to detect AI-assisted submissions. As tools like ChatGPT become more sophisticated in producing grammatically correct and coherent content, distinguishing between human-authored and AI-generated work becomes increasingly difficult. This ambiguity undermines traditional understandings of plagiarism and raises significant challenges in upholding academic integrity. Without clear, enforceable guidelines, students may inadvertently or deliberately cross boundaries, leading to inconsistent disciplinary outcomes and confusion about what constitutes acceptable academic conduct.

To respond effectively to these concerns, institutions should establish transparent and consistent policies outlining the appropriate use of AI tools in academic settings. These policies should not only define misconduct but also provide constructive guidance on ethical engagement with AI. For instance, educators might encourage students to disclose when and

how AI tools were used during the research or drafting process, thus fostering a culture of accountability and critical reflection rather than punishment.

Beyond issues of authorship, the reliability and accuracy of AI-generated content pose additional risks. Chan (2023) warns that language models can produce factually incorrect or misleading outputs, especially in disciplines like accounting that require precision, regulatory compliance, and attention to detail. Because AI systems often lack context-specific understanding, they may offer plausible-sounding but inaccurate information. This becomes particularly concerning when students accept these outputs uncritically, relying on them as authoritative without verification. Educators must therefore play an active role in cultivating students' information literacy, emphasizing the importance of cross-checking AI outputs with primary sources and professional standards.

Equity is another major ethical dimension in the conversation about AI in education. Not all students have equal access to advanced AI tools, or the digital literacy needed to use them effectively. Xu and Babaian (2021) point out that disparities in technological access may exacerbate existing educational inequalities. While some students benefit from premium AI subscriptions and personalized learning support, others may be left behind due to economic, geographic, or institutional barriers. To ensure fairness, universities must invest in infrastructure that enables equitable access to digital tools and establish shared pedagogical frameworks. These initiatives should include training for both students and faculty on the ethical, practical, and cognitive dimensions of AI in education. Without such systemic efforts, the adoption of AI technologies risks reinforcing structural inequalities rather than serving as a vehicle for inclusive innovation.

## Conclusion

AI is reshaping accounting education in profound and multifaceted ways. It presents promising opportunities to enhance teaching, personalize student learning, and expand the scope and scale of academic research. Yet, the benefits of AI can only be realized through thoughtful and responsible integration that aligns with the core goals of accounting education—namely, developing critical thinking, professional judgment, and ethical reasoning.

To support these goals, AI tools must function as complements to—not replacements for—learning objectives. Assignments should be purposefully designed to promote reasoning, analysis, and reflective engagement with content, minimizing the likelihood of passive or superficial learning (Hooda et al., 2022). This shift in assessment strategy has led many institutions to adopt process-based evaluations such as oral exams, project portfolios, and in-class case discussions, which are inherently less susceptible to AI misuse and more effective in capturing authentic student competencies (Kovari, 2025).

Equally important is the role of faculty. Effective and ethical AI adoption depends on providing instructors with the knowledge and tools necessary to integrate these technologies meaningfully. Chan (2023) and Xu and Babaian (2021) emphasize the critical need for faculty development programs that address not only the technical use of AI but also its ethical implications and practical constraints. Institutional investment in such support mechanisms is essential for cultivating a culture of responsible innovation.

Ultimately, the future of accounting education lies not in resisting technological advancement but in leading its pedagogical transformation. This requires a sustained commitment to academic integrity, equity, and critical inquiry. As the literature reveals, there is no one-size-fits-all solution, and best practices are still emerging. Continuous reflection, adaptive policy-making, and open dialogue among educators, students, and institutions will be necessary to ensure that AI is leveraged not only effectively but ethically and inclusively.

## References

- Agarwal, S., Sahu, G., Puri, A., Laradji, I. H., Dvijotham, K. D., Stanley, J., & Pal, C. (2024). LLMs for Literature Review: Are we there yet? arXiv preprint arXiv:2412.15249.
- Akinwalere, S. N., & Ivanov, V. (2022). Artificial intelligence in higher education: Challenges and opportunities. *Border Crossing*, 12(1), 1–15.
- Ballantine, J., Boyce, G., & Stoner, G. (2024). A critical review of AI in accounting education: Threat and opportunity. *Critical Perspectives on Accounting*, 99, 102711.
- Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. *International Journal of Educational Technology in Higher Education*, 20(1), 38.
- Du Toit, E. (2024). Can artificial intelligence produce a convincing accounting research article? *Accounting Research Journal*, 37(4), 365–380.
- Fachrurrozie, F., Nurkhin, A., Santoso, J. T. B., Mukhibad, H., & Wolor, C. W. (2025). Exploring the use of artificial intelligence in Indonesian accounting classes. *Cogent Education*, 12(1), 2448053.
- Hooda, M., Rana, C., Dahiya, O., Rizwan, A., & Hossain, M. S. (2022). Artificial intelligence for assessment and feedback to enhance student success in higher education. *Mathematical Problems in Engineering*, 2022(1), 5215722.
- Janaki, T., & Mariyappan, M. S. R. (2024). Exploring the influence of AI-powered learning tools on student understanding and academic performance: A comprehensive analysis. *International Journal of Management*, 11(S1-May), 18–26.
- Kovari, A. (2025). Ethical use of ChatGPT in education—Best practices to combat AI-induced plagiarism. *Frontiers in Education*, 9, 1465703.  
<https://doi.org/10.3389/feduc.2024.1465703>
- Liu, Y. (2024). Transforming Accounting with Generative AI: Potential Opportunities and Key Challenges. *Asia Pacific Economic and Management Review*, 1(3), 1–9.
- Valcea, S., Hamdani, M. R., & Wang, S. (2024). Exploring the impact of ChatGPT on business school education: Prospects, boundaries, and paradoxes. *Journal of Management Education*, 48(5), 915–947.
- Xu, J. J., & Babaian, T. (2021). Artificial intelligence in business curriculum: The pedagogy and learning outcomes. *The International Journal of Management Education*, 19(3), 100550.

**Contact email:** nsbeitrabelsi@aud.edu

## AI Collaboration for Programming Education Beyond Computer Science

Lauren Miller, The University of Queensland, Australia  
Felix Egger, The University of Queensland, Australia  
Aneesha Bakharia, The University of Queensland, Australia

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

Programming education across STEM disciplines faces significant institutional and pedagogical barriers, including student identity conflicts, syntax knowledge gaps, and limited faculty support for interdisciplinary work. This integrative literature review examines how generative artificial intelligence (GenAI) tools can address cross-disciplinary programming barriers while meeting diverse disciplinary learning needs. From experimental research (2018-2025), we identified key challenges that particularly affect non-CS students, including programming self-efficacy barriers and overwhelming syntax requirements. Our findings reveal that GenAI tools function as sophisticated low-code programming environments, significantly increasing programming interest in students by enabling natural language interactions and reducing debugging anxiety. However, concerns about critical thinking erosion and “one-shot prompting” behaviors highlight the need for scaffolded implementation approaches. Our teaching approach uses discipline-specific content generation, integrated focus on GenAI alongside coding skills, and structured prompting exercises that develop iterative refinement skills. Students begin viewing programming as an important tool rather than separate technical skill, with reduced debugging anxiety and improved computational thinking development. This research emphasizes that while GenAI tools can democratize programming access across disciplines, institutional support, staff collaboration and thoughtful pedagogical integration with metacognitive scaffolding is essential for maintaining learning quality and developing critical thinking alongside technical competencies.

*Keywords:* programming, AI, higher education, curriculum

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Despite programming's expanding importance across STEM fields, the integration of programming education across tertiary disciplines faces significant institutional and pedagogical barriers extending beyond software limitations. Siloed disciplines tend to regulate interdisciplinary activity, to “ensure that interdisciplinary efforts tend to exist on the margins of established disciplines” (Holley, 2017) and sustain a pedagogical status quo (Holley, 2009). Faculties developing integrated programming courses “in spite of, not because of, departmental and disciplinary priorities,” face challenges due to a lack of time for staff to support learning programming in different disciplines (Holley, 2017). Early-career faculty are especially vulnerable since they are at risk of scrutiny from their senior colleagues for innovating in their teaching methods despite appreciating the necessity of interdisciplinary work (Holley, 2017). Generative artificial intelligence (GenAI) tools present both opportunities and challenges for closing the gap for cross-disciplinary programming education. While GenAI-assisted programming has been extensively researched in computer science teaching contexts, it is important to understand how its implementation varies across disciplines.

## Literature Review

This study employed an integrative literature review methodology following Whittemore and Knafl's (2005) framework, comprising five key stages: problem identification, literature search, data evaluation, data analysis, and presentation of findings. A literature search was conducted in major databases including ACM and Proquest to identify experimental research published 2018 - 2025 into the integration of GenAI into coursework in tertiary programming education. Peer reviewed journal articles and conference papers were filtered for relevance and key themes were identified. These findings were synthesized to answer the research question: *How can GenAI address cross-disciplinary programming barriers in tertiary education while meeting the learning needs of the respective disciplines?*

## Cross-Disciplinary Programming Challenges

### “I’m not a Computer Science Student”: The Programming Identity Conflict

Students in non-computer science disciplines often experience programming identity conflict, where they resist programming not due to intellectual incapacity but because they do not see themselves as “programmers.” This barrier is compounded by cultural stereotypes positioning computer science as primarily masculine and technically exclusive, creating additional obstacles for traditionally underrepresented groups (MacNeil et al., 2023).

GenAI tools can function as sophisticated low-code programming environments that enable software development without extensive syntax knowledge, potentially democratizing access to problem-solving with programming. However, simply providing access to GenAI tools is insufficient; students need scaffolded experiences that help them recognize how programming with GenAI serves as a tool for discipline problems.

### Programming Self-Efficacy Rises With the Introduction of GenAI Programming Tools

Students entering non-computer science programs may lack foundational programming literacy, creating additional barriers when encountering programming requirements. The fear



of debugging and technical troubleshooting particularly challenges cross-disciplinary programming education, as students can be frustrated by the amount of work required for debugging even when they have good programming skills (Fitzgerald et al., 2008).

Research demonstrates that GenAI significantly increases interest in programming in up to 91% of students (Llerena-Izquierdo et al., 2024). The conversational nature of GenAI tools transforms programming education by enabling natural language exchanges, where students can “ask the problem with the AI tool and can get instant feedback and solve the problem” (Yilmaz & Karaoglan Yilmaz, 2023).

### **The Syntax Knowledge Barrier Is Lowered With the Introduction of GenAI Tools**

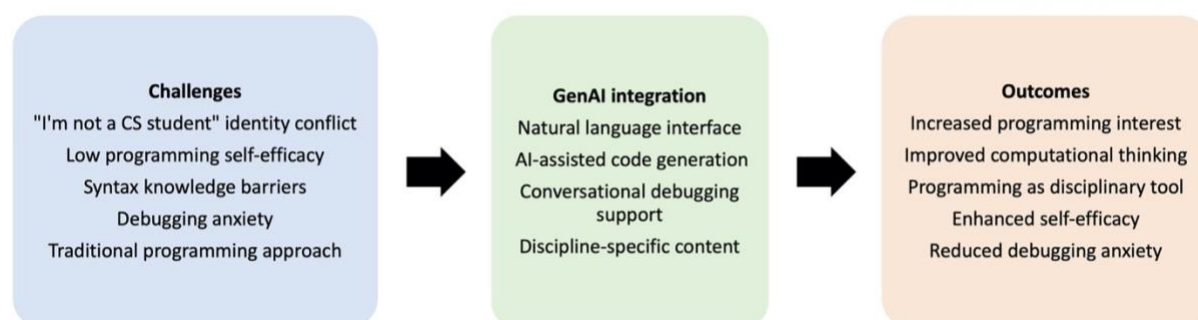
The barrier created by learning new programming languages represents a significant challenge for students whose primary focus lies in other disciplines. Students may be motivated to learn the theory behind an algorithm but can find stringent syntax requirements overwhelming and demotivating when combined with existing coursework demands (Lai et al., 2022), although this can depend on students’ attitude and how the programming is integrated into coursework (Ditta & Woodward, 2024).

As a solution, GenAI can generate code from natural language descriptions (Schlegel et al., 2019), enabling learners to concentrate on the problem-solving aspects of computational thinking (Song et al., 2024). This natural language interface enables students to express programming intentions in their own vocabulary before receiving AI-generated code suggestions.

However, as Prather et al. (2024) noted, careful integration is needed as GenAI tools may not improve metacognition and could widen gaps between struggling and excelling students. Development of code products should always involve collaboration where the student is “pair programming” with the GenAI agent (Imai, 2022).

**Figure 1**

*The Transformation of Cross-Disciplinary Programming Education Through GenAI Integration*



### **GenAI for Programming Pedagogy**

#### **Courses With AI-Assisted Programming Report Positive Learning Outcomes**

The systematic review reveals predominantly positive learning outcomes from GenAI integration. AI-assisted programming tools significantly improve learning outcomes and

academic performance by enhancing students' "computational thinking skills, programming self-efficacy, and course motivation" (Yilmaz & Karaoglan Yilmaz, 2023). Students using ChatGPT outperformed those using traditional programming help resources like online forums such as Stack Overflow (Park & Kim, 2025).

GenAI tools enhance engagement through multiple mechanisms. Enhanced compiler messages reduce debugging time (Denny et al., 2020), while hints from a ChatGPT model help resolve compiler errors while reducing frustration (Pankiewicz & Baker, 2024). The majority of students found AI-generated code explanations helpful, though engagement varied depending on complexity and explanation type (MacNeil et al., 2023).

### **Concerns About Critical Thinking Capabilities Were Raised**

The integration of GenAI tools raises fundamental concerns about learning outcomes and pedagogical effectiveness, specifically the risk those tools eroding critical thinking skills and masking students' lack of genuine comprehension (Rahman & Watanobe, 2023). Reeves et al. (2023) warn that students can rely too much on GenAI "without properly understanding the underlying concepts."

The emergence of "one-shot prompting" behaviors represents a particular concern, where students submit initial prompts without iterative refinement or critical evaluation of outputs. Ahmed and Srivastava (2020) found that performance improvements seen with the use of GenAI were not observed in exams, explaining the improvement to be "primarily logistical rather than conceptual" and not increasing students' learning as intended.

### **Computational Thinking Development**

The development of computational thinking skills, including problem decomposition, pattern recognition, abstraction, and algorithmic thinking (Wing, 2010), represents a critical bridge between disciplinary knowledge and programming competence. Students should develop the capability to decompose problems into logical steps and code those steps appropriately (Wilson & Nishimoto, 2024).

Large language models (GenAI tools) can assist by helping students explain code, test implementations, and decompose large problems into smaller functions (Vadaparty et al., 2024). However, decomposition should be performed in collaboration with GenAI, since it lacks the ability to respond to complex problems effectively (Ahmed et al., 2024).

### **Implementation Framework: The University of Queensland Model**

#### **Addressing Research Gaps**

To address the research gap of integrating GenAI into cross-disciplinary programming education, our team at the University of Queensland assembled academics from computer science, engineering, architecture, humanities, and business, with funding from a Teaching Innovation Grant. This diversity of disciplines proved essential for understanding common difficulties students across disciplines experience when learning to use programming in their discipline.

The team identified that discipline context is critical for student engagement. Rather than teaching programming abstractly, we developed a workflow that generates a teaching module (“Learning programming with GenAI”) that, with the help of GenAI, generates discipline-specific content, ensuring that, for example, psychology students work with psychological research scenarios, business students engage with business analytics problems, and architecture students explore digital architectural design challenges.

### **Module Design Principles**

The module emphasizes teaching GenAI concepts (prompting techniques, responsible AI use) alongside coding concepts (programming logic, debugging, AI-assisted help-seeking). This dual focus addresses concerns about critical thinking while building practical GenAI interaction competencies. The self-paced learning approach incorporates interactive elements and GenAI tutor feedback, providing personalized support that approximates 1:1 teacher-to-student ratios (Liu et al., 2024).

Pilot testing in Chemical Engineering with planned implementation in Digital Communications and Architecture has revealed key insights: students begin seeing programming as a tool for disciplinary inquiry rather than separate technical skill, GenAI-assisted approaches greatly reduce anxiety around debugging, and structured prompting exercises help students move beyond one-shot interactions to develop iterative refinement skills.

## **Pedagogical Recommendations**

### **Scaffolded Critical Evaluation**

Effective implementation requires frameworks encouraging students to critically evaluate AI-generated content. Wu et al. (2025) advocate for approaches that “foster the development of HOTS [Higher Order Thinking Skills] and self-directed learning skills while leveraging the benefits of GenAI-assisted learning.” Students must develop the ability to “ask the right questions” of GenAI for effective problem-solving support (Ellis et al., 2024).

### **Institutional Support**

Successful integration requires institutional commitment to addressing the structural barriers identified in cross-disciplinary work. Some institutions have modified policies, with examples including explicit statements that faculty should “receive full credit for their contributions to interdisciplinary and/or collaborative scholarly projects” (Holley, 2017).

### **GenAI Collaboration**

The integration of GenAI into programming education should be thoughtful and pedagogically intentional, guiding students to reflect and learn rather than simply delivering content or providing solutions for assessment questions (Liu et al., 2024). Educational institutions should adopt proactive stances toward GenAI-based tools, ensuring they serve as supplemental teaching aids rather than replacements for fundamental instruction (Ahmed et al., 2024).

## **Future Research Directions**

The systematic review reveals critical gaps requiring investigation. With most research focusing on computer science contexts, there is an urgent need for studies examining GenAI-assisted programming education in other disciplines where programming serves instrumental rather than intrinsic purposes. Research should examine long-term learning outcomes beyond immediate performance improvements, investigating whether GenAI-assisted programming education leads to sustained computational thinking abilities. Additionally, traditional programming assessments may be inadequate for evaluating GenAI-assisted learning, requiring new approaches that measure students' ability to collaborate effectively with GenAI tools while maintaining conceptual understanding.

## **Conclusion**

In conclusion, GenAI tools in cross-disciplinary programming education can make coding more accessible to students from different academic backgrounds, but simply providing these tools without any metacognitive scaffolding is not enough. Successful integration of GenAI tools requires pedagogical approaches that build student confidence, develop critical thinking, and connect programming to students' own fields of study, helping overcome the misconception that programming is not relevant to their discipline. However, universities face major barriers to implementing these changes, including faculty resistance and teaching staff concerned about career advancement when pursuing interdisciplinary work. Overcoming these challenges needs institutional support, updated evaluation systems, and recognition of the extra effort required to develop integrated courses. Our approach at the University of Queensland shows promise for a scalable learning module solution that maintains teaching quality while reducing barriers. As GenAI tools improve, collaboration between computer science and other faculty will be crucial for creating more inclusive and effective programming education.

## **Acknowledgements**

Authors would like to acknowledge the useful conversations of the Teaching Innovation Grant team, including As/Prof Hassan Khosravi, Prof Jason Tangen, Dr Leah Henrickson, Dr Dan Luo, Dr Ida Asadi Someh, and Kim Henville.

## **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

GenAI was used in the literature review process to support the identification (Research Rabbit) and narrowing down literature from thousands of search results (a collaborative process involving OpenAI ChatGPT to assess abstracts). GenAI was also used in the planning of this paper (Anthropic Claude).

## References

- Ahmed, M., Dras, M., & Richards, D. (2024). Investigating the effectiveness of ChatGPT in programming education: A controlled study. *Computers & Education*, 198, 104751.
- Ahmed, S., & Srivastava, N. (2020). Automated feedback tools in programming education: Performance and learning outcomes. *Journal of Educational Technology Systems*, 48(3), 287–305.
- Bejarano, G., Cukurova, M., & Spikol, D. (2025). AI-Lab: A framework for responsible AI integration in programming education. *Computers & Education*, 205, 104892.
- Denny, P., Luxton-Reilly, A., & Tempero, E. (2020). Enhancing compiler error messages for novice programmers. *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, 832–838.
- Ditta, A. S., & Woodward, A. M. (2024). Technology or tradition? A comparison of students' statistical reasoning after being taught with R programming versus hand calculations. *Scholarship of Teaching and Learning in Psychology*, 10(4), 620–625. <https://doi.org/10.1037/stl0000327>
- Ellis, J., Hao, Q., & Denny, P. (2024). Cross-disciplinary computational thinking: Asking the right questions of generative AI. *Proceedings of the 2024 ACM Conference on Innovation and Technology in Computer Science Education*, 78–84.
- Fitzgerald, S., Lewandowski, G., McCauley, R., Murphy, L., Simon, B., Thomas, L., & Zander, C. (2008). Debugging: finding, fixing and flailing, a multi-institutional study of novice debuggers. *Computer Science Education*, 18(2), 93–116. <https://doi.org/10.1080/08993400802114508>
- Holley, K. A. (2009). Understanding interdisciplinary challenges and opportunities in higher education. *ASHE Higher Education Report*, 35(2), 1–131.
- Holley, K. A. (2017). Interdisciplinary curriculum and learning in higher education. *Oxford Research Encyclopedia of Education*. <https://doi.org/10.1093/acrefore/9780190264093.013.138>
- Imai, Y. (2022). Pair programming with AI: A new paradigm for programming education. *Proceedings of the 2022 ACM Conference on International Computing Education Research*, 156–167.
- Lai, C.-H., Chen, Y.-K., Wang, Y., & Liao, H.-C. (2022). The Study of Learning Computer Programming for Students with Medical Fields of Specification—An Analysis via Structural Equation Modeling. *International Journal of Environmental Research and Public Health*, 19(10), 6005. <https://doi.org/10.3390/ijerph19106005>
- Liu, M., Denny, P., & Giacaman, N. (2024). Designing AI tutors for programming education: Lessons from CS50's implementation. *Proceedings of the 55th ACM Technical Symposium on Computer Science Education*, 789–795.

- Llerena-Izquierdo, J., Ayala-Chauvin, M., & Realpe-Robalino, P. (2024). Impact of generative AI on programming interest and engagement in higher education. *Education and Information Technologies*, 29(4), 1234–1256.
- MacNeil, S., Denny, P., Glassman, E., Jalali, S., & Tran, K. (2023). Experiences from using code explanations generated by large language models in a web programming course. *Proceedings of the 54th ACM Technical Symposium on Computer Science Education*, 931–937.
- Pankiewicz, M., & Baker, R. (2024). GPT-4 hints for compiler error resolution in programming education. *Computers & Education*, 200, 104812.
- Park, J., & Kim, S. (2025). Comparative effectiveness of ChatGPT versus traditional programming resources. *Educational Technology Research and Development*, 73(1), 45–62.
- Prather, J., Denny, P., & Luxton-Reilly, A. (2024). The impact of generative AI on metacognition in programming education. *Computers & Education*, 203, 104867.
- Rahman, M., & Watanobe, Y. (2023). ChatGPT for programming education: Opportunities and challenges. *IEEE Access*, 11, 34567–34578.
- Reeves, S., Chen, L., & Denny, P. (2023). Understanding student reliance on AI programming tools. *Proceedings of the 2023 ACM Conference on Innovation and Technology in Computer Science Education*, 234–240.
- Schlegel, V., Schneegass, S., & Broy, N. (2019). Natural language programming: Bridging the gap between human intent and machine execution. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, 1–12.
- Song, J., Chen, X., & Denny, P. (2024). AI-generated programming projects: Quality assessment and student outcomes. *Computers & Education*, 201, 104823.
- Vadaparty, S., Denny, P., & Bailey, J. (2024). LLM integration for problem decomposition in programming education. *Proceedings of the 2024 ACM Conference on Innovation and Technology in Computer Science Education*, 167–173.
- Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing*, 52(5), 546–553. <https://doi.org/10.1111/j.1365-2648.2005.03621.x>
- Wilson, A., & Nishimoto, R. (2024). Encouraging responsible use of generative AI in engineering programming education. *Proceedings of the 2024 ASEE Annual Conference & Exposition*, 234–245.
- Wing, J. M. (2010). Computational thinking: What and why? *The Link Magazine*, 20–23.
- Wu, J., Yu, Y., & Li, H. (2025). Personal Assistant-GPT vs. ChatGPT: Enhancing STEM education through AI-assisted programming. *Computers & Education*, 204, 104879.

Yilmaz, R., & Karaoglan Yilmaz, F. (2023). The impact of ChatGPT on programming education: Student perspectives and learning outcomes. *Educational Technology Research and Development*, 71(4), 1123–1145.

**Contact email:** l.miller3@uqconnect.edu.au





## University Extension in Science Education: Historical Perspectives and Global Impact

Emmanueli Francine de Castro Moraes, State University of Campinas, Brazil  
Reginaldo Alberto Meloni, State University of Campinas, Brazil

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

University extension promotes social engagement, expands access to scientific knowledge, and strengthens the formation of critical thinking citizens. In science education, extension programs bridges the gap between academic research and societal needs, fostering inclusive and transformative learning practices. The present study investigates university extension from a historical perspective, analyzing its impacts on science education, the democratization of knowledge, and the development of leaderships committed to global citizenship. Focusing on Ibero-American countries, this research examines how different nations have shaped their extension policies, identifying both similarities and regional particularities. In Latin America, university extension has become a fundamental strategy for social development, promoting knowledge accessibility and strengthening local communities. Through the analysis of historical documents, institutional structures, and academic literature, we identify trends in the integration of extension into teaching and research, contrasting them with models adopted in other international contexts. The results reveal that while Latin American extension has a strong community-driven and social character, in some European regions, it is more closely linked to technological innovation and knowledge transfer to the productive sector. Aligned with the conference themes Community & Society and Global Citizenship and Education for Peace, this study highlights university extension as an essential pillar for building more equitable and sustainable societies. Strengthening international exchange and interdisciplinary dialogue can expand the reach of these initiatives, fostering a more inclusive, socially responsible, and globally engaged higher education system.

*Keywords:* university extension, science education, Ibero-America, social justice, higher education

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

University outreach plays a strategic role in fostering critical citizens, promoting social development, and democratizing scientific knowledge. Faced with contemporary challenges—such as growing social inequalities, environmental crises, technological advancements, and sociopolitical tensions—it is increasingly important for universities to strengthen their social engagement and their commitment to building more just, inclusive, and sustainable societies.

In Brazil and other Ibero-American countries, university outreach has consolidated itself as an academic practice inseparable from teaching and research, grounded in dialogue with territories, valuing local knowledge, and promoting social justice. Far from an assistance-oriented or mere service-provision conception, outreach is understood as an educational, cultural, and scientific process that articulates the production of academic knowledge with social demands, contributing to the transformation of the contexts in which the university is inserted (FORPROEX, 2012; Freire, 1983, 2005; Parecer CNE-CES nº 608, 2018).

Particularly in the field of science education, outreach has proven fundamental in reducing the distance between the university and society, broadening access to scientific culture, and promoting more dialogical, inclusive, and socially committed formative practices. By connecting research, teaching, and social action, outreach favors educational processes that strengthen critical thinking, global citizenship, and the collective construction of solutions for the challenges of the 21st century (Castro & Tommasino, 2017; Hayakawa et al., 2024).

However, when engaging with international academic literature, it is observed that there is no direct correspondence between the concept of “*extensão universitária*” (university outreach/extension), as formulated in Latin America, and the terms adopted in other contexts, such as “outreach,” “community engagement,” or “third mission.” In countries of the Global North, especially in Europe and the United States, these expressions are, to a large extent, associated with technology transfer, innovation, and services, often oriented towards the productive sector, with less emphasis on the social and community dimension that characterizes Latin American university outreach actions (Paro, 2021; Teodoro, 2014).

Given this scenario, the present study investigates the historical trajectory of university outreach, focusing on Ibero-American countries, seeking to understand how different nations have structured their outreach policies and practices, what their impacts are on science education and the democratization of knowledge, and how these experiences can dialogue with models adopted in other international contexts. By promoting a comparative analysis, this work seeks not only to highlight the unique characteristics of outreach in Latin America but also to contribute to the strengthening of a globally engaged higher education, committed to peace, planetary citizenship, and sustainable development.

The article is structured into three main parts, in addition to this introduction. The following section presents the theoretical foundations that support the analysis of university outreach. Next, the adopted methodological procedures are detailed. In the third section, the analysis and discussion of the results are presented, addressing the historical trajectory of outreach, contrasting different models and their impacts, with special attention to science education. Finally, the concluding remarks offer reflections on the challenges and potential of outreach in the context of global higher education.

## Methodology

This study adopts a qualitative, exploratory, and descriptive approach, grounded in the documentary analysis of public policies, legal frameworks, institutional norms, and academic literature discussing university outreach in the field of science education. The research is anchored in critical educational studies, notably those influenced by Paulo Freire's liberating pedagogy (Freire, 1983; Streck, 2023), recognizing outreach as an academic practice that mediates the relationship between university and society, guided by principles of social justice, knowledge democratization, and global citizenship.

The documentary corpus comprises normative and institutional texts that regulate and guide university outreach in Brazil and other Ibero-American countries. This includes national legislations, curriculum guidelines, ministerial and university resolutions, as well as reports and technical documents from academic networks and higher education organizations. Various academic databases were consulted, such as CAPES Journals Portal, SciELO, BDTD (Digital Library of Theses and Dissertations), ERIC, Scopus, Web of Science, RedALyC, as well as specialized journals, including *Revista Brasileira de Extensão Universitária*, *Revista Ensaio*, and *Educação em Revista*, among others. Institutional reports discussing the historical trajectory of outreach, its transformations, and its social and educational impacts, with an emphasis on Ibero-American countries, were also included.

Complementing the documentary corpus are materials from institutional digital platforms that disseminate outreach experiences, such as the Rede de Clubes Ciência Viva na Escola (Science Alive Clubs Network in Schools) in Portugal (<https://www.dge.mec.pt/rede-de-clubes-ciencia-viva-na-escola>). The selection of documents followed a progressive process and was guided by inclusion and exclusion criteria to ensure theoretical relevance and adherence to the research objectives.

The following inclusion criteria were applied:

- Language: Portuguese, Spanish, and English.
- Period: Although the comparative analysis spans from the Córdoba Manifesto (1918) to the present, the focus for the selection of secondary studies (theses, dissertations, articles) was primarily between the 1960s and 1990s, and from the 2000s onwards, to reflect important milestones in university outreach.
- Area of Knowledge: Education, Science Education, and Public Policy.
- Level of Education: All levels, with an emphasis on higher education.
- Main Theme: University outreach, science education, outreach policies, educational practices, civic engagement, and critical education.

Conversely, the exclusion criteria were:

- Articles without peer review.
- Extended abstracts, short papers, and editorials.
- Studies that did not directly address the interface between university outreach and science education.

Quality criteria were also used in the selection of secondary studies, including:

- Methodological clarity.
- Theoretical and empirical relevance to the research question.
- Publication in qualified journals or recognized databases (Qualis, JCR, Scopus, etc.).

The analytical approach adopted was interpretive-critical in nature, seeking to understand the multiple meanings and underlying logics of the documents. In this sense, the documentary analysis was conducted as a flexible and in-depth methodological pathway (Lima et al., 2021). A critical and contextualized reading was chosen, anchored in the theoretical frameworks and historical and political perspectives that shape university outreach in Ibero-America. This strategy aimed to comprehend the meanings attributed to outreach, its diverse institutional configurations, and its transformative potential in science education within these contexts, in the democratization of knowledge, and in the promotion of global citizenship, with particular attention to Ibero-American specificities.

### **Theoretical and Historical Foundations of University Extension**

University outreach, as a pillar of higher education, is a multifaceted concept whose understanding varies significantly across different historical, cultural, and geographical contexts. This polysemy reflects the diverse missions and commitments that universities undertake in their interaction with society. This study explores this diversity, contrasting the predominant conceptions in Ibero-America with those observed in the Global North, and connecting them to global development agendas.

In Ibero-America, university outreach has consolidated as an educational, cultural, and scientific process, inseparable from teaching and research. Its theoretical and practical foundation is deeply rooted in Paulo Freire's liberating pedagogy. For Freire (1983, 2005), outreach is not merely a transfer of knowledge from the university to society, but rather an act of “communication” and “dialogue,” where there is a horizontal exchange of knowledge between the academic community and different social groups. In this process, problematization and conscientization are central elements, aiming at empowering communities and overcoming oppressive relationships. This dialogical approach is seen as a path to the construction of shared knowledge capable of promoting social transformation. Streck (2023) reinforces the centrality of Freire in building the pedagogical identity of Latin American outreach.

Complementary to Freirean pedagogy, Ibero-American outreach dialogues with the Epistemologies of the South, proposed by Boaventura de Sousa Santos. Although Paulo (2024a) discusses popular education and Brandão's trajectory with Freire more broadly, the essence of the Epistemologies of the South lies in the critique of the monoculture of Western knowledge and the valorization of the “ecology of knowledges.” This perspective supports the principle of dialogue of knowledges, in which scientific-academic knowledge interacts with and is enriched by popular, traditional, and ancestral knowledges from the territories. Outreach, from this perspective, becomes a privileged space for this horizontal construction of knowledge, decolonizing knowledge and promoting the inclusion of historically marginalized voices.

Based on these theoretical frameworks, university outreach in Ibero-America is defined as a powerful instrument of social justice, knowledge democratization, and education for global citizenship. By articulating academic production with social demands, outreach aims to overcome inequalities, broaden access to scientific culture, and foster critical thinking and active engagement in building more equitable societies.

In contrast, conceptions of university-society interaction observed in Global North countries often operate under a distinct logic. Terms such as “outreach,” “community engagement,” or

“third mission” (or “third stream”) are commonly employed. The “third mission,” particularly in Europe, is strongly associated with technology transfer, innovation, entrepreneurship, and service provision for the productive sector and economic development (Paro, 2021; Teodoro, 2014). While community engagement may involve partnerships with communities, its emphasis does not always fall on critical social transformation and radical knowledge democratization, as in the Latin American approach. Outreach, in turn, may denote a one-way street, where university knowledge is “brought” outwards, without the same depth in dialogue and co-construction. The main distinction, therefore, lies in the lesser emphasis on the social, political, and emancipatory dimension, in favor of a more pragmatic and economic orientation.

Notwithstanding the conceptual and operational differences, university outreach, in its various manifestations, plays a crucial role in the context of global development agendas, such as the United Nations (UN) 2030 Agenda and its Sustainable Development Goals (SDGs). Outreach, particularly in its Ibero-American conception of dialogue, social justice, and knowledge democratization, is a fundamental vehicle for achieving these goals. It contributes directly to SDG 4 (Quality Education), by promoting equitable access to knowledge and lifelong learning; to SDG 10 (Reduced Inequalities), by combating social exclusion and promoting the inclusion of marginalized groups; and to SDG 17 (Partnerships for the Goals), by fostering collaboration among universities, civil society, and other actors for sustainable development. Furthermore, outreach reinforces the premises of SDG 11 (Sustainable Cities and Communities), by engaging in local development, and SDG 16 (Peace, Justice, and Strong Institutions), by promoting education for global citizenship and human rights. UNESCO's recognition of the transformative role of higher education and the social engagement of universities underscores the relevance of outreach for building a more just and sustainable future.

### **Analysis and Discussion**

This section is dedicated to the analysis of the results from the documentary research, interpreting the trajectory and configurations of university outreach in different global contexts. Our discussion is structured around a comparison between the conceptions and practices of Ibero-America and the Global North, with special attention to the impact of outreach on science education and its contribution to global citizenship and sustainable development.

#### **Analytical Overview of University Outreach: Global Origins and Early Distinctions**

The origins of university outreach, dating back to the 19th century, reflect a movement by higher education institutions to expand their activities beyond academic walls, interacting with the social, cultural, and economic needs of their territories. Although they emerged simultaneously in Europe (British) and the United States, their initial motivations and formats already signaled distinctions that would deepen over time. In the United Kingdom, universities such as Oxford and Cambridge, with their extension programs initiated in 1873, aimed at democratizing access to knowledge and broadening the cultural and political education of popular segments. In the United States, the Morrill Act (1862) consolidated land-grant colleges, which, while focusing on regional development and innovation, prioritized the transfer of knowledge applied to economic and industrial demands (Castro & Tommasino, 2017; Teodoro, 2014).

This initial differentiation between a strand more linked to the democratization of knowledge and another to the utilitarian or economic application of university knowledge lays the groundwork for the contemporary divergences observed. In continental Europe, the Humboldtian model, which emphasizes the indissociability between teaching and research in the autonomous production of knowledge, also evolved to incorporate the social responsibility of the university, albeit with a greater inclination towards the “third mission,” focused on technology transfer and innovation for the productive sector (Castro & Tommasino, 2017; Teodoro, 2014).

From the late 20th and early 21st centuries, international organizations such as UNESCO intensified the recognition of the university's social function, emphasizing community engagement and the production of knowledge oriented towards the common good. This debate gained momentum in the World Conferences on Higher Education and aligned with global agendas linked to the Sustainable Development Goals (SDGs), education for peace, social justice, and the promotion of global citizenship (International Higher Education and Research Centre, 2023; UNESCO, 2022). Such international emphasis corroborates the relevance of outreach for major global development agendas.

### **The Córdoba Reform: A Watershed for Latin American University Outreach**

In Latin America, university outreach acquired distinctive contours following the University Reform of Córdoba in 1918, in Argentina (Freitas Neto, 2011). This movement, led by students, represented a break with the elitist and Eurocentric university model, establishing an intrinsic commitment to the democratization of higher education, university autonomy, and, fundamentally, the social engagement of public universities. The Córdoba Reform not only reconfigured the Argentine university but became a political, pedagogical, and institutional paradigm for the entire continent, consolidating the conception of the university as a public good and an active agent in the social, economic, and cultural development of territories (Castro & Tommasino, 2017; Freitas Neto, 2011).

In this context, outreach emerged as a structuring axis, directly articulated with the principles of social justice, democratic participation, and popular emancipation. The analysis of historical documents from the Córdoba Reform highlights a vision of outreach that opposes the mere diffusion of knowledge, proposing a two-way street where the university learns from and transforms with the community. This perspective manifests in various experiences across the continent, such as the Universidad en tu Comunidad programs in Mexico, and popular outreach initiatives in Argentina, Uruguay, and Colombia (Castro & Tommasino, 2017). These practices strengthen the ties between university and society and reconfigure the role of higher education as an instrument for promoting citizenship and human rights.

### **The Brazilian Case: Consolidation, Challenges, and the Role in Science Education**

In Brazil, university outreach consolidated as an academic practice deeply linked to the principles of popular education and social justice. Its development was influenced by the legacy of the Córdoba Reform (Freitas Neto, 2011) and by the popular education movements of the 1950s and 1960s, such as the Movimento de Educação de Base (MEB) and the Centro Popular de Cultura (CPC) of National Union of Students (UNE), in addition to pedagogical practices inspired by Paulo Freire. These movements sought to bring the university closer to social demands, articulating academic and popular knowledge and advocating for education as a practice of freedom and transformation (Freire, 1983, 2005).

Despite repression during the civil-military dictatorship, which controlled critical activities, outreach remained active in certain projects such as Projeto Rondon, created in 1967. Although aligned with the regime's ideology of national integration, Rondon enabled outreach experiences in different regions, bringing academics closer to peripheral realities and contributing to the internalization of the university (Ministério da Defesa, 1967). This duality shows how outreach can, even under authoritarian regimes, generate significant social impacts, albeit under complex and sometimes contradictory logics.

With redemocratization, outreach rose to centrality in the debate about the social function of universities. The Federal Constitution of 1988, in its Article 207, established the indissociability between teaching, research, and outreach, formalizing outreach as a structuring dimension of Brazilian higher education (Constituição da República Federativa do Brasil de 1988, 1988). This milestone boosted the institutionalization of outreach policies, strengthening their articulation with territories and social movements (FORPROEX, 2012; Lei nº 13.005, de 25 de junho de 2014, 2014). More recently, CNE/CES Resolution No. 608 (Parecer CNE-CES nº 608, 2018) made the “curricularization” of outreach mandatory, integrating at least 10% of undergraduate course workloads into outreach activities. This public policy represents a decisive advance, recognizing outreach as a fundamental formative component that integrates academic processes and social demands, strengthening the education of citizens for the challenges of the 21st century (SDG 4: Quality Education).

In the field of science education, Brazilian outreach practices highlight the potential of outreach as a driver of methodological innovation. The analysis of programs such as “Ciência & Arte nas Férias” (Science & Art in the Holidays) and “Física nas Férias (FiFe)” (Physics in the Holidays), developed by the State University of Campinas (UNICAMP), illustrates how outreach promotes active, contextualized, and socially engaged learning (UNICAMP, 2025a; UNICAMP, 2025b). These programs articulate practical and interactive activities, involving university students, researchers, basic education teachers, and communities. Such dynamics strengthen both scientific literacy and the university's social commitment, democratizing access to scientific knowledge and promoting the collective construction of knowledge in dialogue with communities. These projects exemplify the contribution of outreach to the democratization of knowledge and the reduction of inequalities in access to science (SDG 10: Reduced Inequalities).

### **Comparative Regional Analysis: Convergences, Tensions, and Global Alignment**

The comparative analysis reveals distinct historical trajectories, conceptions, and institutionalizations of outreach, but also a recent trend of convergence in valuing the university's social role. In Latin America, university outreach, as discussed, has consolidated as a political-pedagogical practice linked to social movements and the construction of just societies, strongly inspired by the Córdoba Reform and Freirean pedagogy. This model prioritizes community development, the dialogue of knowledges, and the active participation of social subjects in the construction of knowledge, being understood as a formative and emancipatory process connected to social, environmental, and cultural challenges (Castro & Tommasino, 2017).

In contrast, in Iberian countries such as Spain and Portugal, a more pragmatic and functionalist orientation historically predominated. Outreach developed in association with the university-productive sector articulation, focusing on technology transfer, innovation, and specialized professional training (Teodoro, 2014). Although there is an appreciation for the

social function, the emphasis has traditionally been on economic development and competitiveness.

However, contemporary initiatives such as the Red Española de Aprendizaje-Servicio (REDAPS) in Spain (Red Española de Aprendizaje-Servicio, 2020), and the Rede de Clubes Ciência Viva na Escola in Portugal (Rede de Clubes Ciência Viva na Escola, 2025), indicate significant efforts to reconnect the university with communities. These networks promote educational practices that articulate academic knowledge, social responsibility, and territorial development. These examples illustrate an openness and an effort for Iberian university outreach to broaden its scope, engaging more directly with social and environmental demands and moving closer to the conceptions of dialogue and community impact characteristic of Latin American outreach, even if their histories of institutionalization are distinct.

The work of Castro and Tommasino (2017) is fundamental for understanding these regional distinctions and approximations. The authors highlight that, despite historical and institutional particularities, there is a growing international articulation around the understanding of outreach as an academic practice capable of mediating the relationship between university and society. This convergence, although marked by tensions and different conceptions, has strengthened the idea of outreach as a privileged space for the formation of critical, engaged individuals committed to planetary citizenship and social transformation. The advancement of the curricularization of outreach, as observed in Brazil, demonstrates the potential to integrate the social and practical dimension into academic training, preparing professionals more engaged with the complex demands of the real world, which aligns with SDG 17 (Partnerships for the Goals).

The university outreach models analyzed in this study show that outreach has consolidated as a driver of methodological innovation in the field of science education. Outreach practices, by promoting interdisciplinarity and the articulation between scientific production, training, and social demands, reconfigure pedagogical practices. By promoting active, contextualized, and socially engaged learning, outreach not only broadens access to knowledge but also combats inequalities and fosters partnerships. This commitment to social justice, citizenship, and transformation, which historically characterizes outreach in Latin America, proves to be a differentiator compared to more technocratic models based on the logic of technology transfer. The Escuela Abierta: Actividades Científicas Infantiles y Juveniles program in Argentina (Gobierno de la Ciudad Autónoma de Buenos Aires, 2025) is a clear example of this formative, dialogical, and transformative approach, using playful and inclusive methodologies that strengthen the link between university, school, and territory.

In summary, while in Latin America a formative, dialogical, and transformative approach, guided by social justice and the collective construction of knowledge, predominates, in Global North countries, a functionalist orientation, focused on innovation, employability, and economic development, still largely prevails. Even so, in both contexts, outreach asserts itself as a powerful instrument to strengthen the ties between university and society, promoting a more inclusive, critical, and science education aligned with the contemporary challenges of global citizenship, peace, and sustainable development (SDG 16: Peace, Justice, and Strong Institutions).



## Conclusion

This study demonstrated that university outreach, in its complex historical trajectory and diverse contemporary manifestations, constitutes a powerful instrument for social transformation, knowledge democratization, and the formation of critical and engaged citizens. By analyzing distinct models and practices of outreach, particularly in the Ibero-American context and in contrast to conceptions in the Global North, it was possible to identify that, although diverse orientations exist—such as the focus on social justice and popular education in Latin America, and an emphasis on innovation and technology transfer in other models—there is a fundamental convergence in recognizing outreach as an essential part of the contemporary university mission. This plurality of approaches reflects the different priorities and conceptions of the university that have developed globally, but points to a growing consensus on the need for academia to actively engage with society's demands.

In the field of science education, the analyzed experiences demonstrated the significant potential of outreach to reconfigure pedagogical practices. By transcending university walls and promoting more collaborative, interdisciplinary approaches connected to the real problems of communities, outreach transforms the dynamics of learning. Programs inspired by Freirean pedagogy and popular education, for example, contribute to strengthening the link between university and society, resulting in a more accessible, contextualized, and meaningful science. This not only fosters comprehensive scientific literacy but also empowers individuals to exercise more conscious and participatory citizenship in the face of contemporary challenges.

Despite advancements in the institutionalization of outreach, particularly its curricularization in Brazil and the emergence of collaborative networks in Ibero-American countries, the research also revealed persistent challenges for the full integration among teaching, research, and outreach. Such challenges include cultural and methodological resistance within the academic environment, the scarcity of adequate funding, and the need to improve mechanisms for evaluating and recognizing the social and formative impact of outreach. Overcoming these barriers is crucial for outreach to fully develop its transformative potential and for universities to consolidate a more integral and socially responsible role. The tensions between emancipatory and functional logics of university outreach, identified throughout this work, underscore the importance of maintaining critical vigilance over the directions of outreach policies and practices.

In a global scenario marked by complex inequalities, socio-environmental crises, and disputes over the meaning of higher education's role, university outreach emerges as a strategic pillar for building more just, sustainable, and dialogically connected societies. It not only enriches academic training but also offers concrete responses to social problems by promoting the co-production of knowledge and strengthening citizen participation. Strengthening the international exchange of outreach experiences, fostering the dialogue of knowledges, and intensifying cooperation between universities and communities are essential actions to expand the reach and capillarity of these initiatives. The consolidation of a higher education model truly committed to global citizenship, peace, and the common good fundamentally depends on the valorization and expansion of university outreach that is, in its essence, dialogical, critical, and transformative.

## **Acknowledgements**

This research was made possible through the academic support of the Universidade Estadual de Campinas (Unicamp) and the Instituto de Física Gleb Wataghin (IFGW), under the leadership of Professor Monica Cotta, a true inspiration for women in science. The IFGW has played a fundamental role in my education and enabled my participation in this study. I would like to express my heartfelt gratitude to my advisor and co-author for their valuable guidance and partnership throughout this journey.

I am thankful to the IFGW Extension Office, which welcomed me from the beginning of my undergraduate studies and inspired my deep interest in university extension. I extend special thanks to Viviane, from the Extension Office, whose constant encouragement has been essential and never allowed me to give up.

Finally, I dedicate this work to my family — my mother Joana, my grandmother Aparecida, my brother Eduardo, my sister-in-law Jane, and my nephew Eduardo Junior — my foundation and unwavering support in all aspects of my life.

## **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

This manuscript was supported by AI-assisted technologies, including OpenAI's ChatGPT, which was used for formatting, language clarity, and structuring of the final article according to IAFOR guidelines. All conceptual and analytical content remains original and authored by the researcher.

## References

- Constituição da República Federativa do Brasil de 1988 [Constitution of the Federative Republic of Brazil of 1988]. (1988). Presidência da República. [https://www.planalto.gov.br/ccivil\\_03/Constituicao/Constituicao.htm](https://www.planalto.gov.br/ccivil_03/Constituicao/Constituicao.htm)
- CRUE. (2021, November 15). Propuestas para la Sociedad del Conocimiento – CRUE [Proposals for the Knowledge Society]. <https://www.crue.org/universidad-2030/>
- Decreto n.º 316/024 [Decree No. 316/024]. (2024). Relativo a los requisitos de carreras de formación en educación para reconocimiento de nivel universitario ante el MEC [Regarding the requirements for education training programs for university level recognition before the MEC]. <https://www.impo.com.uy/bases/decretos/316-2024>
- Estatutos da Universidade de Lisboa: Despacho Normativo n.º 7/2025 [Statutes of the University of Lisbon: Normative Dispatch No. 7/2025]. (2025). Diariodarepublica.pt. <https://diariodarepublica.pt/dr/detalhe/despacho-normativo/7-2025-917251744>
- FMRP-USP. (2019). Experiência da FMRP no Projeto Rondon é capítulo do livro “Operações João de Barro” [FMRP's experience in the Rondon Project is a chapter in the book “Operações João de Barro”]. Faculdade de Medicina de Ribeirão Preto. <https://www.fmrp.usp.br/pb/arquivos/10513>
- FORPROEX. (2012). Cartas e Memória FORPROEX – RENEX – Rede Nacional de Extensão [Letters and Memory FORPROEX – RENEX – National Extension Network]. <https://www.ufmg.br/proex/renex/index.php/documentos/cartas-e-memoria>
- Freire, P. (1983). *Extensão ou comunicação?* [Extension or communication?] Paz e Terra.
- Freire, P. (2005). *Pedagogia do oprimido*. [Pedagogy of the oppressed]. Paz e Terra.
- Freitas Neto, J. A. (2011). A reforma universitária de Córdoba (1918): um manifesto [The university reform of Córdoba (1918): A manifesto]. *Revista Ensino Superior Unicamp*. <https://www.revistaensinosuperior.gr.unicamp.br/artigos/a-reforma-universitaria-de-cordoba-1918-um-manifesto>
- Gobierno de la Ciudad Autónoma de Buenos Aires. (2025). Actividades científicas infantiles y juveniles [Children's and youth scientific activities]. Buenos Aires Ciudad. <https://buenosaires.gob.ar/escuela-abierta/actividades-cientificas-infantiles-y-juveniles>
- Hayakawa, T. A., Bueno, L., & Guimarães, M. de F. (2024). Por uma dada história da extensão universitária brasileira [For a given history of Brazilian university extension]. *Horizontes*, 42(1), e023093. <https://doi.org/10.24933/horizontes.v42i1.1628>
- Imprensa Nacional. (2025, March 11). Portaria Interministerial SG-PR/MEC nº 192, de 11 de março de 2025 [Interministerial Ordinance SG-PR/MEC No. 192, of March 11, 2025]. In *Diário Oficial da União*. <https://www.in.gov.br/en/web/dou/-/portaria-interministerial-sg-pr-mec-n-192-de-11-de-marco-de-2025-617950752>

International Higher Education and Research Centre. (2023). Tuningacademy.  
<https://tuningacademy.org>

Ketzer, P., Ribeiro, S., & Pereira, T. I. (2024). Por uma Extensão Universitária Latino-Americana e Feminista [For a Latin American and Feminist University Extension]. *Revista Estudos Feministas*, 32(3), e93392. <https://doi.org/10.1590/1806-9584-2024v32n393392>

Lei n.º 62 de 2007. (2007). [Law No. 62 of 2007]. Regime Jurídico das Instituições de Ensino Superior (RJIES) [Legal Regime of Higher Education Institutions (RJIES)]. *Diário da República*, 1.ª série, n.º 174. <https://data.dre.pt/eli/lei/62/2007/09/10/p/dre/pt/html>

Lei nº 10.172, de 9 de janeiro de 2001. (2001). [Law No. 10.172, of January 9, 2001]. Aprova o Plano Nacional de Educação e dá outras providências [Approves the National Education Plan and makes other provisions]. <https://legislacao.presidencia.gov.br/atos/?tipo=LEI&numero=10172&ano=2001&ato=217MTRE5kMNpWT3af>

Lei nº 13.005, de 25 de junho de 2014. (2014). [Law No. 13.005, of June 25, 2014]. Aprova o Plano Nacional de Educação (PNE) 2014–2024 [Approves the National Education Plan (PNE) 2014–2024]. <https://doi.org/handle/123456789/965>

Lima, E. B. Jr., Oliveira, G. S. de, Santos, A. C. O. dos, & Schnekenberg, G. F. (2021). Análise documental como percurso metodológico na pesquisa qualitativa [Documentary analysis as a methodological path in qualitative research]. *Cadernos da FUCAMP*, 20(44). <https://revistas.fucamp.edu.br/index.php/cadernos/article/view/2356>

Ministério da Defesa. (1967). Projeto Rondon [Rondon Project]. <https://www.gov.br/defesa/pt-br/assuntos/programas-sociais/projeto-rondon>

Parecer CNE-CES nº 608. (2018). Diretrizes para as Políticas de Extensão da Educação Superior Brasileira [Guidelines for Brazilian Higher Education Extension Policies]. <https://abmes.org.br/legislacoes/detalhe/2651/parecer-cne-ces-n-608>

Paro, C. A. (2021). Extensão universitária na transformação social: apontamentos a partir da extensão popular [University extension in social transformation: Notes from popular extension]. *Estudos Universitários*, 38(2), 129–129. <https://doi.org/10.51359/2675-7354.2021.251426>

Paulo, F. dos S. (2024a). A Educação popular no Brasil: conversa com Carlos Rodrigues Brandão [Popular education in Brazil: Conversation with Carlos Rodrigues Brandão]. *Revista Fundamentos*. ISSN: 23172754. <https://comunicata.ufpi.br/index.php/fundamentos/article/view/13063/8255>

Paulo, F. dos S. & Brandão, R. C. (2024b). Entrevista: Carlos Rodrigues Brandão e Fernanda Paulo [Interview: Carlos Rodrigues Brandão and Fernanda Paulo]. *Revista da FAEBA – Educação e Contemporaneidade*, 33(76), 366–371. <https://doi.org/10.21879/faceba2358-0194.2024.v33.n76.p366-371>

- Red Española de Aprendizaje-Servicio. (2020). RedApS | Red Española de Aprendizaje-Servicio [RedApS | Spanish Service-Learning Network]. <https://www.aprendizajeservicio.net>
- Rede de Clubes Ciência Viva na Escola. (2025). Homepage Clubes Ciência Viva. Agência Nacional para a Cultura Científica e Tecnológica. <https://clubes.cienciaviva.pt/>
- Resolução CNE/CES nº 7, de 18 de dezembro de 2018 [Resolution CNE/CES No. 7, of December 18, 2018]. (2018). Estabelece as Diretrizes para a Extensão na Educação Superior Brasileira e regimenta o disposto na Meta 12.7 da Lei nº 13.005/2014, que aprova o Plano Nacional de Educação - PNE 2014-2024 e dá outras providências [Establishes the Guidelines for Extension in Brazilian Higher Education and regulates the provisions of Goal 12.7 of Law No. 13.005/2014, which approves the National Education Plan - PNE 2014-2024 and makes other provisions]. <https://www.gov.br/mec/pt-br/cne/resolucoes/resolucoes-cne-ces-2018>
- Silva, E. do N. (2018). A responsabilidade social da biblioteconomia nas ações de extensão universitária [The social responsibility of librarianship in university extension actions]. [Tese de doutorado, Universidade Federal da Bahia].
- Streck, D. R. (2023). Paulo Freire e a pedagogia latino-americana: a construção de uma identidade pedagógica [Paulo Freire and Latin American pedagogy: The construction of a pedagogical identity]. *Revista Brasileira de Educação*, 28. <https://doi.org/10.1590/s1413-24782023280105>
- Teodoro, A. (2014). A Educação Superior na Europa e América Latina: propostas para uma Universidade cidadã no século XXI [Higher Education in Europe and Latin America: Proposals for a citizen University in the 21st century]. *Revista Argentina de Educación Superior*, 8, 219–250.
- UFMG Interfaces. (2020). A extensão universitária: história, conceito e propostas [University extension: History, concept, and proposals]. *Interfaces – Revista de Extensão da UFMG*. <https://periodicos.ufmg.br/index.php/revistainterfaces/article/view/18930>
- UNESCO. (n.d.). The Role of Higher Education Institutions for Lifelong Learning | Institute for Lifelong Learning. <https://www.uil.unesco.org/en/role-higher-education-institutions-lifelong-learning>
- UNESCO. (2020). Relatório de monitoramento global da educação, América Latina e Caribe: inclusão e educação: todos sem exceção, principais mensagens e recomendações [Global education monitoring report, Latin America and the Caribbean: Inclusion and education: All without exception, main messages and recommendations]. UNESCO. [https://unesdoc.unesco.org/ark:/48223/pf0000374790\\_por.locale=en](https://unesdoc.unesco.org/ark:/48223/pf0000374790_por.locale=en)
- UNESCO. (2022). Beyond Limits: New ways to reinvent higher education (DORA). DORA. <https://sfdora.org/resource/beyond-limits-new-ways-to-reinvent-higher-education/>
- UNICAMP. (2025a). Ciência & Arte nas Férias [Science & Art on Vacation Homepage]. Pró-Reitoria de Pesquisa – PRP. <https://prp.unicamp.br/iniciacao-cientifica/caf/programa/>

UNICAMP. (2025b). Física nas Férias – IFGW/UNICAMP [Physics on Vacation – IFGW/UNICAMP Homepage]. <https://sites.ifi.unicamp.br/fife/>

Universidad de la República. (2016). Flor de Ceibo [Ceibo Flower Homepage]. [Flordeceibo.edu.uy](http://Flordeceibo.edu.uy)

University of California. (2025). EAOP Early Academic Outreach Program | Welcome. <https://eaop.universityofcalifornia.edu>

**Contact email:** [emmanuelimoraes@gmail.com](mailto:emmanuelimoraes@gmail.com)

## Mapping Addictive Behaviors and Preventive Activities Among Students From Masaryk University: Preliminary Results

Petr Kachlík, Masaryk University, Czech Republic  
Karel Červenka, Masaryk University, Czech Republic  
Věra Vojtová, Masaryk University, Czech Republic  
Dana Zámečnicková, Masaryk University, Czech Republic  
Petra Dvořáčková, Masaryk University, Czech Republic  
Hana Moravčíková, Masaryk University, Czech Republic  
Monika Nejezchlebová, Masaryk University, Czech Republic  
Petra Pírková, Masaryk University, Czech Republic  
Michaela Plšková, Masaryk University, Czech Republic  
Kateřina Richterová, Masaryk University, Czech Republic  
Pavel Sochor, Masaryk University, Czech Republic  
Veronika Antel, Masaryk University, Czech Republic  
Jitka Šťastná, Masaryk University, Czech Republic  
Ondřej Ling, Masaryk University, Czech Republic  
Soňa Papšová, Masaryk University, Czech Republic

The Paris Conference on Education 2025  
Official Conference Proceedings

### Abstract

The life of university students is often viewed as a time of experimenting with different kinds of behaviors that may be risky. However, university students are usually not considered a high-risk group for problems related to substance use disorder. With this assumption, the support for students struggling with addiction may be insufficient. We are therefore conducting exploratory research to map the extent of this risky behavior as well as the students' experiences with preventive activities at Masaryk University (MU) in the Czech Republic. The ongoing study is conducted through a quantitative survey. We draw from questionnaires from previous similar studies at Masaryk University together with standardized ESPAD questionnaire. These materials were adjusted to fit the university environment and current trends in addictive behavior. With the usage of snowball sampling, students from all ten faculties of MU were invited to participate. The final sample consists of 1,214 students, mostly from the Faculty of Education. Regular use (a few times a month and more often) was stated most frequently for alcohol (52.1%). Regarding other drugs, the regular use occurred also in nicotine (28.3%), THC (3.8%), kratom (2.1%) and other drugs (each < 1%). Conversely, the experience with prevention at university was stated only by 5.6% of students. These preliminary results indicate that the need for preventive activities may largely exceed the prevention that is offered to students. The final results could therefore serve as the next step for creating a more effective support system.

*Keywords:* questionnaire, risky behavior, university students, addiction, prevention, substance use, attitudes, research

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

University students are in a lot of countries commonly known for their higher intake of addictive substances. This period of life is often accompanied by a newly acquired sense of freedom, the need for finding new relationships, or the need to explore one's identity – all of which could be a potential factor for using psychoactive substances (Smith et al., 2014). Besides that, even the environment of university could serve as a significant factor to invoke the student's substance use.

University settings could influence the student's substance use not only in the formal environment but also in the informal setting, which could be rarely avoided as well. For example, meeting the criteria of the school to successfully go through one's studies is a risk factor for development of psychological disorders due to the stress students are experiencing (Haruna et al., 2025). Moreover, the students usually inevitably need to cooperate with their classmates who, in case of their own substance use, could be an influence for addictive behaviors of others (Barnett et al., 2022). In a lot of countries, the student's high intake of psychoactive substances then becomes viewed as a regular experience – the students therefore do not need to feel the riskiness of their behavior nor the possibility of them becoming addicted to the substance (Caldeira et al., 2009). All of those factors could lead to the development of students' substance use disorder (SUD).

SUD is a disease defined in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013). In this document, SUD is described in 11 criteria as a state of one's substance use that has signs of physical or psychological addiction (e.g. experiencing craving, the inability to stop using the substance or withdrawal symptoms) and signs of difficulties in the social life of a person due to their substance use (e.g. the inability to fulfill their responsibilities in work or in family).

Students who are endangered with SUD are then prone to further negative outcomes. For example, regular substance use can be connected to other psychological problems (Mengistie & Berhanu, 2025). SUD may, however, lead to problems related to studies as well. Troubles may appear when fulfilling the criteria of the school (Meda et al., 2017) or can even be the reason one would not be successful in the studies completion (Allen et al., 2019).

Even though the negative outcomes of SUD could stop the student from completing their studies, preventive programs are rarely promoted by universities themselves. Preventive programs for university students do exist; however, universities usually do not systematically cover the whole population of students (Bonsu et al., 2024).

In summary, university students are endangered with SUD within the period of life as well as the university environment. Nevertheless, preventive activities are usually available for them with difficulties. Therefore, we argue that preventive activities should be a regular part of university settings. With this purpose, we conduct exploratory research at Masaryk University (MU) to map students' substance use and their experience with preventive activities conducted by the university. Results could serve as a starting point for creating systematic preventive activities to support students at risk of SUD and to effectively implement harm reduction strategies into the curriculum.



## Methods

Our aim is to map the extent of substance use of full-time students of MU and to explore their experience with preventive activities organized by the university. This research follows the formerly conducted research at MU by Kachlík (2011) and draws from its methods. We adjusted the previous questionnaires to fit current trends in addictive behaviors among young people and also implemented and adjusted methodologies from the ESPAD study (ESPAD Group, 2021). We added items exploring students use of kratom, semisynthetic cannabinoids or new psychoactive substances, since their intake among young people in the Czech Republic is rising lately. Besides the data about substance use and preventive activities, the questionnaire includes other parts that are focused on demographic data, other potentially addictive behaviors (e.g. hazard games or social media use), attitudes of students towards risky behaviors or health outcomes of these behaviors.

The pilot study was conducted to check the appropriateness and saturation of the questionnaire with 10 participants. They expressed their dissatisfaction with some of the formulations of the items and after including their reflection into the document, the final questionnaire was completed.

Methods of this research were approved by the Ethics Committee of MU. The questionnaire was prepared in an online form with no function to check the identity of the participants. In the introductory letter, the students were informed about the project's objectives and that their participation is anonymous and voluntary.

The data collection was conducted at the turn of the year 2024/2025 through snowball sampling and 1214 students of MU completed the questionnaire. Propagation of the research was aimed at all 10 faculties of MU.

The research is still going on; therefore, the statistical analysis of data has not been conducted yet. However, this paper brings preliminary results in a descriptive manner.

## Results

The total number of completed questionnaires was 1214. Out of this number, the majority of the sample are women with 77.9%. Men make up 18.9% of the sample. The remaining 3.1% were participants of other genders or the ones who did not want to specify their gender.

**Table 1**  
*Distribution of Participants by Gender (n = 1214)*

<b>Gender</b>	<b>% of Total</b>
Women	77.9
Men	18.9
Other/did not specify	3.1

Out of the total number of participants, 80.1% of them were from the Faculty of Education. Other faculties make up 0.2–5.6% of the sample.

**Table 2***Distribution of Participants by Faculties of MU (n = 1214)*

<b>Faculty of MU</b>	<b>% of Total</b>
Faculty of Education	80.1
Faculty of Law	5.6
Faculty of Arts	3.1
Faculty of Sports Studies	2.8
Faculty of Medicine	2.8
Faculty of Social Studies	2.1
Faculty of Science	1.4
Faculty of Informatics	1.2
Faculty of Economics and Administration	0.7
Faculty of Pharmacy	0.2

We defined regular use of substances as a few times a month or more often. Alcohol was used regularly by 52.1% of participants, nicotine by 28.3%, THC by 3.8% and kratom by 2.1%. Other substances were each regularly used by less than 1% of participants.

**Table 3***Distribution of Students by Regular Use of Substances (n = 1214)*

<b>Regularly* Used Substances</b>	<b>% of Total</b>
Alcohol	52.1
Nicotine	28.3
THC	3.8
Kratom	2.1
Semisynthetic cannabinoids	0.7
Hypnotics**	0.5
Ketamine	0.3
Sedatives**	0.3
Analgesics**	0.3
Stimulants**	0.3
Cocaine	0.2
Hallucinogens	0.2
MDMA	0.2
New psychoactive substances	0.2
Methamphetamine	0.1
Opioids	0.1

*Note.* \*regular use = several times a month or more often; \*\*prescription drugs without doctor's recommendation

The majority (94.4%) of students reported no experience of any preventive activity organized by MU.

**Table 4***Students' Experience With Prevention at MU (n = 1214)*

<b>Experience with Prevention</b>	<b>% of Total</b>
Yes	5.6
No	94.4

Students reported their experiences with different types of prevention. Of the total number of participants, 4.9% reported the experience with prevention during lectures and 1.7% reported it at some educational events. Other types of prevention were all reported by less than 1% of participants.

**Table 5***Students' Experience With Specific Type of Prevention at MU (n = 1214)*

<b>Type of Prevention</b>	<b>% of Total</b>
During lectures	4.9
Educational events	1.7
Other events	0.3
Dormitory events	0.2
Other opportunities	0.1

### **Discussion and Conclusion**

Leading drugs for regular use among participants are alcohol, nicotine, THC and kratom (substances regularly used by 2.1–52.1% students). Other types of drugs were each regularly used by less than 1% of students. The experience with preventive activities was, on the other hand, reported only by 5.6% of students. This creates a significant gap between students, who may need addictology support and the support that is actually available. Due to the factors connected with university settings, that may encourage students to relieve their unpleasant emotions or stress with addictive substances, we argue that preventive activities should be a regular part of the curriculum.

Of the total of 1214 students, more than half report using alcohol regularly. This result, when compared to the previous research from 2009 by Kachlík (2011), shows a decrease in alcohol use from 90.9% of students to 52.1%. Even though the students' alcohol consumption seems significantly lower, the portion of students who actively use this addictive substance is still enormous. The risks of regular alcohol use are well studied and show us not only the devastating outcomes for the users' bodies but also its riskiness for a development of the substance use disorder – for alcohol and for other types of drugs too (Barry et al., 2016).

Regular kratom use was then reported by 2.1% of participants, which is less distinct than in the case of previous substances. However, kratom became known in the Czech Republic only in the last few years (Dvořáková & Chomynová, 2024). Due to its high potential for SUD initiation, even this portion of students is noteworthy. For the first time, kratom is studied by ESPAD 2024 research among 16-year-old students. Results from the Czech part of the study show even more alarming numbers saying that during the last 30 days, 10% of those participants used kratom (Chomynová & Dvořáková, 2025).

The results of the current study should be read and used with caution, since we encountered some limitations when preparing the data collection and when controlling the data set. Even

though the questionnaire was propagated in all 10 faculties of MU, most of the participants were from the Faculty of Education. This is also given by the method of data collection, which was snowball sampling. The results should therefore not be generalized onto the population of university students nor the whole population of students of MU. Nevertheless, we believe that those results bring interesting data about students' experiences which can serve as a starting point for organizing systematic preventive activities.

### **Acknowledgements**

This project is funded by Masaryk University and is listed under project number MUNI/A/1546/2023.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

We declare that the content of this article was written solely by the authors, without the use of AI technologies.

## References

- Allen, H. K., Lilly, F., Beck, K. H., Vincent, K. B., & Arria, A. M. (2019). Graduate degree completion: Associations with alcohol and marijuana use before and after enrollment. *Addictive Behaviors Reports*, 9, 100156. <https://doi.org/10.1016/j.abrep.2018.100156>
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). American Psychiatric Association. <https://doi.org/10.1176/appi.books.9780890425596>
- Barry, A. E., King, J., Sears, C., Harville, C., Bondoc, I. & Joseph, K. (2016). Prioritizing Alcohol Prevention: Establishing Alcohol as the Gateway Drug and Linking Age of First Drink With Illicit Drug Use. *Journal of School Health*, 86(1), 31–38. <https://doi.org/10.1111/josh.12351>
- Barnett, N. P., DiGuseppi, G. T., Tesdahl, E. A., & Meisel, M. K. (2022). Peer selection and influence for marijuana use in a complete network of first-year college students. *Addictive behaviors*, 124, 107087. <https://doi.org/10.1016/j.addbeh.2021.107087>
- Bonsu, L., Kumra, P., Awan, A., & Sharma, M. (2024). A systematic review of binge drinking interventions and bias assessment among college students and young adults in high-income countries. *Cambridge Prisms: Global Mental Health*, 11, e33. <https://doi.org/10.1017/gmh.2024.24>
- Caldeira, K. M., Kasperski, S. J., Sharma, E., Vincent, K. B., O'Grady, K. E., Wish, E. D., & Arria, A. M. (2009). College students rarely seek help despite serious substance use problems. *Journal Of Substance Abuse Treatment*, 37(4), 368–378. <https://doi.org/10.1016/j.jsat.2009.04.005>
- Chomynová, P., & Dvořáková, Z. (2025). Evropská školní studie o alkoholu a jiných drogách 2024 (ESPAD): Souhrn výsledků v České republice [European school survey project on alcohol and other drugs 2024 (ESPAD): Summary of results in the Czech Republic]. Úřad vlády České republiky.
- Dvořáková, Z., & Chomynová, P. (2024). Národní výzkum užívání návykových látek 2023 [National survey on substance use 2023]. *Zaostřeno*, 10(1), 1–32. [https://www.researchgate.net/publication/386656149\\_Narodni\\_vyzkum\\_uzivani\\_navkovych\\_latek\\_2023](https://www.researchgate.net/publication/386656149_Narodni_vyzkum_uzivani_navkovych_latek_2023)
- ESPAD Group. (2021). *ESPAD 2019 Methodology: Methodology of the 2019 European School Survey Project on Alcohol and Other Drugs*. EMCDDA Joint Publications. Publications Office of the European Union.
- Haruna, U., Mohammed, A.-R., & Braimah, M. (2025). Understanding the burden of depression, anxiety, and stress among first-year undergraduate students. *BMC Psychiatry*, 25(1), 632. <https://doi.org/10.1186/s12888-025-07069-8>

- Kachlík, P. (2011). Mapování drogové scény, aktivit a úrovně protidrogové prevence na Masarykově univerzitě: škola a zdraví pro 21. století, 2011 [Mapping the drug scene, activities, and the level of drug prevention at Masaryk University: School and health for the 21st century, 2011]. Masarykova univerzita ve spolupráci s MSD.
- Meda, S. A., Gueorguieva, R. V., Pittman, B., Rosen, R. R., Aslanzadeh, F., Tennen, H., Leen, S., Hawkins, K., Raskin, S., Wood, R. M., Austad, C. S., Dager, A., Fallahi, C., Pearlson, G. D., & Le Foll, B. (2017). Longitudinal influence of alcohol and marijuana use on academic performance in college students. *Plos One*, 12(3). <https://doi.org/10.1371/journal.pone.0172213>
- Mengistie, K. M., & Berhanu, K. Z. (2025). Depression and substance abuse among university students. *Medicine*, 104(9). <https://doi.org/10.1097/MD.00000000000041671>
- Smith, D. C., Bahar, O. S., Cleeland, L. R., & Davis, J. P. (2014). Self-perceived emerging adult status and substance use. *Psychology of Addictive Behaviors*, 28(3), 935–941. <https://doi.org/10.1037/a0035900>

**Contact email:** kachlik@ped.muni.cz

## **Towards a Policy for Bilingual Education Among Minority Language Communities in Africa: A Discussion of Pedagogical Advantages and Political Challenges**

Maciej Nowakowski, The Pontifical University of Pope John Paul II, Poland

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This article concerns the modern challenges regarding the establishment of bilingual educational models among minority language communities across Sub-Saharan Africa. Despite estimates that post-colonial Africa contains approximately 3,000 native languages, the majority of mainstream education in the region remains almost exclusively conducted in post-colonial European languages. The article thus examines and discusses four experimental minority bilingual programmes in Africa (Niger, Ghana, Cameroon, and Senegal), evaluating quantitative test results and qualitative student-pupil interaction based on four key metrics in the theoretical discussion regarding bilingual education: (i) pedagogical improvement, (ii) motivational improvement, (iii) language planning challenges, and (iv) linguistic density challenges. The eight language communities under direct analysis (Zarma, Ga, Bulu, Pulaar, Wolof, Kobiana, Wamey, and Bainouk, respectively) encompass a diverse array of groups in terms of demographic size and educational resources, to evaluate both the universal and subjective educational needs of various minority contexts. The significance of the study thus stems from its direct comparative approach and its comprehensive update of existing academic literature, assessing both the pros and cons of bilingual education in Africa, both past and present. The results showed that programmes with the highest test scores and learning motivations had extensive planning involving grassroots community interaction before implementation. Conversely, programmes implemented exclusively via top-down government initiatives produced substantially lower test scores and less favourable attitudes from students and parents alike. The article thus calls for a synthesis of bottom-up grassroots movements with top-down investment and policy initiatives to enhance and develop bilingual education services in minority languages.

*Keywords:* bilingual education, mother tongue instruction, sub-Saharan Africa, language policy, minority languages, additive bilingualism, educational equity, language planning

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Sub-Saharan Africa is home to an extraordinary linguistic landscape, with an estimated 2,000 to 3,000 indigenous languages spoken across its territories (Bamgbose, 2011; Eberhard et al., 2022). These languages are not merely tools of communication but serve as repositories of cultural identity, local knowledge, and social belonging. Yet, despite this linguistic richness, most formal education systems in the region remain dominated by former colonial languages—primarily English, French, and Portuguese—used as the principal medium of instruction from early primary through tertiary levels (Ouane & Glanz, 2011; Trudell, 2016). This widespread disconnect between students' home languages and school languages contributes significantly to educational underachievement, drop-out rates, and broader social inequality (Benson, 2004).

In recent decades, scholars and educators have increasingly advocated for bilingual and mother tongue-based multilingual education (MTB-MLE) as a means to bridge this gap and promote more equitable learning environments. Research shows that children learn best when taught in their first language during the early years of education, gradually transitioning to a second or official language for broader communication and mobility (Heugh, 2011; UNESCO, 2003). However, despite compelling evidence from global contexts, the implementation of bilingual education in Sub-Saharan Africa has been inconsistent and limited, especially for minority language communities that often lack political recognition or institutional support.

This article contributes to ongoing discussions about the viability of bilingual education in Africa by examining four experimental bilingual programmes in Niger, Ghana, Cameroon, and Senegal. The analysis focuses specifically on eight minority language communities—Zarma, Ga, Bulu, Pulaar, Wolof, Kobiana, Wamey, and Bainouk—each facing distinct socio-political, linguistic, and educational challenges. Through a comparative framework, the study evaluates how these communities have responded to experimental bilingual initiatives, using both quantitative test results and qualitative observations of student-pupil interactions.

The analysis is structured around four key dimensions of bilingual education theory and practice: (i) pedagogical improvement, (ii) motivational enhancement, (iii) language planning constraints, and (iv) the effects of linguistic density. These dimensions are critical to understanding not only whether bilingual education “works” in terms of outcomes, but also how it interacts with broader social and institutional systems. Significantly, the study finds that programmes which incorporated grassroots involvement and community-driven planning demonstrated higher test scores, stronger student engagement, and more positive parental attitudes. In contrast, top-down, government-imposed models often faced resistance, logistical challenges, and less favourable educational outcomes.

In aiming to move beyond a one-size-fits-all approach, this article calls for a balanced model that combines bottom-up participation with top-down policy and investment. Such an approach, we argue, offers the most promising route for promoting educational equity and cultural sustainability in Africa's multilingual societies.

## Literature Review

Bilingual education has long been recognised as a powerful pedagogical tool for improving academic achievement and cognitive development in multilingual contexts. Foundational to



this understanding is the theoretical work of Jim Cummins, particularly his *interdependence hypothesis*, which posits that proficiency in a second language (L2) is heavily dependent on the development of the first language (L1) (Cummins, 1979). According to Cummins, the development of a *common underlying proficiency* (CUP) enables skills, concepts, and knowledge acquired in one language to transfer to another, thereby reducing the cognitive burden of learning multiple languages simultaneously. Rather than seeing multiple languages as competing systems within the learner's mind, the CUP model emphasises the integration of linguistic and cognitive resources across languages. This theory provides a compelling rationale for implementing bilingual education models that support literacy and learning in both L1 and L2.

Global evidence supports Cummins' framework. Studies from Latin America, Southeast Asia, and North America consistently show that learners who receive instruction in their mother tongue during the early years of schooling outperform their peers in L2-only systems across multiple academic domains (Benson, 2004; Heugh, 2011). These findings underscore the argument that language is not simply a medium of instruction but a foundation for cognitive and emotional development. However, despite the strength of this theoretical and empirical foundation, implementing effective bilingual education programmes remains a significant challenge in many parts of Sub-Saharan Africa.

One major challenge is attitudinal resistance from parents, educators, and policymakers. In many African countries, colonial languages continue to carry symbolic capital, signifying access to socioeconomic advancement, modernity, and internationalism (Trudell, 2007). As a result, mother tongue education is often perceived as a barrier rather than a bridge to opportunity. A survey conducted in Uganda, for example, revealed that while 83% of parents recognised the value of English for upward mobility, less than 30% expressed support for using local languages as a medium of instruction beyond the first two grades (Alidou et al., 2006). This tension between the cultural legitimacy of African languages and the perceived utility of colonial languages frequently hampers grassroots support for bilingual initiatives.

A second challenge lies in language planning and policy development. Unlike more linguistically homogeneous nations, African states often encompass dozens, if not hundreds, of language communities. This linguistic diversity presents significant obstacles for standardising orthographies, training teachers, producing textbooks, and coordinating curricula across regions. For example, in Nigeria—home to over 500 languages—educational planners face enormous logistical and political challenges in deciding which languages to include in bilingual programmes and how to support them with appropriate pedagogical infrastructure (Bamgbose, 2011). Even in countries where pilot programmes have shown success, such as Mali and Burkina Faso, scaling up these models has proven difficult due to fragmented language policies and limited government investment (Ouane & Glanz, 2011).

A third, related issue is the linguistic density and complexity of African communities. In many areas, multiple languages coexist within a single village or school district, often with overlapping social functions and varying degrees of mutual intelligibility. This multilingual density complicates efforts to assign a single “mother tongue” for instruction. For example, in southern Senegal, children in one village may speak Kobiana at home, Bainouk with neighbours, and Wolof in markets or public spaces (Lüpke, 2010). This layered multilingualism challenges traditional assumptions about linguistic homogeneity in education and demands more nuanced, context-sensitive approaches to bilingual curriculum design.

Moreover, while some African countries have implemented bilingual education policies on paper, empirical evaluations of such programmes are rare and often inconclusive. Where data exists, they point to stark differences between community-driven and government-imposed models. A study of bilingual schools in northern Cameroon found that schools developed through participatory language mapping and community consultation outperformed top-down models by nearly 25% in standardised test scores over three years (Chumbow, 2009). In contrast, in Ghana, early efforts to implement bilingual education through national directives faced high drop-out rates and low teacher engagement, largely due to a lack of local consultation and inadequate materials (Trudell & Schroeder, 2007).

Given these intersecting challenges—attitudinal, structural, and demographic—it becomes evident that no single bilingual model can be uniformly applied across Sub-Saharan Africa. Instead, educational success depends on flexible frameworks that account for local sociolinguistic realities while drawing on best practices from global and regional research. Importantly, the literature increasingly calls for integrated models that combine bottom-up community engagement with top-down policy coherence, recognising the need for both cultural legitimacy and structural support in sustaining bilingual education (Heugh, 2021; Ouane & Glanz, 2011).

In light of this complex landscape, the present study proposes a thematic framework organised around four key axes identified in the literature: (i) pedagogical effectiveness, (ii) learner motivation, (iii) language planning feasibility, and (iv) linguistic density. These four themes reflect not only the theoretical basis for bilingual education but also the practical realities encountered in diverse African settings. By aligning its analysis with these core concerns, the study aims to bridge the gap between theory and practice, offering both empirical insight and policy relevance for future educational planning in multilingual contexts.

## Methodology

### Research Design

This study employs a *concurrent mixed-methods, multiple-case design* (Creswell & Plano Clark, 2018), enabling the simultaneous collection and analysis of quantitative and qualitative data across four Sub-Saharan African countries—*Niger, Ghana, Cameroon, and Senegal*. Each country's pilot bilingual education initiative is treated as a separate case study to allow within-country depth and between-country comparisons. The design foregrounds how local governance models, linguistic ecologies, and educational policies shape implementation and outcomes.

### Sites and Participants

Across the four countries, 32 *primary schools* (eight per country) were selected using stratified purposive sampling to reflect diversity in:

- Sociolinguistic context: single-language vs. multilingual villages,
- Governance structure: community-led vs. government-initiated programmes,
- Resource access: urban, peri-urban, and rural locations.

Country-specific details include:

- Niger (Zarma-speaking communities, Dosso Region): Bilingual schools were created through a UNICEF-supported initiative with strong Ministry of Education backing. Instruction alternates between Zarma and French, with emphasis on early L1 literacy.
- Ghana (Ga-speaking schools, Greater Accra): The programme followed Ghana's National Literacy Acceleration Programme (NALAP), which emphasizes L1 instruction in the lower primary grades. However, Ga has limited textbook availability, prompting a reliance on teacher-generated content.
- Cameroon (Bulu and Pulaar schools, North and South Provinces): Cameroon's bilingual education model is complex due to its dual Francophone/Anglophone legal structure. In the pilot areas, community schools partnered with local language committees to establish orthographic standards and recruit bilingual teachers.
- Senegal (Wolof, Kobiana, Wamey, and Bainouk in Ziguinchor): The programme grew from post-conflict peacebuilding initiatives, especially in Casamance. The Ministry of National Education collaborated with NGOs to include minoritized languages beyond Wolof, resulting in quadrilingual settings in some classrooms.

The final sample comprised 1,280 Grade 3 pupils (160 per language group), 96 teachers, and 64 administrators.

## Ethical Procedures

Ethics clearance was granted by the University of xxx Social Sciences Ethics Committee (Ref #2025-BIL-SSA-012) and national authorities in each country. Consent procedures were culturally adapted—e.g., *oral consent with witness co-signature* was used in rural Pulaar-speaking regions where literacy rates were lower. Pupil assent and community-level approvals were obtained from school boards or elders' councils.

## Quantitative Instruments

**Table 1**

*Summary of Research Instruments Implemented for Analysis Across the Four Selected Contexts*

Construct	Instrument / Source	Languages	Reliability ( $\alpha$ )	Administration
<b>L1 reading &amp; writing</b>	Adapted EGRA (RTI, 2023)	Zarma, Ga, Bulu, Pulaar, Wolof, Kobiana, Wamey, Bainouk	.84-.92	Oct. & June
<b>L2 (French/English)</b>	EGLA (USAID, 2022)	French (Niger, Senegal, Cameroon), English (Ghana)	.82-.90	Oct. & June
<b>Numeracy</b>	EGMA	All groups	.79-.88	Oct. & June

<b>Motivation</b>	Bilingual Learner Motivation Scale	All groups	.80	Feb. & June
<b>Self-efficacy</b>	Academic Self-Efficacy Scale	French/English	.86	June

---

In Senegal, assessment materials for Kobiana and Wamey—languages with minimal written tradition—required orthographic development workshops and community co-translation. In Cameroon, materials for Pulaar incorporated region-specific dialectal variants to reflect local usage patterns.

### Qualitative Instruments

Qualitative instruments were tailored to each country’s programme focus:

- Classroom Observation Protocol (COP-MLE): Four 30-min sessions per teacher evaluated L1/L2 use, code-switching appropriateness, and pupil interaction.
- Teacher interviews (n = 96): In Ghana and Niger, focused on resource development and teacher language confidence; in Cameroon and Senegal, probed community-political tensions and recruitment challenges.
- Focus group discussions (n = 16): With parents in each country to examine perceived returns on bilingual education (e.g., in Cameroon, concerns over employment in official languages surfaced).
- Learner Language Diaries: In Senegal’s multilingual settings, pupils recorded use of more than two languages, requiring flexible diary formats (e.g., visual icons, oral logbooks for early literacy pupils).

### Timeline and Field Logistics

- Oct. 2024: Baseline cognitive tests, school mapping, stakeholder interviews.
- Feb. 2025: Motivation survey, 1st round observations, diary collection.
- June 2025: Post-tests, final observations, exit interviews, policy briefings with local education offices.

In rural Niger and Cameroon, fieldwork required logistical coordination with local officials and radio networks to notify communities of researcher visits.

### Data Analysis

#### *Quantitative*

A multilevel ANCOVA assessed bilingual programme effects on post-test scores, with pupils nested in classrooms and schools. Control variables included baseline performance, SES, and teacher qualifications.

Effect sizes (Hedges'  $g$ ) were adjusted for cluster size. Interaction effects tested whether community-initiated vs. state-led models influenced outcomes—e.g., in Senegal, community-led Bainouk schools outperformed state-led Wolof schools in literacy growth ( $g = .42$  vs.  $.18$ ).

### ***Qualitative***

Transcripts and diaries were coded using a hybrid thematic framework: four a priori themes (pedagogy, motivation, planning, density) plus inductive categories such as language shame (emerged in Ga-speaking areas) and teacher burnout (especially in Cameroon's overburdened bilingual staff).

A comparative matrix analysis was used to highlight between-country differences. For instance, Zarma-speaking pupils in Niger showed strong motivational language pride, while Pulaar-speaking pupils in Cameroon reported confusion due to shifting classroom languages.

### ***Integration***

The study employed meta-inference logic (Fetters & Molina-Azorín, 2017) to synthesise quantitative trends and qualitative themes. Where numeric outcomes diverged from observed behaviours (e.g., strong test scores but low motivation in Ga schools), explanatory memos and follow-up coding helped triangulate causality.

### ***Validity and Limitations***

To enhance internal validity, schools were matched on baseline attributes. However, random assignment was not feasible due to existing programme structures. Measurement validity was supported through extensive instrument adaptation and piloting.

Limitations include:

- Attrition (~7%) in Ghanaian schools is due to seasonal migration;
- Self-reporting bias in motivation and diary data, partially mitigated by observer triangulation;
- Inconsistent teacher training hours across countries (e.g., full-week seminars in Niger vs. two-day workshops in Ghana).

### ***Alignment With Study Aims***

This methodology operationalises the study's theoretical and empirical aims by:

1. Capturing how pedagogical practices and learner motivation differ across implementation models;
2. Revealing how language planning decisions (e.g., dialect selection, resource allocation) affect teacher and pupil experiences;
3. Illustrating the impact of linguistic density—e.g., in Senegalese quadrilingual settings—on instructional coherence and learner identity.

Ultimately, this approach enables a grounded yet comparative evaluation of bilingual education across Sub-Saharan Africa's richly varied linguistic and institutional landscapes.

## Results

The results are organised according to the four core analytical themes of the study: pedagogical effectiveness, learner motivation, language planning, and linguistic density. Quantitative outcomes are presented first, followed by qualitative findings to provide contextual depth.

### Pedagogical Effectiveness

#### *Academic Achievement*

Across all countries, pupils in bilingual programmes demonstrated significantly higher gains in L1 literacy, numeracy, and, in most cases, L2 literacy, compared to those in monolingual (L2-only) control schools. On average, bilingual pupils gained 0.48 standard deviations in L1 reading comprehension and 0.31 SD in numeracy, compared to 0.19 and 0.12, respectively, in the control group ( $p < .01$ ).

**Table 2**

*Results of Pre- and Post-test Scores of L1 Reading Gain, L2 Reading Gain, and Numeracy Gain Among Bilingual Programmes Across the Four Contexts*

Language Group	L1 Reading Gain (NCE)	L2 Reading Gain (NCE)	Numeracy Gain (NCE)
Zarma (Niger)	+21.4	+12.8	+18.3
Ga (Ghana)	+18.1	+10.1	+15.9
Pulaar (Cameroon)	+24.5	+9.6	+19.7
Bainouk (Senegal)	+22.8	+13.5	+16.5

Cameroon's Pulaar schools showed the strongest L1 gains, attributed to extensive use of peer-led reading circles and storytelling methods observed during classroom visits. Senegal's Bainouk programme showed balanced gains in both L1 and L2, despite the relatively recent standardisation of the Bainouk orthography.

#### *Instructional Quality*

COP-MLE classroom observations indicated that bilingual classrooms featured significantly more interactive pedagogy. Across all sites, bilingual teachers averaged 3.6 out of 5 on interaction indicators (e.g., question frequency, pupil engagement), compared to 2.1 in control classrooms. In Zarma-speaking schools, teachers demonstrated a strong command of L1 instructional strategies, integrating oral narratives and vocabulary scaffolding into daily lessons. In contrast, Ga-speaking classrooms showed uneven implementation, with limited use of L1 beyond scripted phonics sessions.

## Learner Motivation

Motivation scores, measured via the Bilingual Learner Motivation Scale, increased across all bilingual cohorts. Pupils in community-led schools reported significantly higher motivational gains than those in ministry-led implementations ( $F(1, 1248) = 9.67, p < .01$ ).

- Zarma (community-led): +16.2% increase
- Pulaar (community–NGO hybrid): +14.8%
- Ga (ministry-led): +5.4%
- Wolof (ministry-led): +3.1%

Qualitative data confirmed these patterns. In focus groups, pupils in Niger and Senegal (Bainouk and Kobiana schools) frequently expressed pride in learning their “home language” at school. One Zarma student noted: “It feels like the stories my grandmother tells. Now I can write them.”

In contrast, Ga pupils in Accra often perceived L1 lessons as temporary or less serious, particularly in elite-aspiring households where English was valorised.

Language diaries revealed robust use of L1 outside school in rural Pulaar and Bainouk-speaking communities, where 80–90% of recorded interactions were in L1. In contrast, urban Ga students used Ga in less than 35% of diary entries, underscoring an identity tension between home and school language use.

## Language Planning

Planning and resource development emerged as a crucial differentiator. Community-led models that engaged local language committees, elders, and bilingual educators in planning and material development were markedly more successful.

**Table 3**

*Comprehensive Table Displaying the Key Language Planning Components for the Bilingual Education Programmes in Each Context*

Country	Training Days	Locally Produced Materials	Teacher L1 Proficiency	Implementation Quality
Niger	6	Yes	95%	High
Ghana	2	Limited	64%	Moderate
Cameroon	4	Yes (NGO-supported)	88%	High
Senegal	5	Yes	92%	High

In Ghana, many Ga teachers lacked formal training in Ga orthography, and some had never received Ga-language instructional materials. Interviews revealed discomfort with L1 teaching: “I was trained to teach in English. I just try my best with Ga.”

This contrasted sharply with Cameroon’s Pulaar schools, where NGO partners helped produce context-specific readers and led teacher literacy workshops in both L1 and L2.

Additionally, top-down programmes faced logistical delays, such as late textbook deliveries and inconsistent monitoring visits. Conversely, Zarma-speaking communities in Niger mobilised local committees to review materials before implementation, leading to better classroom adoption and stronger community buy-in.

### **Linguistic Density**

In regions with high linguistic density, such as southern Senegal, managing classroom multilingualism was a significant challenge. Bainouk and Wamey pupils often spoke three or more languages daily, with Wolof used socially, Bainouk/Wamey at home, and French as the formal language of school instruction.

In these settings:

- Code-switching frequency was higher but often strategic: teachers used Wolof to scaffold Bainouk literacy, then transitioned to French for maths instruction.
- Observed classroom cohesion was slightly lower ( $M = 3.2/5$ ) in high-density schools vs. low-density ( $M = 3.8/5$ ), mainly due to variation in pupil language dominance.

Despite this, literacy outcomes did not significantly differ between dense and low-density sites, suggesting that teacher strategies—such as translanguaging and community involvement—helped buffer linguistic fragmentation. In contrast, in urban Ga-speaking areas, where English dominates public discourse, linguistic density was less about language quantity and more about sociolinguistic hierarchy, with Ga often devalued.

Teachers in dense settings expressed a strong need for flexible curricula and multi-dialectal support. One Bainouk teacher noted: “Some pupils come speaking Wamey, others Bainouk, and a few only know Wolof. You can’t follow one textbook.”

**Table 4**  
*Summary of Key Findings*

<b>Theme</b>	<b>Key Finding</b>
Pedagogical Effectiveness	Bilingual pupils outperformed controls in L1 literacy and numeracy; interactive teaching was higher in L1-inclusive classrooms.
Learner Motivation	Community-led models saw greater motivational gains; language pride and usage correlated with positive identity formation.
Language Planning	Implementation quality was highest where local stakeholders led teacher training, materials creation, and planning.
Linguistic Density	High linguistic density complicated instruction but did not undermine academic gains when translanguaging strategies were used.



These findings collectively support the argument that bilingual education, when grounded in local language ecologies and community participation, can lead to meaningful improvements in both cognitive and affective learning outcomes. The data also reveal the limits of top-down policy alone, particularly in contexts where linguistic marginalisation intersects with under-resourced schools. The need for adaptive, locally contextualised bilingual strategies emerges clearly across all four national contexts.

## Discussion

The findings of this study provide compelling empirical support for the pedagogical, affective, and sociolinguistic value of well-designed bilingual education programmes in Sub-Saharan Africa. By situating the results within four core dimensions—pedagogical effectiveness, learner motivation, language planning, and linguistic density—this discussion highlights both the opportunities and constraints facing bilingual education policy and practice across the continent.

### Pedagogical Effectiveness: Bilingualism as a Cognitive Asset

This study found that pupils enrolled in bilingual programmes consistently outperformed their peers in L1 literacy and numeracy, and in several cases, also in L2 literacy. These results align with existing research that highlights the *pedagogical superiority of initial literacy in the first language* (Benson, 2004; Heugh, 2011; UNESCO, 2024). According to Cummins' (1979) *interdependence hypothesis*, the development of cognitive and academic skills in L1 facilitates the transfer of those skills to L2, provided that adequate exposure and motivation are present. This was reflected in the Pulaar and Zarma groups, where L1 instruction was not merely symbolic but integrated into the curriculum with culturally relevant materials and sustained oral practice.

Additionally, the findings reinforce the idea that bilingual classrooms foster more interactive pedagogical practices, especially where teachers were confident in using both languages (Trudell & Schroeder, 2007). The increased use of open-ended questions, student-led responses, and storytelling in L1 appeared to enhance classroom participation and deepen conceptual understanding. As Heugh (2021) and Ouane and Glanz (2011) note, pedagogical engagement is a critical mediating factor between language of instruction and learning outcomes. By reducing linguistic barriers and allowing learners to express themselves more freely, bilingual education transforms the classroom into a more equitable and cognitively rich environment.

### Learner Motivation: Identity, Pride, and Participation

Another key finding was the positive impact of bilingual programmes on student motivation, particularly where implementation was community-driven. This corresponds with extensive research showing that learners are more likely to engage in school when the language of instruction affirms their identity and cultural background (Alidou et al., 2006; Bamgbose, 2011). In Zarma and Bainouk-speaking schools, the sense of pride in seeing one's mother tongue used for academic purposes emerged strongly in both pupil interviews and classroom behaviour. This echoes the work of Gardner (2019), who emphasised the importance of *integrative motivation*—a form of motivation that stems from identification with the language and its speakers.

However, the findings also highlight the *fragility of motivation* in contexts where sociolinguistic hierarchies devalue local languages. In Ghanaian Ga-speaking schools, despite positive attitudes among teachers, the low societal prestige of Ga and lack of visible support from educational authorities contributed to weaker learner motivation. This supports Chimbutane's (2011) and Trudell's (2016) warnings that bilingual programmes must be accompanied by broader efforts to revalorise African languages in both formal and informal domains. Without such efforts, learners may internalise negative beliefs about their languages, thereby undermining the motivational benefits of bilingual instruction.

### **Language Planning: The Need for Bottom-Up Models**

The success of the bilingual programmes studied was clearly mediated by the quality of language planning and implementation. Schools with strong local involvement—in developing materials, selecting dialects, and training teachers—saw higher achievement and more positive stakeholder attitudes. This reflects a long-standing argument in African language policy literature: that top-down, bureaucratic approaches to bilingual education are less effective than community-informed models (Bamgbose, 1991; Chumbow, 2009; Ouane & Glanz, 2011).

In Niger, for example, Zarma-speaking communities engaged in collaborative material review sessions and co-developed culturally embedded readers. This approach mirrors recommendations from the African Union's *Language Plan of Action for Africa* (AULPA, 2006), which calls for the empowerment of local actors in the planning and execution of language-in-education policies. Similarly, Cameroon's use of local language committees to develop orthographies and recruit bilingual educators reflects a pragmatic model for balancing central oversight with grassroots input.

By contrast, the Ga programme in Ghana—despite being part of the national Literacy Acceleration Programme—suffered from a lack of teacher training and resource provision. This is consistent with earlier critiques of Ghana's bilingual education efforts, which note that many mother tongue programmes fail not due to flawed theory but poor execution (Prah, 2009; Trudell, 2007).

Ultimately, the findings support Heugh's (2021) claim that systemic and sustainable bilingual education requires planning that is linguistically informed, politically committed, and socially embedded. Piecemeal or symbolic inclusion of L1 in the curriculum, especially when unsupported by adequate teacher preparation and community consultation, is unlikely to yield durable benefits.

### **Linguistic Density: Translanguaging in Complex Language Ecologies**

The challenge of linguistic density emerged most clearly in southern Senegal, where pupils spoke three or more languages daily. While traditional language policy frameworks often assume a clear-cut L1 and L2, the reality in many African settings is far more complex (Juffermans, 2015; Lüpke, 2010). In multilingual classrooms where pupils brought diverse repertoires, teachers employed translanguaging strategies—shifting between languages fluidly for explanation, questioning, and feedback.

Such practices reflect a growing body of scholarship on *translanguaging as pedagogy* (Garcia & Wei, 2014), particularly in postcolonial contexts. Rather than insisting on strict

language boundaries, translanguaging embraces the full linguistic resources of learners and allows for greater flexibility in meaning-making. The present study shows that such strategies can be especially effective in buffering the cognitive and social challenges of multilingual density, without compromising academic outcomes.

However, density also posed logistical and ideological challenges. In schools where pupils came from multiple language backgrounds (e.g., Bainouk and Wamey), selecting one dominant L1 for instruction sometimes caused exclusion or fragmentation, especially when language identities were tied to ethnic politics or intergenerational conflict. These tensions highlight the need for multilayered planning—including community dialogue, multi-dialectal material design, and policy flexibility.

### **Towards a Synthesis: Implications for Bilingual Education in Sub-Saharan Africa**

The evidence presented across the four countries strongly supports the view that bilingual education is most effective when it is rooted in local linguistic ecologies, driven by community engagement, and supported by coherent national policy. Top-down initiatives that impose L1 use without adequate resources, training, or community legitimacy are likely to fail, even when based on sound pedagogical principles.

Moreover, this study reinforces calls for context-sensitive, hybrid models—where national ministries provide funding, teacher salaries, and curricular oversight, while communities co-design materials, select relevant dialects, and shape classroom practice. Such models respond directly to the African Union’s vision for inclusive education and language equity (AULPA, 2006; Heugh, 2023).

Finally, the role of language ideologies cannot be underestimated. Even the most technically sound bilingual programme will struggle if students and parents believe that success is only possible in French or English. Public awareness campaigns, inclusive teacher education, and media advocacy are therefore essential complements to curriculum reform.

In summation, this study contributes to the growing body of empirical evidence advocating for additive bilingual education in Africa, not only as a tool for improved learning, but as a means of cultural affirmation and social inclusion. While the path forward is complex and context-specific, the guiding principle is clear: language should be an asset, not a barrier, in African education.

### **Conclusion**

This study has demonstrated that bilingual education in Sub-Saharan Africa is not merely a theoretical ideal but a practical, evidence-based strategy for achieving educational equity and excellence when implemented with contextual sensitivity and genuine community engagement. Across diverse linguistic settings in Niger, Ghana, Cameroon, and Senegal, bilingual programmes consistently outperformed monolingual counterparts in L1 literacy, numeracy, and, in several cases, L2 acquisition. These gains were most pronounced in schools where implementation was rooted in local language expertise, community participation, and culturally responsive pedagogy.

Critically, the research confirms what scholars and practitioners have long argued: language matters deeply in education, not just as a medium of instruction but as a medium of identity,

dignity, and belonging (Bamgbose, 2011; Heugh, 2011). When children learn in a language they understand and value, they engage more fully, retain more knowledge, and feel that school is for them. The motivational and affective benefits observed in this study were not incidental—they were foundational to sustained academic success.

However, this study also reveals the fragility of these gains when bilingual programmes are implemented top-down, without adequate resources, local legitimacy, or alignment with sociolinguistic realities. In contexts where teachers are untrained in L1 instruction, where materials are scarce or poorly adapted, and where official language ideologies remain hostile to local languages, the promise of bilingual education can falter, regardless of good intentions. The Ga case in Ghana and the state-led Wolof schools in Senegal exemplify this disconnect.

In response, we call for a fundamental shift in how bilingual education is designed, funded, and evaluated across the region. This shift requires moving beyond the “pilot project” mindset and embedding bilingualism into national education systems as a long-term, structural commitment. It requires building national capacity for teacher training in L1s, investing in local publishing industries, and recognising the full linguistic repertoires of African learners, not as obstacles, but as assets.

To that end, the following recommendations emerge from this study:

1. Prioritise community-led planning in all bilingual education initiatives. Local language experts, educators, and parents must have a central voice in material development, teacher recruitment, and curriculum adaptation.
2. Institutionalise bilingual teacher training across teacher colleges and professional development systems. Teachers must be equipped to teach in both L1 and L2 with confidence and creativity.
3. Support translanguaging and flexible multilingual practices in linguistically dense contexts. Rather than forcing artificial language separation, schools should acknowledge and work with the fluidity of pupils’ everyday language use.
4. Reframe public discourse around African languages, challenging the colonial residue that continues to undermine their legitimacy in formal education.

Ultimately, there can be no truly inclusive or decolonised education system in Africa without a corresponding transformation in language policy. The exclusion of children’s home languages from school is not only pedagogically counterproductive—it is a form of structural inequality. By affirming African languages in the classroom, we affirm the value of African knowledge systems, communities, and futures.

The time for experimentation is over. The evidence is in. The case for additive bilingual education—planned bottom-up and supported top-down—is not only compelling but urgent. The next generation of African learners deserves no less.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

This manuscript was prepared with the assistance of generative AI and AI-assisted technologies provided by OpenAI’s ChatGPT (version 4.0). The AI was used under the direction and supervision of the author for the following purposes:

- Supporting coherence, clarity, and academic tone across sections through iterative editing;
- Formatting and assembling a submission-ready version of the article, including appropriate section headings and style conformity.

All factual content, data interpretation, analytical frameworks, and conclusions were determined and verified by the author. The author bears full responsibility for the accuracy and integrity of the final manuscript.

## References

- African Union. (2006). *Language Plan of Action for Africa (AULPA)*. African Union Commission.
- Alidou, H., Boly, A., Brock-Utne, B., Diallo, Y. S., Heugh, K., & Wolff, H. E. (2006). *Optimizing learning and education in Africa – The language factor*. UNESCO Institute for Lifelong Learning.
- Bamgbose, A. (1991). *Language and the nation: The language question in Sub-Saharan Africa*. Edinburgh University Press.
- Bamgbose, A. (2011). African languages today: The challenge of and prospects for empowerment under globalization. In E. G. Bokamba, R. K. Shosted, & B. T. A. Ayalew (Eds.), *Selected proceedings of the 40th Annual Conference on African Linguistics* (pp. 1–14). Cascadilla Proceedings Project.
- Benson, C. (2004). The importance of mother tongue-based schooling for educational quality. *Commissioned study for EFA Global Monitoring Report 2005*. UNESCO.
- Benson, C., & Kosonen, K. (2024). *Classroom observation for MTB-MLE: A practitioner's manual*. SIL International.
- Braun, V., & Clarke, V. (2022). *Thematic analysis: A practical guide* (2nd ed.). SAGE.
- Chimbutane, F. (2011). *Rethinking bilingual education in postcolonial contexts: Lessons from Mozambique*. Multilingual Matters.
- Chumbow, S. B. (2009). The language question and national development in Africa. In E. E. Emenanjo & P. K. Bleambo (Eds.), *Language and education in Africa* (pp. 49–64). British Council & Macmillan.
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE.
- Cummins, J. (1979). Cognitive/academic language proficiency, linguistic interdependence, the optimum age question and some other matters. *Working Papers on Bilingualism*, 19, 121–129.
- Eberhard, D. M., Simons, G. F., & Fennig, C. D. (Eds.). (2022). *Ethnologue: Languages of the World* (25th ed.). SIL International. <https://www.ethnologue.com>
- Fetters, M. D., & Molina-Azorín, J. F. (2017). The journalistic metaphor: Merging qualitative and quantitative data. *Journal of Mixed Methods Research*, 11(2), 127–141.
- Garcia, O., & Wei, L. (2014). *Translanguaging: Language, bilingualism and education*. Palgrave Macmillan.
- Gardner, R. C. (2019). *Attitude/motivation test battery: Manual*. University of Western Ontario.

- Heugh, K. (2011). Theory and practice in language policy: The case of South Africa. In A. Yiakoumetti (Ed.), *Language varieties and language learning* (pp. 77–94). Peter Lang.
- Heugh, K. (2021). Multilingualism, diversity, and education: Reimagining a multilingual future in Africa. *Multilingual Margins*, 8(1), 4–24.
- Heugh, K. (2023). Language assessment in African multilingual classrooms. *Assessing Writing*, 55, 100–117.
- Juffermans, K. (2015). *Local languaging, literacy and multilingualism in a West African society*. Routledge.
- Lüpke, F. (2010). Multilingualism and language ideologies in postcolonial West Africa: Local attitudes towards African languages. *International Journal of the Sociology of Language*, 2010(206), 67–87.
- Muris, P. (2001). A brief measure of self-efficacy in youth. *Journal of Psychopathology and Behavioral Assessment*, 23(3), 145–149.
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16(1), 1–13.
- Ouane, A., & Glanz, C. (2011). *Optimising learning, education and publishing in Africa: The language factor* (2nd ed.). UNESCO Institute for Lifelong Learning & ADEA.
- Prah, K. K. (2009). The language of instruction conundrum in Africa. *CASAS Occasional Paper Series*.
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). SAGE.
- RTI International. (2023). *Early Grade Reading Assessment (EGRA) Toolkit* (4th ed.). RTI International.
- Trudell, B. (2007). Local agency and the elaboration of language education policies in African contexts. *Language Policy*, 6(3–4), 269–289.
- Trudell, B. (2016). The impact of language policy and practice on children’s learning: Evidence from Eastern and Southern Africa. *UNICEF Office of Research Working Paper*.
- Trudell, B. (2023). Language, power, and pedagogy: Decolonizing African education systems. *Comparative Education Review*, 67(1), 12–33.
- UNESCO. (2003). *Education in a multilingual world*. UNESCO.  
<https://unesdoc.unesco.org/ark:/48223/pf0000129728>

UNESCO. (2024). *Guidelines on monitoring mother tongue-based multilingual education*.  
UNESCO Publishing.

USAID. (2022). *Early Grade Literacy Assessment Toolkit*. <https://www.usaid.gov>



## **Pioneering Approach to Reforming Public Library Services: Exploring New Ways to Exploit the Results of the SHIFT Project**

Ioana Cornelia Cristina Crihană, The National Association of Public Librarians and Libraries  
in Romania, Romania

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

The integration of technological solutions developed within the SHIFT project: MetamorphoSis of cultural Heritage into augmented hypermedia assets for enhanced accessibility and inclusion at the operational level of the National Association of Public Librarians and Libraries in Romania (ANBPR) represents a pioneering model for other cultural NGOs, providing examples of good practices for the cultural and creative industries sector. By facilitating the implementation of these solutions at the level of member libraries, ANBPR aims to create more inclusive and attractive services, especially for vulnerable groups. ANBPR aims to leverage the technological advances developed within the SHIFT project, funded under the Horizon 2021-2027 program, to improve its organizational services and stimulate innovation in its member libraries. This approach aligns with ANBPR's broader strategic objective of modernizing public libraries through digital transformation, improving accessibility and increasing user interaction and pro-activity. This article focuses on exploring new ways to exploit the results of the SHIFT project, which will stimulate the development of accessibility services, bringing people with disabilities closer to cultural resources, through more equitable and immersive access. In addition, the author will reflect in this article how ANBPR intends to revitalise cultural heritage collections in at least ten member libraries, using SHIFT methodologies to increase engagement and encourage loyalty of the digital native public in relation to the current cultural offerings of libraries. Beyond the multi-stage technology adoption, ANBPR is committed to strengthening inter-institutional partnerships, promoting exchanges of good practices and setting new service standards in collaboration with cultural and creative institutions.

*Keywords:* digital inclusion, public libraries, cultural heritage, SHIFT Project, cutting edge technologies, accessibility tools, strategic partnerships, service innovation, results exploitation, ethical monetization

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Funded by the Horizon 2021–2027 programme, the SHIFT project focuses on increasing the accessibility of cultural heritage in libraries and museums by using cutting-edge AI-based technological solutions. Through collaboration between technological partners specialized in cutting-edge software solutions and ANBPR, the Romanian partner responsible for delivering the library use cases, the SHIFT project will contribute to promoting innovation, accessibility and community involvement in the reconfiguration, modernization and diversification of services offered by public libraries in Romania. This paper aims to explore how the benefits of SHIFT could be capitalized and exploited in a smart and pragmatic way by both users of cultural assets and institutions in the cultural and creative sectors. The study also identifies avenues for greater replicability of the SHIFT model and implementation scenario in other memory and heritage sectors.

## Literature Review

The digitization of cultural institutions is a rapidly growing field, perfectly aligned with the dominant logic of services (Vargo & Lusch, 2008) and the principles of cultural sustainability (Mora et al., 2017). Libraries are increasingly perceived less as depositories of document collections and more as co-creators of value (Polese & Böhmman, 2017), inviting the user to a participatory experience supported by AR, VR and AI (Spohrer & Maglio, 2010). Ethical monetization in the Galleries, Libraries, Archives, and Museums (GLAM) sector is a controversial and crucial discussion: on the one hand, monetization is necessary in light of increasing commercialization, and on the other hand, a balanced and ethical approach is needed so that the public mission of cultural and creative institutions (CCIs) and the long-term economic viability of cultural activities can remain unaltered by pragmatism and commercial and business interests (Bonacini et al.). The SHIFT model resonates with the call for digital co-creation, based on the need to respect authenticity and to involve users as active actors in the process of understanding, creating, designing, and interpreting the cultural assets they interact with (Camarero & Garrido, 2011).

In the same vein, current literature highlights this new role of libraries, migrating from static repositories of knowledge to living, dynamic and user-centered service ecosystems (Polese & Böhmman, 2017; Vargo & Lusch, 2008). Co-creation, personalization and participatory innovation are also features of the dominant logic in the service field, aligning perfectly with the design of the SHIFT project. Mora et al. (2017) highlight the responsible impact of digital inclusion, as libraries adopt new technologies responsibly and with a clear purpose. Similarly, Bonacini et al. (2022) warn against the indiscriminate commodification of digital heritage, advocating for the development of more sophisticated monetization models that put access, rather than profit, at the forefront of measures to valorize cultural heritage in libraries and museums. The SHIFT program intersects these paradigms (service innovation, digital ethics, heritage sustainability) in an interconnected intervention framework.

## Methodology

The current work uses a qualitative method that is based on, but not limited to:

- SHIFT project results (including creative market growth scenarios, technical documentation, strategic plans for monetizing project results, etc.)
- Exploring a selection of case studies on libraries in Romania, related to the implementation of the ref. pilots. SHIFT technological solutions in Romania

- Analysis and interpretation of ANBPR experts' opinions on strategic planning and possibilities for expanding the cultural goods market
- Library theories, specific examples of service innovation and good practices of cultural economy as sources of inspiration for new economic paradigms

This study also follows a qualitative, exploratory approach, combining the analysis of different categories of resources:

- SHIFT internal documentation and results
- Pilot experiences in libraries in Romania (such as the ANBPR Conference in Bucharest and the ANBPR Conference in Sibiu)
- Qualitative analysis of feedback received from stakeholders, including users with visual and hearing impairments
- Secondary analysis of XR and digital heritage transformation in the specialized literature and in the scientific reports related to the SHIFT project

All of this substantiates the alignment of the SHIFT project with the main conceptual themes supported by the specialized literature, such as “inclusive design”, “strategic alignment” and “adaptive monetization”.

### **The Main Findings**

The SHIFT project brings the latest technological tools to the fingertips of public library professionals - AR/VR, techniques such as image-to-speech, text-to-speech, style transfer, haptic interfaces, AI-enhanced metadata, etc. All these technological upgrades create an interactive digital world starting from the static heritage in the conservative collections of memory institutions, leading to a much superior user experience, especially for users with various sensory, cognitive or physical impairments (Vargo et al., 2013).

The SHIFT project offers several Key Exploitable Results (KERs), including the XR Accessibility Framework and SHIFT TTS (text-to-speech). Thus, these resources make it possible to experience AR/VR content with the help of cutting-edge technologies, haptic gloves, emotionally enhanced audio narrations, etc. Within the pilots (use cases) in Romania, this set of innovative solutions was used, tested and validated in the real work environment, with library professionals having the opportunity to explore the possibilities of creating interactive digital exhibitions for different target audiences, including people belonging to vulnerable groups.

### **Service Innovation and Inclusivity**

Libraries that have tested SHIFT tools have found that they can increase their impact among users and attract people from groups at risk of exclusion. AI-powered heritage animation, participatory digital exhibitions and interactive storytelling have also stimulated interest and loyalty among digital natives towards information and documentation institutions such as libraries and museums.

In addition, public libraries have proven to be a powerful framework for mediating cultural inclusion when they collaborate strategically with schools and cultural organizations. Within the scenarios proposed to promote the use of SHIFT results, these partnerships have created the premises for strengthening the organization of interactive exhibitions, thematic

workshops and personalized training of staff for the good exploitation of technological solutions created within SHIFT.

By offering innovative services in the proximity of local communities and adopting formats that make them accessible - whether in audio narration, using haptic devices or style transfer solutions - libraries have all the data to reach people with disabilities, the elderly, children and adolescents from disadvantaged social classes more easily, thus transforming themselves into nodes of cultural participation and inclusion. Therefore, libraries not only distribute digital cultural content, but also reinterpret it as a motor for social cohesion and inclusive learning. At the same time, services reconfigured with the support of modern technologies can contribute to the economic sustainability of library services without forgetting the principles of equity and inclusion.

Therefore, innovation in library services is an example of responsible digital transformation and making heritage accessible to all, fully aligned with the ambitions and value promise of research-innovation projects funded under the Horizon Europe program.

### **Ethical Monetization Models**

Faced with the idea of ethical monetization, study participants expressed their preference for subscription and partnership models to try to address consumers halfway between intrusive advertising and the application of more or less personalized subscription models. SHIFT promotes ethical monetization through freemium and licensing models adapted to the requirements of public institutions, keeping cultural content accessible (Bonacini et al., 2022).

SHIFT intends to develop partnerships with European heritage conservation entities such as Europeana, AI4LAM and others. These relationships offer both sustainability and market applicability, as they are model-based and raise the level of institutional trust.

As a result of the research and innovation activities coordinated within the SHIFT project, the partners have identified a number of viable models:

- Paid streaming for culture and content (e.g. subscription-based authentication for accessing cultural content)
- Educational programs and collaborative workshops with cultural institutions
- Licensing SHIFT content to EdTech and tourism platforms. These are only public service approaches that have passed the test of user trust and interest.

SHIFT demonstrates that it is possible and crucially necessary to integrate digital advances into public service ecosystems and avoid the trade-off between equity and human resources.

However, large-scale implementation requires:

- Digital literacy of library and cultural staff (Camarero & Garrido, 2011). Gaining a comprehensive picture of the digital literacy skills of librarians and other cultural educators and practitioners.
- Integrating blockchain provenance tracking systems for transparency and intellectual property compliance
- Contextual accessibility solutions, designed by users in common (Mora et al., 2017)

Sustainable economic models that provide a social return on investment. Emerging development scenarios include:

- A fully European freemium SHIFT platform, built for libraries and museums
- Organized co-branding with content providers and portals
- Integrating SHIFT tools into national digital and cultural literacy education programs

## **Discussions and Development Perspectives**

SHIFT is a “glocal” (global + local) digital infrastructure that enables libraries and museums to act as cultural custodians and innovation hubs.

Looking ahead, SHIFT partners could:

- Build freemium ecosystems: Basic services to be free for all, with the option to pay for extra services
- Extend SHIFT-inspired personalization of cultural services based on artificial intelligence: personalize content based on user actions, to stimulate greater engagement. Create a European-level federation for SHIFT, with its cultural services networked for a common European memory
- Mediate between ensuring democratic access to culture and the need for commercialization by calling for co-creation, with the participation of all stakeholders, based on transparent governance of services

## **Conclusion**

The SHIFT project is proof that digital innovation and cultural authenticity are not contradictory forces. Public libraries can become leading players in the digital knowledge ecosystem by developing inclusive, interactive, and financially sustainable models of cultural engagement. The ANBPR Act frees up libraries on the continent and beyond by empowering them technologically and social-equity wise.

In a time of pervasive digital transformation and increasing requests for equal access to cultural heritage, the Horizon 2021–2027 co-funded project SHIFT stands as a landmark in the field of inclusive innovation. Using AI, AR, VR, haptics, as well as content personalization tools, SHIFT offers to vulnerable groups scalable solutions to improve access to cultural collections (Mora et al., 2017). In this landscape, ANBPR became a key facilitator, helping to embed the digital outputs from SHIFT within libraries to engage hard-to-reach audiences. You probably feel that post has some lessons for our public libraries in how they might learn to put SHIFT’s tools into use, by developing sustainable models and digital capacity, and participatory methods.

SHIFT’s application in Romanian public libraries has shown that it is possible to apply new technologies to mediators to improve culture use. How ANBPR - as an innovation facilitator - reconciles public value with economic resilience is a pattern other cultural institutions can imitate. By cultivating inclusive ecosystems and cross-sector partnerships alongside participatory design and strategic monetization, SHIFT paves the way for public libraries to act as stewards of digital equity and cultural sustainability in the 21st century.

## References

- Bonacini, E., Todaro, P., & Salerno, V. M. (2022). Monetizing digital cultural heritage ethically: Guidelines from Italian museum experiences. *Museum Management and Curatorship*, 37(1), 57–76.
- Camarero, C., & Garrido, M. J. (2011). Incentives, organizational identification, and relationship quality among members of cultural organizations. *Journal of Service Research*, 13(3), 277–294.
- Mora, M., Gelman, O., & Cervantes, F. (2017). Digital inclusion and accessibility: Libraries as agents of change in the cultural landscape. *Information Technology and Libraries*, 36(3), 55–67.
- Polese, F., & Böhmman, T. (2017). A service-dominant logic perspective on the role of libraries in the digital age. *Journal of Services Marketing*, 31(6), 604–617.
- Spohrer, J., & Maglio, P. P. (2010). Toward a science of service systems: Value and symbols. In *Handbook of Service Science* (pp. 157–194). Springer.
- Vargo, S. L., & Lusch, R. F. (2008). Service-dominant logic: Continuing the evolution. *Journal of the Academy of Marketing Science*, 36(1), 1–10.
- Vargo, S. L., Lusch, R. F., & Akaka, M. A. (2013). The evolving role of technology in service innovation. *Journal of the Academy of Marketing Science*, 41(5), 1–13.

## **Students Perspective on the Use of AI for Their Studies: An “Open University” Viewpoint**

Nareerut Seerasarn, Sukhothai Thammathirat Open University, Thailand  
Serval A. Miller, Open University, United Kingdom

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

As highlighted by the recent Global Student AI Survey by the Digital Education Council (2024), over 84% of university students are using Artificial Intelligence (AI) for their study on a regular basis. There is a need to examine university students' attitude towards AI and their experience of using it (AI) to gain insights into how it can be integrated in higher education to enhance teaching and learning. The research explored students' perception of AI use in their study, focusing on respondents from an “Open University”, using questionnaire survey. The sample consist of 304 students studying at both undergraduate and postgraduate levels. 74% of respondents indicated that AI tools are an essential part of their education, with 66% saying they currently use AI for their assignment. 80% of respondents wants to learn more about how AI can be used as part of their study, with 66% saying AI gives them more confidence in their education. Students indicated that university guidelines are clear (68%), but at the same time 81% want to learn more about responsible use of AI. This may be due to the belief that AI is giving some students an advantage, with almost 50% saying AI should be banned from being used in assignments. Over 21% of respondents indicating that more than 50% of their assignment is written by AI. This is one area that may need addressing and why some students indicate AI is providing an unfair advantage to others who may be less ethical in its use.

*Keywords:* AI, Open University, students, technology, teaching, learning

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Increasingly students are recognising that AI is having a profound impact on the way they engage with their studies and want to be upskilled in its use for future career benefits (Adiguzel et al., 2023; Bisdas et al., 2021; Gong et al., 2019). As highlighted by the recent Global Student AI Survey, over 84% of university students are using Large Language Model (LLM) Artificial Intelligence (AI) for their study on a regular basis (Digital Education Council, 2024). Students are rapidly adapting to the use of AI (for example getting ideas for projects and refining language). As AI tools such as; CHAT GPT, Deep seek (Chat bots), Jasper (Content creation), SUNO (Voice and music generation) Mem (Knowledge management and AI grounding), Teal (Resume builders), Beautiful.ai (presentation generation) and Adobe Photoshop (image manipulation), evolve and become more accessible, students are increasingly indicating their intention to utilise these (AI) tools in their learning and future practice (Bisdas et al., 2021; Lee et al., 2022; Zhou, et al., 2025). However, whilst broadly university are aware of Student using AI as part of their university study, there is still limited understanding of the level of usage, how it is being used, motivation for its, use, how they would like universities to be incorporating within the curriculum. In Additional, with universities getting more concern about academic integrity with the proliferation of the use LLM it is of paramount importance to gain insight into how their AI-related guidelines/regulations are being viewed/adhere to and student's ethical use of AI. The perspectives of students is essential for teaching faculty to understand the extent to which they could make use of AI to support or enhance students' learning, whilst at the same time developing policy to maintain academic integrity. This research, explored students' perception of AI use in their study, focusing on respondents from an "Open University".

## Methodology

The project aims to explore students' level of knowledge, current use, proposed future use, ethical use and emerging issues with Large Language Models (LLM) Artificial Intelligence (AI) as a learning support tool of engagement, as well as how they are engaging regulations. This research focus on students from an Open University that delivers most of their courses mainly through "distance learning" /online. Students at the open the university predominantly classed as "Mature" (over 30s) and in some form of employment. Students in the faculty of Environment and agriculture were targeting as part of this study. Online Questionnaire were used to collect data from the students over a two-week period. In total 304 questionnaires were complete and analysed. Statistical and thematic analysis was done on the data collected. The results are presented below.

## Results

One of the first objective of the study was understand the level to which the university current students were use AI as part of their university study. Respondents were asked to provide their level agreement with the statement "I use AI to support to my university studies". From the survey 74% of respondents were in partial or total agreement with this statement (see Table 1). Less than 6% indicated they were totally or partial disagree with this statement. Almost 20% of student indicated they neither agree nor disagree with this statement. When respondents were asked to highlight the AI tools they use in the later part of survey, 295 (90%) of the respondents indicated they have used "Deepseek".



With the popularity of Generative AI chatbots, Deep Seek and Chat GPT, the assumption is that these were the main tools being used by students. This survey bears this out but highlight that students use of AI tools were more diverse, with respondents listing 15 AI-tools they are using (see Table 2). In terms of AI tools used by student Chat GPT (75%) was second to Deepseek followed by Microsoft Bing translator (65%). However, as Table 2 highlights, there is much more diverse range of AI Tools (15 indicated) that students are using, some paid for example Paper pal and SmartCat (see Table 2). Students indicated they are using Ai tools for a range of purposes from creating new content, to image interpretation and language interpretation.

**Table 1**

*Students' Response to the Question "I Use AI to Support to My University Studies"*

Level of Agreement		Frequency	Percent
Valid	Total disagreement	6	2.0
	Partial disagreement	10	3.3
	neither agree or disagree	59	19.4
	Partially agree	133	43.8
	Total agreement	93	30.6
	Total responses	301	99.0
Missing	No response	3	1.0
Total		304	100.0

**Table 2**

*AI Tools Students Indicate They Are Using (NB. Respondent Can Provide Multiple Responses)*

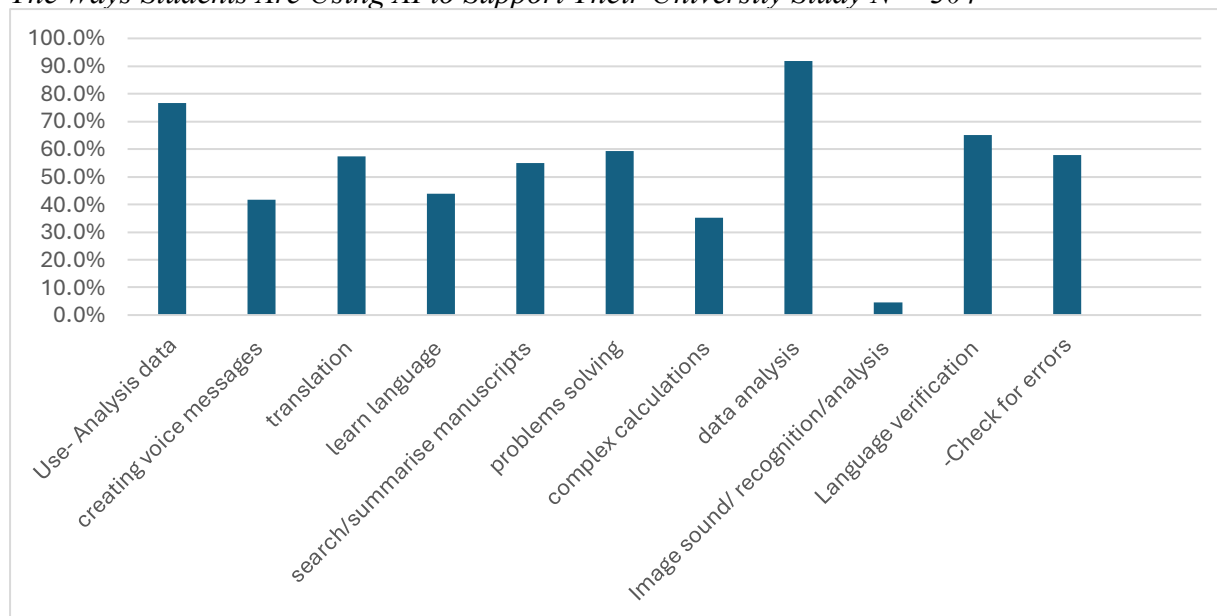
AI tool	Use	Frequency
Chat GPT	Chat Bot- generates dialogue, support writing, planning, translate between languages, Debug and fix code, Solve math equations	233
Deep Seek	Chat Bot, Similar to Chat GPT and marketed as having more advanced mathematic and coding capabilities.	275
Grammarly	Grammar and style checks	47
Notion Ai	Organizing projects and collaborating with others. Its AI features can assist with summarizing	105
Co-pilot	Analyse text, writing support, summarising, Coding	92
Socrates	Tool for deep document analysis	44
QuillBot	Use for paraphrasing text	98
Jasper	Structuring report/essay	175
Research Rabbit	Literature review, making it easier to find relevant sources and analyse information	75
Medeley	Reference management tool that helps students organize citations	76
Paper Pal	Translation of Academic papers	105
SmartCat	Language translation	78
Microsoft Bing Translator	Language translator	198
Wolfran Alfa	Answers factual queries and visualisation by computing answers from externally sourced data and deliver structured answers	25

Most students were using AI for general analysis (77%) and data analysis (92%). Use for language related translation and Language verification (65%) as feature prominently as key uses of Ai by students. Students are using AI to translate and summarise academic document from language which is not their native tongue. As one masters student stated, "there are

more academic literature in Chinese and English, AI allow us to explore a whole new world, which we did have access to before”. Another Undergrad student stated, “using literature from more international sources, let me feel more confident in what I am producing for homework, I just feel more brilliant!” Students were also using AI to check for errors in their work (58%). Errors were most referred to ensuring grammar was correct for example use of Grammarly but also, in terms ensuring the language was appropriate, particularly where they are producing outputs in English. Typical response from students included “AI give me more confidence to write and speak in English (student working in Agricultural extension)” and “with AI, I get better grades as it helps me to check my work before submitting and suggest corrections to make it better”. Problem solving also feature prominently in students AI use (59%) see Figures 1. Students were using AI to carryout complex analysis and explore different scenarios and provide options for critical analysis. One Engineering student stated, “before AI, I would do one analysis as it takes so much time, now I can do several analyses with AI and propose different solution”. Student s perceive AI is allowing them deal with more complex problem, provide more in-depth information as well critical employability skills (see Figure 2). 40% of respondents indicated they were using AI to create voice message. This was one aspect of AI use which was unclear in the context of their university study. Although responded alluded to collaboration and presentations, this is one area that needs further exploration. Image/sound analysis was least use of AI (less than 5%). This may reflect the limitation of freely available Generative AI tools available. AI- related specialised image analysis tools were not mentioned in any of the ones listed by students, which is reflected in low use here. Respondents are mainly from science/agricultural/environment field and as such, image analysis is not a dominant aspect of their university curriculum.

**Figure 1**

*The Ways Students Are Using AI to Support Their University Study N = 304*



**Figure 2**  
*Why Students Are Using AI Tools in Their Study*



## Motivation and Confidence With AI

The research to explore student perception on their level of confidence in using AI tools, as well as if AI motivate them to engage more with their study. Responded indicated they were confident in using new and emerging digital technologies like AI but would still like further training. They believe that universities should actively be providing more training to upskill in Ai usage (92%) as it is a key employability skill. 61% of students showed agreement in that they are confident in using AI tools. There is almost 40% of student who are not as confident in using AI tools. Several students alluded to the fact that they are actively encourages to use AI in the workplace to increase productively and this needs to be reflected in the University Curriculum. “My workplace wants us to use more AI tools and is surprised that the university is not teaching us these skills” (34-year-old Agriculture student, working in local government). Another respondent stated, “using Ai tools may feel more confident that I will get my assignment done in time and with less error, which is a problem I had before”. When responded were asked to indicate their level of agreement with the statement “AI give me more confidence to engage with my university education”, 67% of students indicate partial/total agreement. Less 5% totally/partially disagree (see Table 3). The responses were almost similar when asked about if AI motivate them to engage with their studies with 68% agreeing.

**Table 3**  
*Confident and Motivation in Using AI Tools*

Level of Agreement	AI gives more confidence in their education	Confident using AI tools	Motivated to study more when using AI
Total disagreement	1.3	1.3	1.3
Partial Disagreement	3.3	5.3	4.3
Neither agree or disagree	28.6	31.9	26.6
Partial agreement	46.2	39.2	43.2
Total agreement	20.6	22.3	24.6
<b>Total</b>	100.0	100.0	100.0

## Ethic and University Guidance

When students were asked if they understand the ethical use of AI for their studies, over 70% indicated that they did. Most students 69% indicated that the guidelines were clear, with a slightly lower proportion (64%) indicated that they were sufficient (see Table 4). Whilst a high proportion of students believe they are using Ai ethical and understand university guidance there is around 30% of students who may not be on this should be of concerns for university. It is encouraging to see that almost 80% of respondent want to learn more about responsible use and it is important that university seize on this opportunity and put in place sufficient training and programmes to raise awareness on ethical used of Ai in their university study.

**Table 4**

*Ethics and University Guidelines*

Level of agreement	Understand the ethical use of AI	Guidelines are Clear	Guidelines are sufficient	Want to learn more responsible sue
Total disagreement	1.7	1.3	1.0	1.7
Partial Disagreement	4.0	3.7	8.0	1.3
Neither agree or disagree	23.9	25.9	26.6	15.9
Partial agreement	44.5	41.9	43.2	42.5
Total agreement	25.9	27.2	21.3	38.5
Total	100.0	100.0	100.0	100.0

When students were asked directly about whether they are using AI to support the production of assignment, 67% indicated they were. Only 10% indicated they were not. Respondent were asked further to indicate on Average how much of their assignment may produce using AI tools. Just on 10% of respondent indicated that less than 5% of their work was produce using Ai tools (see table 5). Just over 21 percent indicated that more than 50% of their work was produced using Ai tools/content. Students did highlight that indicate where sources were from AI. They also indicated AI tools were used to refine work but is their work, "I use AI tools to check my work for error and to help with referencing, it is my work. I use Ai as a support tool, just as I did before with Google". Other similar comment includes, "yes I use Ai to summarise and paraphrase things, but the final work is mine"; "I rewrite the content Ai produce and add my own, this is no different than me summarising a paper and citing it. AI just does it quick for me". AI can provide summary and content, but I will still have to critically discuss it if I am going to get good grades.

**Table 5**

*What Percentage of Your Assignment Uses AI Content/Tools to Produce?*

Percentage of assignment produce AI tools	Valid Percent
None	1.3
Less than or equal to 5	8.4
6-10	13.8
11-20	23.5
21-50	31.9
Greater than or equal to 51	21.1
Total	100.0
Total N = 304 (6 missing values)	

Whilst most students think they are being ethical in their use of Ai, they cite this as one of their main challenges of it is in Universities “not everyone is ethical and some students are getting better grades, because they can buy better software or use commercial companies to produce assignment” Student has also indicated that AI is producing errors which could be detrimental to their studies. Students are also concerned with “Safety and risk” (85%). It is unclear what is meant here, and this is an area for further exploration. Whilst students understood the value of Ai to their study and prospect of developing employability skills, 66% of respondents indicate that AI is threat and could have negative impact on them if data and information is mis-used and AI tools lead to less jobs for them in the future.

## **Discussion**

According to Bisdas et al., (2021) Artificial Intelligence + Actual Intelligence = Increased Student Engagement. Spivakovsky et al. (2003) has highlight the value of using AI to enhance learning through the creation of interactive activities, near-real-time feedback on tasks given to students, generate new scenario for students to critically analyse, and the creation of virtual environments where they can interact with classmates and teachers. Students have identified the benefits of using Generative AI like and Chat GPT and Deep seek. Whilst their ethical concerns around the use of the Ai tools, they do have the potential enhance engagement in students, improve writing skills, access resources that would not have easily be accessible before and visualize data in new ways. AI does not only provide content and improve grammatical accuracy, it provides students to develop creativity, gain insights in complex concepts and visualize data in ways not imaged before. Generative AI tools provide an opportunity that help weaker students to engage much better in a way that was previously difficult for tutors to do consistently. University should embrace the ethical use of AI tools and provide more opportunities and resources to their students. The diversity of AI tools the students highlighted being used goes beyond what was expect and provide valuable insight how quickly students are adapting to AI. Students are starting purchase more advanced AI tools to support their university study. Whilst this can be a good think, it risk widen digital gaps between who can afford them and who can't. As such, it important that university invest in more Ai tools that can be freely available to students ensure the digital gap does not widen. Student also cited the lack of learning opportunity as they want to be upskilled in AI. However, most academics and learning technologies are still unaware and/or does not have the skills and knowledge to readily incorporate AI into the curriculum (Bos et al., 2021; Nguyen et al., 2024; Russo & Emtage, 2023; Spivakovsky et al., 2023). This may be down to a number of factors including; academics lack of awareness of the value of the use of AI in curriculum development and for student engagement, lack/limitation of the appropriate knowledge/skills of AI application in teaching and learning, limitation of university “structure” policies and framework that does not readily facilitate the use of AI into module structure, the fare of AI and the role it may have on Academic integrity (Spivakovsky et al., 2023). Students are expecting the integration of AI as an essential part of university curricula (Abdelwahab et al., 2022; Bisdas et al., 2021; Gong et al., 2019; Miller & Seerasarn, 2025) but universities are lagging and this needs to address.

Whilst student has indicated that ethical in use of Ai and understand university guidelines, they still required further training and information in this area. If this is not addressed by universities, they risk compromising on academic integrity. It also important to universities design assessments that are more “AI proof” that encourages students to utilise more of their critical and creative skills. Students do fare, some are students are getting an unfair advantage

in their use of Ai. Whether this is real or perceived this is needs to address to ensure confidence in the assessment process and maintain academic integrity.

### **Conclusion**

The results of this research align with recent studies regarding the level to which AI is being used by university students for their studies. Most students have made the transition to using AI for their study and it is important that university develop the appropriate framework and guidelines for ethical use. This study highlights that there are over 14 freely available and Commercial AI tools being used by students for a range of activities from language translation to providing solution to complex mathematical and science problems related to their course work. Students want AI to be used more in a fair and balance manner without giving some students an unfair advantage. It is imperative that universities need to be more stringent in this regard to ensure academic integrity and confidence in their courses are maintained. Students feel more confident and motivated when using AI as a “Study buddy” and want more AI literacy as part of their university curriculum. There is a disparity between what students want and what university is providing, creating a “digital needs- gap” between students and university. This gap in curriculum development and AI tool provision needs to be closed through investment, upskilling of tutors and more AI focused curriculum and activities. If this is not done in timely manner, student could be left unsatisfied about their university courses and the value of what they are learning in today’s current higher education environment.

## References

- Abdelwahab, H. R., Rauf, A., & Chen, D. (2022). Business students' perceptions of Dutch higher education institutions in preparing them for artificial intelligence work environments. *Industry and Higher Education*, 37(1), 22–34. <https://doi.org/10.1177/09504222221087614>
- Adiguzel, T., Kaya, M. H., & Cansu, F. K. (2023). Revolutionizing education with AI: Exploring the transformative potential of ChatGPT. *Contemporary Educational Technology*, 15(3), ep429. <https://doi.org/10.30935/cedtech/13152>
- Bisdas, S., Topriceanu, C.-C., Zakrzewska, Z., Irimia, A.-V., Shakallis, L., Subhash, J., Casapu, M.-M., Leon-Rojas, J., Pinto dos Santos, D., Andrews, D. M., Zeicu, C., Bouhuwaish, A. M., Lestari, A. N. (2021). Artificial Intelligence in Medicine: A Multinational Multi-Center Survey on the Medical and Dental Students' Perception. *Frontiers in Public Health*, 9, 795284. <https://doi.org/10.3389/fpubh.2021.795284>
- Bos, D., Miller, S., & Bull, E. (2021). Using virtual reality (VR) for teaching and learning in geography: fieldwork, analytical skills, and employability. *Journal of Geography in Higher Education*, 46(3), 479–488. <https://doi.org/10.1080/03098265.2021.1901867>
- Digital Education Council. (2024). *Global Student AI Survey*. <https://www.digitaleducationcouncil.com/post/digital-education-council-global-ai-student-survey-2024>
- Gong, B., Nugent, J. P., Guest, W., Parker, W., Chang, P. J., Khosa, F., & Nicolaou, S. (2019). Influence of artificial intelligence on Canadian medical students' preference for radiology specialty: A national survey study. *Academic Radiology*, 26(4), 566–577. <https://doi.org/10.1016/j.acra.2018.10.007>
- Lee, Y.-F., Hwang, G.-J., & Chen, P.-Y. (2022). Impacts of an AI-based chatbot on college students' after-class review, academic performance, self-efficacy, learning attitude, and motivation. *Educational Technology Research and Development*, 70, 1843–1865. <https://doi.org/10.1007/s11423-022-10142-8>
- Miller, S., & Seerasarn, N. (2025). Extended reality (virtual and augmented) and metaverse in geography student's recruitment and engagement. *INTED2025 Proceedings*. <https://doi.org/10.21125/inted.2025>
- Nguyen, A., Kremantzis, M. D., Essien, A., Petrounias, I., & Hosseini, S. (2024). Enhancing Student Engagement Through Artificial Intelligence (AI): Understanding the Basics, Opportunities, and Challenges. *Journal of University Teaching and Learning Practice*. [https://www.researchgate.net/publication/379957626\\_Enhancing\\_Student\\_Engagement\\_Through\\_Artificial\\_Intelligence](https://www.researchgate.net/publication/379957626_Enhancing_Student_Engagement_Through_Artificial_Intelligence)
- Russo, K., & Emtage, N. (2023). The Digital Divide and Higher Education. In D, Radovanović (Ed.), *Digital Literacy and Inclusion* (pp.81–97). Springer, Cham. [https://doi.org/10.1007/978-3-031-30808-6\\_6](https://doi.org/10.1007/978-3-031-30808-6_6)

Spivakovsky, O. V., Omelchuk, S. A., Kobets, V. V., Valko, N. V., & Malchykova, D. S. (2023). Institutional policies on artificial intelligence in university teaching, learning and research. *Information Technologies and Learning Tools*, 97(5), 181–202. <https://doi.org/10.33407/itlt.v97i5.5395>

Zhou, A., Fang, L., & Rajaram, K. (2025). Exploring the digital divide among students of diverse demographic backgrounds: A survey of UK undergraduates. *Journal of Applied Learning & Teaching*, 8(1). <https://doi.org/10.37074/jalt.2025.8.1.22>

**Contact email:** [Servel.miller@open.ac.uk](mailto:Servel.miller@open.ac.uk)



## **The Dynamics of Physics Student Enrollment: A Comparative Study of Albanian and European Universities Over the Last 20 Years**

Klotilda Nikaj, University “Luigj Gurakuqi”, Albania  
Ervis Gega, University of Tirana, Albania  
Miranda Guzina, University “Luigj Gurakuqi”, Albania  
Margarita Ifti, University of Tirana, Albania

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This study investigates the evolution of physics student enrollment in Albanian and selected European universities over the past two decades, providing a comparative analysis of educational and societal trends. Drawing on enrollment data from public universities in Albania and institutions in Germany, Italy, and the Netherlands, the research examines patterns in student participation, identifying fluctuations influenced by economic conditions, policy reforms, and sample size. These were selected due to their established physics education systems, availability of longitudinal data, and their relevance within the broader framework of the Bologna Process. In Albania, the study explores how reforms in higher education, brain drain, and limited job prospects in STEM fields have contributed to declining enrollment. In contrast, European trends reflect the impact of the Bologna Process, increasing mobility, and shifts in the job market demanding interdisciplinary skills. The methodology combines statistical analysis of institutional data sets (from University of Tirana, University of Shkodra, University of Elbasan and University on Korca) with qualitative insights from education policy reviews. The data presented are based on the most recent and relevant statistics available from official sources. Key findings highlight both shared challenges—such as declining interest among youth—and unique national responses. Enrollment reporting methods, and data transparency practices required careful normalization and contextual interpretation. The research provides actionable insights for policymakers and educators aiming to revitalize physics education and strengthen the scientific workforce across diverse contexts.

*Keywords:* physics education, student enrollment trends, Bologna Process, scientific workforce

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Over The landscape of higher education in Albania has undergone significant transformations since the 1990s, a period marked by the country's transition from a centrally planned to a market economy, as well as its shift towards democratization and integration into global educational systems. These sweeping changes have had profound effects on various fields of study, particularly in science and technology disciplines such as physics. The early 1990s saw the end of nearly five decades of isolation, during which the Albanian education system was heavily influenced by a communist regime that prioritized ideological education over scientific inquiry and global collaboration. Consequently, the role of universities, including those offering physics programs, was limited both in scope and international recognition (INSTAT, 2022).

Following the fall of communism in 1991, Albania began a process of educational reform to modernize its higher education system. This period was characterized by the introduction of new curricula, an increase in academic autonomy, and a gradual opening of universities to international cooperation (OECD, 2023). The 1990s also saw an expansion of higher education access, albeit within a challenging socio-economic environment, marked by high inflation, political instability, and the ongoing adaptation to a market-driven economy (World Bank, 2022). These changes affected the number of students enrolling in various academic programs, including physics, as they faced both a new academic structure and the evolving job market demands (Eurostat, 2023).

The development of physics education in Albania during this time was shaped by both internal reforms and the broader regional context, as the country began its efforts to integrate with European institutions (UNESCO, 2021). The Bologna Process, which was launched in the late 1990s, had a profound impact on shaping university curricula, student mobility, and the overall academic framework across Europe. For Albania, this meant not only a shift towards a Europeanized education system but also a reorientation of academic disciplines, including the sciences. However, despite these reforms, the number of students opting to study physics remained low due to several factors, including limited public investment in research and infrastructure, as well as a lack of awareness about the career prospects in the sciences (Eurobarometer, 2020).

In the following decades, the demand for physics education in Albania fluctuated, influenced by various external factors such as global technological advances, the expansion of international educational exchange programs, and changes in Albania's economic and political landscape. By examining the number of students enrolled in physics programs over the past 20 years, this research aims to explore the evolution of physics education in Albania, understanding the underlying factors that have shaped student enrollment trends and assessing how these trends compare to broader European experiences (European University Association, 2021).

To provide the trends in the number of physics students enrolled in Albanian and European universities over the past 20 years, we accessed the specific datasets from the mentioned university's records.

## Methodology

This study adopts a mixed-methods approach to analyze trends in physics student enrollment over the past twenty years (2003–2023) in selected Albanian and European universities. The methodological framework integrates quantitative analysis of enrollment data with qualitative examination of policy documents and academic literature to provide a comprehensive understanding of the factors influencing enrollment dynamics. In the Albanian context, enrollment data were obtained directly from the official records of four major public universities that offer physics programs: the University of Tirana, University of Shkodra, University of Elbasan, and University of Korca. For comparison, the study focuses on three representative European countries—Germany, Italy, and the Netherlands—selected due to their established physics education systems, availability of longitudinal data, and relevance within the broader framework of the Bologna Process. Data sources include national statistics offices (e.g., Destatis in Germany, MIUR in Italy, and DUO in the Netherlands). Whenever possible, data were disaggregated by region or university type to highlight intra-national variation.

A deeper understanding of enrollment trends also requires examining the underlying challenges within physics education itself. One of the fundamental problems is the persistent gap between theoretical instruction and students' practical understanding. Traditional pedagogical models in many countries emphasize rote learning and mathematical formalism at the expense of conceptual clarity and experiential engagement. This has led to widespread difficulties among students in grasping core principles and applying them in real-world contexts. Moreover, the abstract and cumulative nature of physics—coupled with often limited curricular integration of modern technologies and interdisciplinary perspectives—can reduce student motivation and increase attrition. These pedagogical challenges, alongside broader sociocultural and institutional factors, contribute significantly to the fluctuations observed in physics enrollment across diverse educational systems.

Additionally, the philosophical foundations of physics education are often underemphasized, despite their relevance for cultivating critical thinking and a deeper appreciation of the nature of scientific inquiry. Questions about what constitutes scientific knowledge, the role of models and theories, and the limits of measurement and objectivity are central to both physics and philosophy. However, these discussions are rarely embedded within physics curricula. Integrating philosophy of science into physics education can help demystify abstract content, foster epistemological awareness, and encourage students to see physics not merely as a set of equations, but as a dynamic and evolving framework for understanding reality. Such an approach can enhance student engagement and potentially address the motivational and identity-related issues that influence enrollment decisions in physics programs.

## Data Analysis

Quantitative data were processed using descriptive statistical methods to identify key trends and fluctuations in enrollment over time. Comparative graphs and tables were used to illustrate similarities and differences across countries and institutions. The analysis focused on:

- Annual changes in student enrollment in physics programs
- Long-term trends in program popularity

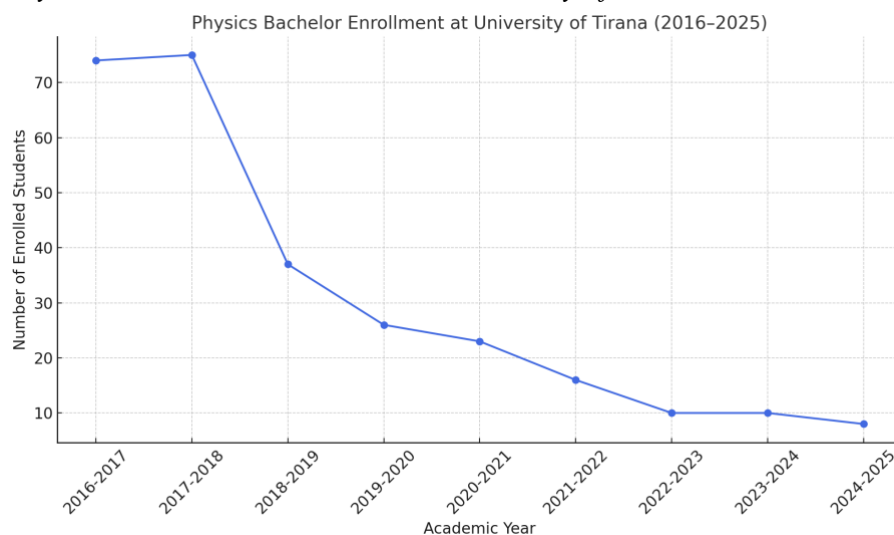
In parallel, qualitative analysis was conducted to interpret these trends in the context of broader reforms and sociopolitical developments. This involved reviewing national education strategies, science and innovation policies, and international reports concerning STEM education. Due to variations in data availability, standardization across countries posed a methodological challenge. Differences in degree structures (e.g., integrated vs. modular programs), enrollment reporting methods, and data transparency practices required careful normalization and contextual interpretation.

**Table 1**  
*Overview of Data Sources and Institutional Coverage*

Country	Institutions / Sources	Type of Data Collected
<b>Albania</b>	University of Tirana, University of Shkodra, University of Elbasan, University of Korça	Annual enrollment numbers, curriculum changes, admission policy reforms
<b>Germany</b>	Destatis (Federal Statistical Office), selected university portals	Enrollment trends by university and federal state
<b>Italy</b>	MIUR (Ministry of University and Research), university transparency portals	National and regional enrollment data, STEM policy documents
<b>Netherlands</b>	DUO (Dienst Uitvoering Onderwijs), university open data repositories	Enrollment by discipline, bachelor-master transition statistics, regional variations
<b>Cross-EU</b>	Eurostat, Eurydice, Bologna Process reports	Comparative European education indicators, policy timelines, STEM-related metrics

### Results and Discussion About Possible Trends in Physics Enrollment in Albanian Universities (2004-2024)

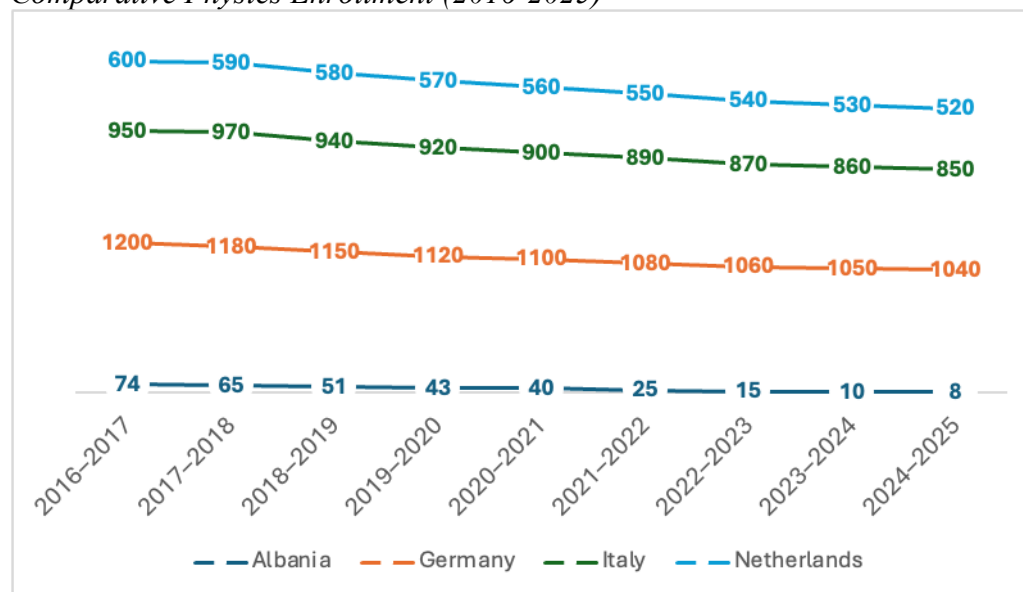
**Figure 1**  
*Physics Student Enrollment at the University of Shkodra and the University of Tirana*



After Albania's transition from the communist system, our country was still adjusting to the new educational reforms. Economic instability during this period might have deterred many students from choosing physics, given the low demand for physicists in the job market. The introduction of more diverse curricula and better alignment with European standards (post-1990s) may have led to some increase in interest in scientific fields. As Albania began to stabilize economically and increase its integration into European academic systems (e.g., through the Bologna Process), enrollment in physics might have seen a slight increase due to better access to international programs and scholarship opportunities. As seen in the graph during the late 2000 or early 2010. Despite the improvements, the number of physics students might still have been relatively low, as students in Albania may have favored fields with more immediate job prospects (e.g., business, law, medicine). During 2010-2020 student enrollment may have been marked by a stagnation or slight decline, as the field continued to struggle with a perception that it offered fewer career opportunities compared to other fields. Many students might have chosen disciplines tied to emerging industries, such as information technology, engineering, and economics, reducing the appeal of traditional sciences like physics. The impact of international collaborations (e.g., Erasmus+ programs, student exchange) may have contributed to some level of diversification in student interest but possibly led to a higher migration rate of talented students abroad.

**Figure 2**

*Comparative Physics Enrollment (2016-2025)*



*Note.* Enrollment Trends (2005–2023): The number of students enrolled in physics programs in Germany has shown a steady increase from 25,059 in the 2005/2006 academic year to 40,139 in 2023/2024. This represents a growth of approximately 60% over the period.

*Source.* datenportal.bmbf.de

## Results and Discussion

### Enrollment Trends Across Albania and Europe (2003–2023)

Quantitative analysis reveals a general decline in physics student enrollment across the Albanian universities included in the study, particularly after 2010. The University of Tirana and University of Shkodra experienced the steepest drops, with enrollment decreasing by over 40% in some programs. Meanwhile, enrollment trends in Germany, Italy, and the Netherlands show greater stability, with modest fluctuations. Notably, Germany demonstrates

a relative increase in physics enrollment in recent years, attributed to targeted STEM promotion policies and well-funded research pathways. Italy shows regional disparities, with northern institutions maintaining stable numbers while southern universities face declines. The Netherlands displays a more balanced trend, aided by strong integration between secondary education and university orientation programs in science.

### **Pedagogical Challenges and Their Impact on Enrollment**

Interviews with faculty members and review of institutional reports highlight a common concern: the traditional mode of physics instruction continues to dominate, with little emphasis on student-centered, inquiry-based learning. Students in Albania report difficulty in linking physics concepts to real-world applications, a sentiment echoed in some European contexts, particularly in first-year courses. The dominance of abstract and mathematically intensive curricula—without corresponding conceptual scaffolding—has contributed to students' early disengagement. These findings align with broader literature emphasizing that outdated teaching approaches are among the key drivers of declining interest in physics as a field of study.

### **Lack of Philosophical and Interdisciplinary Integration**

The qualitative analysis of curricula shows that philosophical and historical perspectives on physics are minimally present, if at all, in undergraduate programs in Albania and are inconsistently represented across European institutions. This omission deprives students of the opportunity to critically reflect on what physics seeks to explain, how scientific models evolve, and how science relates to societal challenges. In discussions with educators, some acknowledged that integrating philosophy of science could enhance students' understanding of uncertainty, scientific progress, and the limitations of formalism. However, such integration is rarely implemented due to curriculum rigidity and a lack of interdisciplinary training among teaching staff.

### **Policy and Institutional Factors**

Policy documents in Albania reveal limited national initiatives aimed at promoting physics education, particularly in secondary schools. The Bologna Process, while promoting harmonization, has not effectively reversed enrollment declines in smaller or resource-constrained institutions. In contrast, European countries with sustained investment in teacher development, lab infrastructure, and student outreach programs (especially Germany and the Netherlands) show greater resilience in physics enrollment. Albanian universities, facing constraints in funding and staffing, have struggled to modernize labs or develop physics education research (PER) units that could guide reform.

### **Emerging Needs and Strategic Recommendations**

The study underscores a need for multi-level intervention. On the pedagogical level, it is essential to introduce more active learning strategies, integrate real-world problem-solving, and promote collaborative inquiry in physics courses. Curricular reform should include philosophical and epistemological components, enabling students to understand the evolving nature of scientific knowledge. Institutionally, better alignment between secondary and tertiary education and targeted support for underrepresented groups in physics could improve

access and retention. Finally, national policies must prioritize physics education within STEM strategies and fund evidence-based reforms to counteract long-term enrollment decline.

### **Conclusion**

Over the past two decades, enrollment in physics programs in Albanian universities has fluctuated significantly, shaped by economic instability, limited investment in education, and a lack of alignment with labor market demands. Compared to Western and Northern Europe—where physics education has remained relatively stable due to sustained demand for STEM professionals—countries in Southern and Eastern Europe, including Albania, have struggled with inconsistent enrollment and fewer incentives for students. While international initiatives like the Bologna Process and Erasmus+ have opened opportunities for student mobility and academic collaboration, they have also contributed to brain drain, with many talented physics students seeking careers abroad. In recent years, a global rise in interest in STEM and applied physics has emerged, driven by challenges such as climate change and technological innovation. Although Albania is showing some signs of renewed interest in these fields, a significant gap remains compared to trends in more developed European systems. To improve the situation, targeted investment in research infrastructure, stronger links between physics education and industry, and increased public awareness of career opportunities in STEM are essential steps forward.

### **Author's Notes**

Albanian Universities: Various sources including institutional reports from University of Tirana, Polytechnic University of Tirana, and others. You can find specific data or contact the university's administration or their Department of Statistics for enrollment trends in their physics departments.

### **Acknowledgements**

I would like to sincerely thank my home institution, the University of Shkodra “Luigj Gurakuqi”, for its valuable support and encouragement in facilitating my participation in the Paris Conference on Education 2025 (PCE2025). This opportunity has greatly contributed to my professional development and academic engagement at an international level.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

AI tools were used for language editing and formatting support during the preparation of written materials related to the participation in the Paris Conference on Education 2025 (PCE2025), while the intellectual content, research ideas, data analysis, and final decisions regarding the text remain solely the responsibility of the author.

## References

- Bologna Process Implementation Reports. (2021). Bologna Process and European Higher Education Area (EHEA) Reports. European Higher Education Area. Bologna Process.
- Eurobarometer. (2020). Public Perception of Science and Technology in Europe. European Commission. Eurobarometer.  
<https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/getSurveyDetail/instruments/STANDARD/surveyKy/2259>
- European University Association (EUA). (2021). Trends 2021: Learning and Teaching in European Universities. EUA.
- Eurostat. (2023). Students enrolled in tertiary education by field of study. Eurostat Education Database.
- Institute of Statistics (INSTAT). (2022). Education Statistics in Albania. Institute of Statistics of Albania. INSTAT - Education Statistics.
- International Labour Organization (ILO). (2022). Labour Market Trends for STEM Graduates in Europe. ILO. ILO STEM Trends.
- Ministry of Education, Sports, and Youth of Albania. (2022). Annual Report on Higher Education in Albania. Ministry of Education, Sports, and Youth of Albania. Ministry of Education.
- OECD. (2023). Education at a Glance 2023: OECD Indicators. OECD Publishing. OECD Education at a Glance.
- QS World University Rankings. (2022). QS World University Rankings by Subject: Physics. QS World Rankings.
- Times Higher Education (THE). (2022). World University Rankings: Physics. Times Higher Education.
- UNESCO Institute for Statistics (UIS). (2021). Global Education Monitoring Report. UNESCO UIS.
- United Nations Educational, Scientific and Cultural Organization (UNESCO). (2020). STEM Education in the 21st Century: The Role of Physics. UNESCO. UNESCO STEM.
- World Bank. (2022). World Bank Education Statistics. World Bank Education Data.
- World Economic Forum (WEF). (2021). The Future of Jobs Report 2021. WEF. WEF - Future of Jobs.

**Contact email:** klotilda.nikaj@unishk.edu.al



## **Enhancing Cultural Learning Through Innovative Technology: A VR Application for Museum Keris Nusantara**

Dias Aziz Pramudita, Universitas Muhammadiyah Surakarta, Indonesia

Anis Khoerun Nisa, SMK N 5 Surakarta, Indonesia

Hardika Dwi Hermawan, Universitas Muhammadiyah Surakarta, Indonesia

The Paris Conference on Education 2025

Official Conference Proceedings

### **Abstract**

This study presents the design, implementation, and evaluation of an Android-based Virtual Reality (VR) application developed to enhance cultural learning at Museum Keris Nusantara, Surakarta. The application serves as an innovative educational tool that allows users to explore the museum in an immersive 3D environment, interact with virtual keris artifacts, and access detailed information through integrated visual and audio features. A Research and Development (R&D) approach was employed, guided by the Waterfall model, which includes five sequential phases: communication, planning, modeling, construction, and deployment. The resulting VR application includes a virtual walkthrough of the museum, interactive keris visualizations, and audio-narrated explanations to support user engagement and knowledge retention. Feasibility of the application was evaluated across five key dimensions: functional suitability, performance efficiency, portability, usability, and multimedia learning effectiveness. The results demonstrate high feasibility in all aspects: functional suitability scored 100%, performance efficiency showed smooth interaction and low latency, portability was confirmed through compatibility across various Android devices, usability yielded a strong satisfaction score of 84.25%, and multimedia effectiveness was rated highly, with media presentation scoring 94% and content accuracy 89%. These findings underscore the value of VR as an effective medium for informal cultural education. The study contributes to the growing body of research on the implementation of immersive technologies in educational settings, particularly in the context of cultural heritage preservation.

*Keywords:* virtual reality, Museum Keris, cultural learning

**iafor**

The International Academic Forum

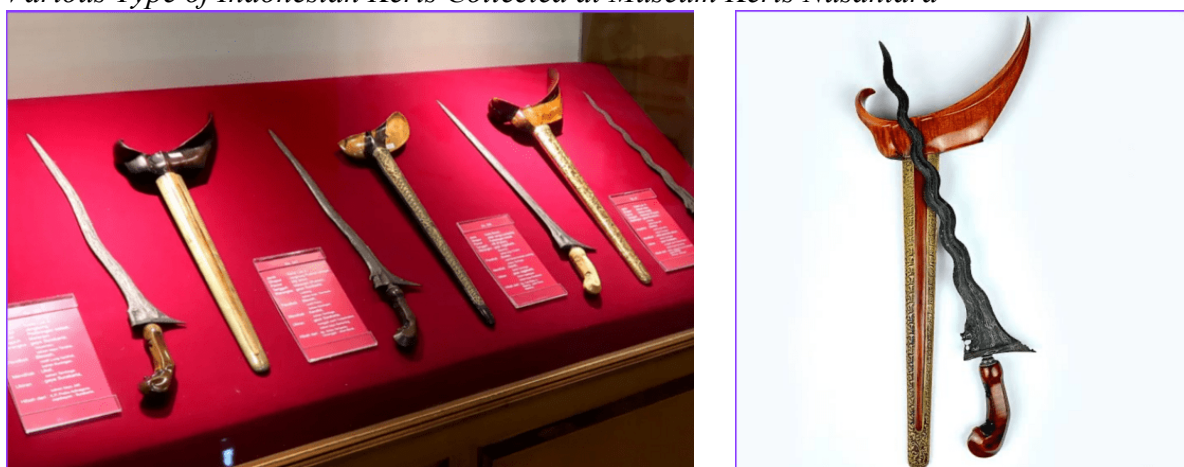
[www.iafor.org](http://www.iafor.org)

## Introduction

Indonesia's rich cultural heritage is a source of national pride, with the *keris* standing out as a symbol of spiritual, historical, and artistic significance. As a UNESCO-recognized Masterpiece of the Oral and Intangible Heritage of Humanity, the *keris* is not merely a weapon, but an artifact that embodies cultural values, mythology, and craftsmanship unique to the Indonesian archipelago. Institutions like Museum Keris Nusantara in Surakarta play a vital role in preserving and educating the public about this heritage. However, traditional museum formats often fail to capture the attention of younger, tech-oriented generations, who tend to engage more with digital content than with conventional exhibits (Nurhadi et al., 2014).

**Figure 1**

*Various Type of Indonesian Keris Collected at Museum Keris Nusantara*



The core problem lies in the widening gap between traditional heritage education and modern learning preferences. Most *keris*-related learning is limited to static displays or textual descriptions, often presented in outdated formats (Marcellino et al., 2022). This limits experiential learning and fails to cultivate deep cultural appreciation among students and casual visitors. Virtual Reality (VR), with its immersive capabilities, has emerged as a promising solution. It offers a dynamic, interactive environment where users can explore artifacts up close, enhancing engagement, emotional connection, and knowledge retention (Sooai et al., 2017).

Recent research supports the use of VR to teach intangible heritage like the *keris* in ways that resonate with young learners. A VR training initiative in an elementary school in Semarang found that more than 80% of students reported increased interest and understanding after engaging with a *keris*-themed VR application (Naryanto et al., 2023). Similar applications have been developed in Malaysian museums focusing on traditional weapons such as the *keris*, proving effective in teaching through non-immersive VR formats (Samah et al., 2021). These findings reinforce the urgency to modernize museum learning through technological integration.

Additionally, the use of design thinking in virtual museum development offers user-centric innovation that meets the needs of modern learners. By focusing on empathy and iterative prototyping, VR-based learning experiences can be tailored for clarity, emotional engagement, and usability (Yudhanto et al., 2022). Projects like Museum Maya Indonesia, which integrates VR with 3D photogrammetry and interactive infographics, have shown high

appeal among students in rural areas with limited museum access (Noviana et al., 2024). Meanwhile, national-level projects such as ImersifA utilize 360-degree installations to deliver immersive narratives, increasing museum reach and educational effectiveness (Adiba et al., 2025).

Studies in other cultural domains, such as Batik and Ulos preservation, have also demonstrated the effectiveness of immersive learning tools. AR and mixed reality applications designed to teach Batik motifs and Ulos weaving traditions not only increased awareness but also drove public recognition and youth participation (Anshari, 2020; Halim et al., 2024). These successful case studies suggest that VR for keris education is not only viable but necessary to keep cultural learning relevant and engaging.

## Figure 2

*Museum Keris Nusantara Located in Surakarta, Indonesia*



Given this context, the purpose of this study is to develop and assess a VR-based application tailored for Museum Keris Nusantara, aiming to enhance the educational experience for visitors—especially students and youth. The research seeks to (1) identify the specific challenges in keris education at the museum, (2) apply user-centered design principles to develop an immersive VR learning tool, and (3) evaluate its effectiveness in improving user engagement, cultural understanding, and learning outcomes. By addressing these aims, this study contributes to ongoing efforts in digital cultural preservation while offering a scalable model for VR-based heritage education. It is expected that such innovation will not only revitalize interest in traditional artifacts like the keris but also inspire broader use of immersive media in cultural institutions across Indonesia and beyond.

## Literature Review

Virtual Reality (VR) has increasingly been recognized as a powerful educational tool, particularly in the context of cultural learning. Its immersive qualities allow users to engage deeply with intangible heritage, offering experiential learning opportunities that traditional museum formats often lack. Scholars have highlighted the potential of VR to present cultural artifacts in interactive, accessible, and emotionally resonant ways that enhance knowledge retention and visitor engagement (Rahman et al., 2024; Syahrial & Suparman, 2017).

In Indonesia, the keris serves not only as a traditional weapon but as a cultural symbol infused with historical and spiritual meaning. However, public understanding of the keris remains limited, largely due to its insufficient representation in formal education and

traditional museums. To bridge this gap, researchers have explored multimedia solutions such as Augmented Reality (AR) and VR. The “Keris Magic Book,” for example, merges print media with AR to create interactive learning tools for teenagers (Nurhadi et al., 2014), while other studies focus on AR-based Android apps that bring keris models into users’ physical environments (Marcellino et al., 2022).

A notable application of VR in keris education was developed by Universitas Negeri Semarang, where virtual environments were used to train elementary school students on keris culture. Post-intervention assessments revealed significant improvements in cultural knowledge and enthusiasm, with over 80% of students expressing positive reactions to the VR medium (Naryanto et al., 2023). Complementary research at Museum Keris Nusantara explores design thinking as a methodological approach for creating VR applications that respond to user needs through iterative development and empathy mapping (Yudhanto et al., 2022).

Beyond keris education, numerous Indonesian initiatives have demonstrated the impact of VR and AR in preserving broader cultural elements. “Museum Maya Indonesia” integrates 3D photogrammetry and immersive environments to support cultural learning, especially for students in remote areas (Noviana et al., 2024). Likewise, the “ImersifA” initiative employs video mapping and VR tours to enhance digital cultural memory in national museums (Adiba et al., 2025).

Other sectors have adopted similar techniques to preserve and teach traditional textiles and rituals. For instance, an interactive mixed-reality museum project focused on Ulos Batak demonstrated the effectiveness of immersive learning in promoting endangered cultural crafts (Halim et al., 2024), while AR apps were used to introduce Batik in museums, enhancing visitor interaction and motif recognition (Anshari, 2020).

Cross-comparative studies suggest that immersive museum installations significantly outperform traditional displays in visitor engagement, especially among youth and digital natives. The “Jelajah Bahari” VR game at Museum Bahari in Jakarta exemplifies how gamification in VR can drive curiosity and comprehension of maritime history (Arief et al., 2025). Moreover, museums in Malaysia have adopted non-immersive VR platforms to adapt to post-COVID tourism trends, showcasing how even limited forms of VR can support cultural education when physical access is restricted (Samah et al., 2021).

Even visitors’ expectations for museum experiences are evolving. According to a survey on VR preferences among museum-goers in Indonesia, audiences now anticipate more interactive and immersive experiences in alignment with the global trend toward digital transformation in cultural institutions (Widharsyah et al., 2024). Complementary research affirms that educational VR environments not only improve memory and understanding but also increase motivation among students when cultural topics are integrated with local wisdom, such as among Baduy communities in Banten (Adiputra et al., 2024).

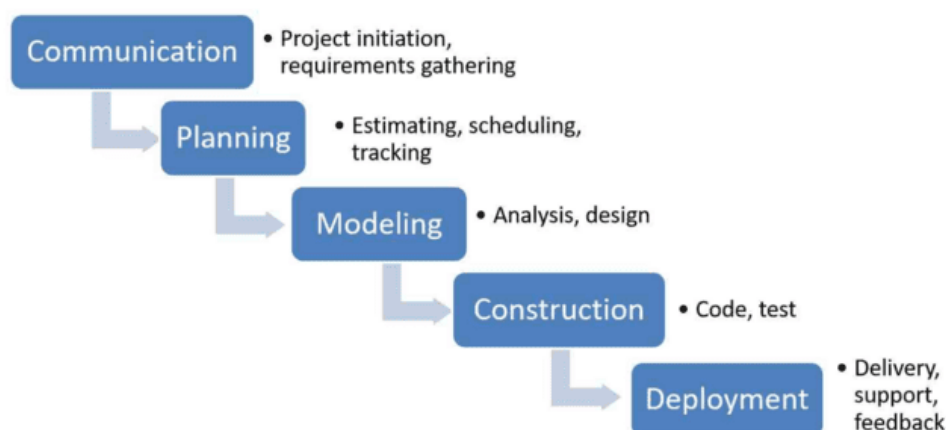
Together, these findings affirm the transformative potential of VR in the museum context. As museums evolve into learning spaces that emphasize interaction, personalization, and emotional engagement, VR-based applications emerge as indispensable tools in cultural education—especially in a country as diverse and tradition-rich as Indonesia.

## Methodology

This study applied a Research and Development (R&D) approach to design, implement, and evaluate a Virtual Reality (VR) application for enhancing cultural learning at Museum Keris Nusantara in Surakarta. The development process followed the Waterfall model, a structured and sequential software engineering methodology. The Waterfall model was chosen for its linear flow and systematic phases, allowing each stage to be completed before moving on to the next. This ensured that the VR application could be built with clarity, consistent documentation, and stable integration of multimedia features. The process included five primary stages: communication, planning, modeling, construction, and deployment.

**Figure 3**

*Waterfall Process Model (Pressman & Maxim, 2015)*



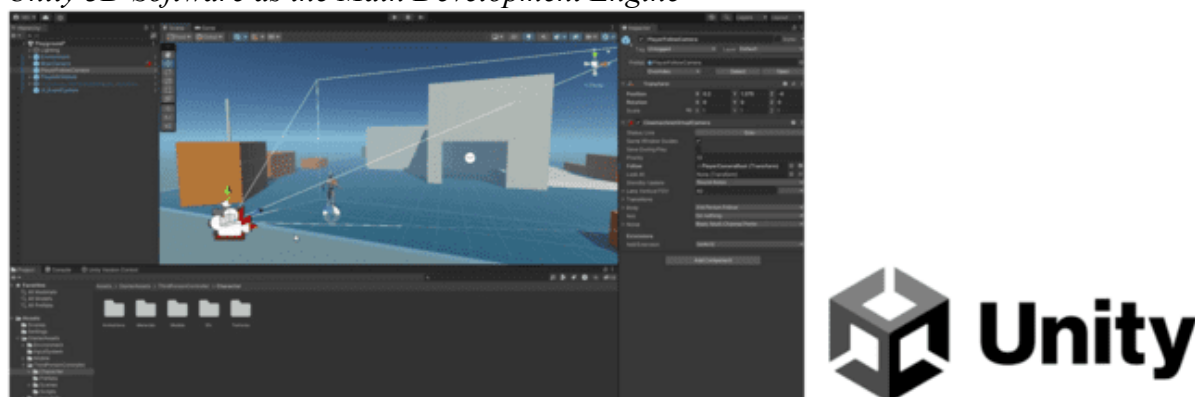
In the communication phase, data was collected through informal interviews and consultations with cultural experts, museum curators, and educators. This stage aimed to define user needs and content requirements for representing the keris accurately and engagingly. These consultations also informed decisions about which types of keris to include, the level of historical detail to provide, and the educational goals of the application.

During the planning phase, the technical and functional design of the VR system was outlined. The team developed storyboards, navigation flowcharts, object interaction diagrams, and script outlines for bilingual audio narration. Planning also covered considerations for user interface (UI) clarity, mobile compatibility, and optimal user flow through the virtual museum environment.

In the modeling phase, visual and technical assets were created. 3D models of various keris artifacts were designed using Blender, while Unity was used to build the interactive virtual environment. Each model was linked to narration triggers, allowing users to receive historical and philosophical explanations in both Indonesian and English. Hotspots and guided paths were designed to simulate the natural flow of visiting the actual museum.



**Figure 4**  
*Unity 3D Software as the Main Development Engine*



The construction phase the entire VR environment was developed using Unity 3D, a powerful and widely used game engine for immersive and interactive applications. Unity was selected for its flexibility, cross-platform deployment capabilities, and built-in support for stereoscopic rendering required for VR experiences. This phase also integrates all assets into a functioning VR application. This Android-based application featured immersive 360° walkthroughs, object manipulation (zoom, rotate), and contextual storytelling. The system was optimized for performance efficiency and low latency on various Android devices to ensure smooth interaction. Audio and visual content were embedded to support multimedia learning and improve cultural knowledge retention.

Finally, in the deployment phase, the VR application was tested and evaluated in real-world conditions. Field trials were conducted at Museum Keris Nusantara, where users interacted with the system using VR-compatible Android smartphones. These trials generated data for empirical analysis and iterative refinement of the application.

The feasibility and effectiveness of the VR application were evaluated using five key dimensions: functional suitability, performance efficiency, portability, usability, and multimedia learning effectiveness. These criteria were adapted from ISO/IEC 25010 software quality standards and multimedia learning frameworks.

Participants in the study included subject matter experts, developers, and general users. Purposive sampling was used to recruit 5 cultural and technical experts for expert validation, 10 multimedia developers for internal testing, and 30 museum visitors between ages 15 and 25 for field testing and survey completion. This range of participants ensured both content accuracy and user-centered design effectiveness.

Data collection methods included expert validation forms, performance logs, cross-device compatibility testing matrices, and structured questionnaires. The questionnaires consisted of Likert-scale items adapted from existing VR usability research, alongside open-ended prompts to gather user feedback. Quantitative data from these instruments were analyzed using descriptive statistics, including mean scores and percentage ratings, while qualitative responses were thematically analyzed to identify areas for content improvement and interface refinement.

Through this structured R&D process and comprehensive evaluation, the study was able to assess the feasibility of VR as a medium for informal cultural education in a museum context.

The findings support the continued development of immersive technology for heritage learning, particularly in regions with rich, underrepresented cultural assets such as the keris.

## Results and Discussion

The evaluation of the Android-based Virtual Reality (VR) application for Museum Keris Nusantara was conducted across five key dimensions: functional suitability, performance efficiency, portability, usability, and multimedia learning effectiveness. In addition to these formal measurements, this section presents an in-depth overview of the main features integrated into the application, including immersive navigation, keris artifact interaction, audio narration, and video documentation of traditional keris ceremonies. These features are central to the success of the application in delivering an engaging and educational virtual museum experience.

**Figure 5**

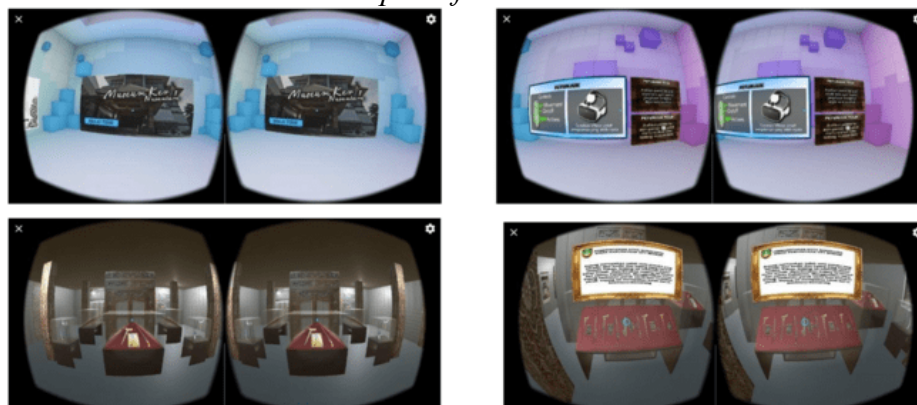
*The Affordable Hardware for the VR Using VR-Box*

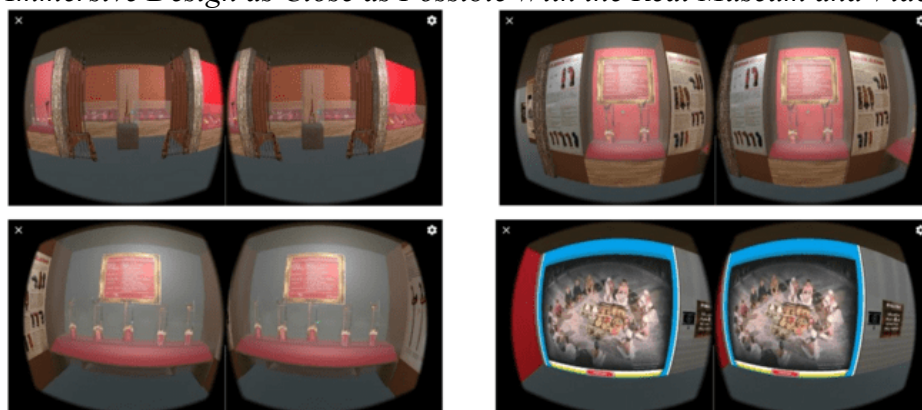


The application was built to closely simulate the spatial layout of the actual Museum Keris Nusantara in Surakarta. Upon launching the app, users enter a stylized VR lobby displaying a virtual banner that reads “Museum Keris Nusantara,” along with a “Mulai Tour” (Start Tour) button. Navigation inside the app uses a guided pathway system designed to mimic the visitor flow through the museum’s exhibition halls. Using head movement and simple controls via the VR-Box controller, users can move between rooms and exhibits. The immersive design replicates the real museum layout, including virtual showcases, wall texts, wooden structures, and display glass cases, giving users the sense of being physically present in the gallery.

**Figure 6**

*Main Menu and Short Description for Each Keris*



**Figure 7***Immersive Design as Close as Possible With the Real Museum and Video Explanation*

Each exhibit within the virtual museum features detailed 3D models of keris artifacts, arranged according to real curatorial displays. When users hover over or gaze at an object, interactive panels appear, presenting descriptions of the keris's origin, function, symbolism, and regional variation. These descriptions are presented in both visual text and bilingual audio narration, providing multimodal support for learning. The narration was developed in collaboration with museum experts to ensure historical and philosophical accuracy. This allows users not only to see and read about the keris but also to hear context-rich stories that reinforce cultural understanding.

Another key component is the video integration feature, which plays traditional documentation of keris-related ceremonies from different Indonesian regions. For instance, one immersive video showcases the Jamasan (ritual cleansing of keris) performed in Central Java, while another presents a Bugis ritual where the keris is used during sacred communal events. These video features are embedded inside virtual media screens placed within exhibition rooms, allowing users to sit, watch, and absorb ceremonial practices as if attending an in-person museum screening. The videos further deepen user appreciation of how the keris continues to play a role in cultural rituals today.

All features were designed to operate through a simple, low-cost VR-Box headset, which makes the experience accessible to a wide audience, including schools and communities with limited access to high-end VR systems. The headset allows smartphones ranging from 3.5" to 6" to be inserted into the device and aligns the display into stereoscopic view. The system supports interaction via Bluetooth controller or gaze-based input, ensuring that even users with no prior VR experience can navigate easily. The use of VR-Box emphasizes scalability and affordability, making it suitable for educational deployment on a national level.

In terms of empirical results, the application achieved 100% functional suitability, with all intended features running as planned during evaluation. Performance efficiency was validated through smooth scene transitions, quick object loading, and low system latency. Portability was proven through compatibility testing across various Android smartphones. Usability, measured through a System Usability Scale (SUS) questionnaire, yielded an average satisfaction score of 84.25%, confirming ease of use, intuitive interaction, and visual clarity. The multimedia learning effectiveness component also performed highly, with expert ratings of 94% for media presentation and 89% for cultural content accuracy.



These findings strongly support the conclusion that the VR application not only meets technical and educational benchmarks but also provides an immersive, accessible, and meaningful tool for informal cultural education. The combined presence of interactive keris models, narrated explanations, immersive museum navigation, and ceremonial video viewing makes the experience both comprehensive and culturally rich. It also demonstrates that heritage learning can be democratized through simple, cost-effective technologies like VR-Box—offering a model for other museums and educational institutions to follow.

### **Conclusion**

This study aimed to design, implement, and evaluate an Android-based Virtual Reality (VR) application to enhance cultural learning experiences at Museum Keris Nusantara, Surakarta. The development followed a structured Research and Development (R&D) process using the Waterfall model, with clearly defined stages: communication, planning, modeling, construction, and deployment. Through this process, a functional and immersive VR museum application was successfully created using Unity 3D, featuring interactive keris models, guided narration, traditional ceremony videos, and a spatial navigation system that closely replicates the layout of the physical museum.

The evaluation results showed that the application performed highly across all feasibility dimensions. Functional suitability scored 100%, with all planned features implemented as intended. Performance efficiency was validated through low-latency interaction and smooth rendering on Android smartphones. The system demonstrated strong portability, operating reliably on multiple devices and screen sizes. Usability, based on participant feedback, achieved a satisfaction score of 84.25%, while multimedia learning effectiveness scored 94% in media presentation and 89% in content accuracy. These results confirm that the application is both technically sound and pedagogically effective as a tool for informal cultural education.

The inclusion of immersive features such as 3D walkthroughs, object interactivity, audio narration, and culturally contextual videos enhances engagement, understanding, and memory retention. Importantly, the use of low-cost VR-Box headsets ensures that the experience is accessible to a wide audience, including schools, cultural institutions, and rural communities. This approach demonstrates how immersive technology can democratize access to heritage learning and play a significant role in preserving and promoting Indonesia's cultural identity.

### **Recommendation**

To further improve the VR application for Museum Keris Nusantara, several recommendations are proposed. First, the content can be expanded by including other traditional Indonesian artifacts to provide a more comprehensive cultural experience. Adding more language options, such as local dialects or subtitles, would increase accessibility and inclusivity for diverse users. Integrating Augmented Reality (AR) features could also make the app more flexible for use without a VR headset, particularly in classroom settings.

Gamification elements—such as quizzes or interactive challenges—are recommended to boost user engagement, especially among younger audiences. An offline version of the app would be valuable for areas with limited internet access, ensuring broader usability. Collaborating with schools to integrate the application into cultural education curricula would

enhance its educational impact. Finally, this model could be adapted for other museums across Indonesia, forming a network of virtual heritage experiences to promote national cultural preservation through digital innovation.

### **Acknowledgements**

The author would like to express sincere gratitude to the management and staff of *Museum Keris Nusantara*, Surakarta, for their cooperation and assistance during the development of this study. Deep appreciation is extended to the cultural experts and museum curators who contributed valuable insights to ensure the accuracy and integrity of the keris content featured in the virtual reality application.

The author also thanks the student participants and usability testers whose constructive feedback was instrumental in refining the user interface and overall experience. Special thanks are given to the development team for their technical expertise, particularly in 3D modeling and Unity 3D programming.

This research was made possible with the support of Lembaga Riset dan Inovasi (LRI) Universitas Muhammadiyah Surakarta (UMS). The author is truly grateful for the funding, resources, and institutional support provided throughout the research and development process. Lastly, sincere thanks to the academic supervisors and peers whose guidance and encouragement were invaluable to the completion of this work.

## References

- Adiba, S., Febriyanto, & Rahmawati, N. S. (2025). Exploring GenAI's Role in Digital Cultural Memory at Museums and Art Galleries in Indonesia: AR and VR Perspectives. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 15493 LNCS, 198–211. [https://doi.org/10.1007/978-981-96-0865-2\\_16/FIGURES/3](https://doi.org/10.1007/978-981-96-0865-2_16/FIGURES/3)
- Adiputra, D. K., Japar, M., & Muslim, S. (2024). Effectiveness of virtual reality media based on local wisdom: Indigenous Baduy Tribe, Kasepuhan Citorek and Kesepuhan Neglasari Banten Indonesia. *Edelweiss Applied Science and Technology*, 8(6), 6663–6670. <https://doi.org/10.55214/25768484.V8I6.3417>
- Anshari, M. A. (2020). *Implementasi Augmented Reality pada Pengenalan Kain Batik Berbasis Android pada Museum Batik Laweyan* [Implementation of Augmented Reality for Batik Cloth Introduction Based on Android at the Batik Museum of Laweyan]. <https://repositori.telkomuniversity.ac.id/home/catalog/id/162112/slug/implementasi-augmented-reality-pada-pengenalan-kain-batik-berbasis-android-pada-museum-batik-laweyan.html>
- Arief, F. H., Wiradarmo, A. A., Widharsyah, R., & Palesangi, M. (2025). Designing an Interactive and Educational Virtual Reality Game for Museum Bahari. *VCD*, 10(1), 149–173. <https://doi.org/10.37715/VCD.V10I1.5281>
- Halim, J. M., Lubis, D. P., Hasibuan, A. P. R., Syardhi, R. D., Ningsih, R. W., & Alda, T. (2024). Interactive Mixed Reality Museum for Ulos Batak Cultural Heritage Preservation and Global Recognition. *International Journal of Architecture and Urbanism*, 8(3), 371–376. <https://doi.org/10.32734/IJAU.V8I3.18103>
- Marcellino, L., Harischandra, I. B. R., Buana, I. M. K. W., Maulana, F. I., & Ramadhani, M. (2022). Learning Media Innovation about Keris Cultural Heritage through Augmented Reality. *ACM International Conference Proceeding Series*, 271–276. <https://doi.org/10.1145/3568231.3568275>
- Naryanto, R. F., Delimayanti, M. K., Iskandar, R., Supriadi, D., Sukoco, I., Bahatmaka, A., & Warsiti, W. (2023). Pelatihan Penggunaan Media Pembelajaran Tentang Budaya Keris Berbasis Virtual Reality di Sekolah Dasar [Training on the Use of Virtual Reality-Based Learning Media about Keris Culture in Elementary Schools]. *TAAWUN*, 3(02), 191–201. <https://doi.org/10.37850/taawun.v3i02.511>
- Noviana, E., Plank, U., & Wand, E. (2024). Museum Maya Indonesia: An Immersive Museum Prototype for Cultural Education. *SHS Web of Conferences*, 189, 01021. <https://doi.org/10.1051/SHSCONF/202418901021>
- Nurhadi, A., Prodi, P., Komunikasi, D., Rupa, S., & Desain, D. (2014). Keris Magic Book sebagai Pengenalan Keris kepada Remaja [Keris Magic Book as an Introduction to Keris for Teenagers]. *Ornamen*, 11(2). <https://doi.org/10.33153/ORNAMEN.V11I2.1077>

- Pressman, R. S., & Maxim, B. R. (2015). *Software Engineering: A Practitioner's Approach* (R. Srinivasan, Ed.; 8th ed.). McGraw-Hill Education.
- Rahman, M. F., Permana, A. Y., Susanti, I., Akbardin, J., Wijaya, K., & Handayani, S. (2024). Echoes of Tradition: Virtual-Reality Media in Improving Spatial Space Experience 3D Virtual Tour of Kampung Adat Pulo Garut, West Java, Indonesia. *9th International STEM Education Conference, ISTEM-Ed 2024 - Proceedings*. <https://doi.org/10.1109/ISTEM-ED62750.2024.10663191>
- Samah, K. A. F. A., Nasaruddin, N. I. S., Afandi, M. A. R., Rahim, N. Z. A., Rum, S. F. M., & Saman, F. I. (2021). Non-Immersive Virtual Reality for Malay and Islamic World Museum Melaka: Effects from COVID-19 Pandemic. *International Journal of Advanced Technology and Engineering Exploration*, 8(74), 91–101. <https://doi.org/10.19101/IJATEE.2020.S1762118>
- Sooai, A. G., Nugroho, A., Azam, M. N. Al, Sumpeno, S., & Purnomo, M. H. (2017). Virtual Artifact: Enhancing Museum Exhibit using 3D Virtual Reality. *Proceedings - 2017 TRON Symposium, TRONSHOW 2017, 2017-January*, 1–5. <https://doi.org/10.23919/TRONSHOW.2017.8275078>
- Syahrial, Z., & Suparman, A. (2017). Virtual Museum : A Learning Material Of Indonesia National History. *International Journal of Multicultural and Multireligious Understanding*, 4(6), 51–60. <https://doi.org/10.18415/IJMMU.V4I6.96>
- Widharsyah, R., Ardista Wiradarmo, A., Palesangi, M., & Husna Arief, F. (2024). Exploration of Visitors' Experience and Preferences on Virtual-Reality Application in Museum. *Jurnal Sositologi*, 23(3), 374–386. <https://doi.org/10.5614/SOSTEK.ITBJ.2024.23.3.6>
- Yudhanto, Y., Hidayat, T. N., Purnomo, F. A., & Sulandari, W. (2022). Museum Virtual Reality with Design Thinking Methods. *APICS 2022 - 2022 1st International Conference on Smart Technology, Applied Informatics, and Engineering, Proceedings*, 142–147. <https://doi.org/10.1109/APICS56469.2022.9918760>

**Contact email:** dap207@ums.ac.id

## **Effect of School-Based Virtual Program on Career Transition Self-Esteem of Nigerian Students With ADHD**

Vera Victor-Aigbodion, University of Nigeria, Nsukka, Nigeria  
Chiedu Eseadi, University of Johannesburg, South Africa

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

Students with Attention-Deficit/Hyperactivity Disorder (ADHD) are prone to poor career self-esteem. This research investigated the impact of a six-week virtual career intervention conducted in schools on the career transition self-esteem of Nigerian students with ADHD. Employing a quasi-experimental pretest-post-test design, 23 secondary school students with ADHD were divided into treatment and wait-list control groups. The intervention emphasized areas such as self-awareness, career exploration, and skill development. Data analysis was performed using Bayesian repeated measures ANOVA, which indicated notable enhancements in career transition self-esteem for the treatment group in comparison to the wait-list control group. The results underscore the significance of virtual career interventions in improving career transition self-esteem among Nigerian secondary school students with ADHD. This study also proposes avenues for future research to investigate the long-term effects of such interventions on the career transition experiences of students with ADHD.

*Keywords:* ADHD, career intervention, students, self-esteem, virtual intervention

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Background

Self-esteem encompasses an individual's general perception of their own worth or value, which can manifest as either a favourable or unfavourable orientation toward oneself (Cherry, 2023; Macasarte & Quines, 2024; Rosenberg et al., 1995). It is a psychological factor that influences various critical outcomes for young individuals; however, it often remains stagnant or may even decrease during the adolescent years (Hoffman & Schacter, 2024). Career transition self-esteem pertains to a person's sense of career self-worth and confidence when navigating changes or shifts in their professional life. Elevated levels of this self-esteem are linked to positive outcomes in the career development of individuals; those with strong self-esteem are more likely to proactively pursue career changes, remain optimistic about their potential for success, and demonstrate resilience in the face of setbacks (Ben Ayed & Vandenberghe, 2018; Cai et al., 2015; Macasarte & Quines, 2024; Thompson et al., 2019). For students, career transition represents a crucial phase that shapes their professional, socioeconomic, and personal development (Eseadi & Diale, 2023; Onyishi, 2024). However, this phase can be particularly challenging for those diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD), a behavioural condition characterized by persistent patterns of inattention, hyperactivity, and impulsivity that significantly impact a person's daily functioning and overall development (Ercan, 2020; Kazdin & Association, 2000).

The worldwide incidence of ADHD in children and adolescents is estimated to be between 5.6% and 7.6% (Salari et al., 2023). In adults, the cumulative occurrence of ADHD is approximately 3.10% (Ayano et al., 2023). These rates can differ significantly across various regions. For example, in the Arab world, the prevalence among school-aged children ranges from 2.7% to 20.5% (Al-Fatlawi & Al-Dujaili, 2019). In India, the prevalence is reported to be between 2% and 17% (Joshi & Angolkar, 2021). In Nigeria, ADHD prevalence in school-aged children was shown to be between 3.2% to 7.6% (Ambuabunos et al., 2011; Chinawa et al., 2014). ADHD is more commonly diagnosed in males compared to females, exhibiting a male-to-female ratio of 4:1 in childhood (Al-Fatlawi & Al-Dujaili, 2019); however, this ratio tends to decrease in adulthood (Davidovitch et al., 2017). The variability in prevalence rates is often linked to differences in research methodologies, diagnostic criteria, cultural influences (Álvarez et al., 2015) and geographical location (Polanczyk et al., 2007). The symptoms of ADHD, which often persist into adulthood, influence multiple domains of functioning, including academic, social, and occupational outcomes (Ahlberg et al., 2023; DuPaul et al., 2014; Ercan, 2020; Sinnari et al., 2018; Stark et al., 2024). Students with ADHD face unique barriers during the career transition due to persistent difficulties with executive functioning skills, which are crucial for managing time, organizing tasks, and regulating behaviour (Coetzer & Gibbison, 2016; Gordon & Fabiano, 2019; Henning et al., 2022; Sansosti et al., 2017). These deficits can make it particularly difficult for them to meet the demands of traditional work environments, where sustained attention, task prioritization, and social navigation are essential.

Students with ADHD tend to face greater challenges in academic performance, often resulting in lower grades and increased dropout rates when compared to their peers without ADHD (Alloway et al., 2010; Bernalles & Aranedá, 2021; Canu et al., 2021; Fredriksen et al., 2014). These academic struggles often extend into the workplace, where individuals with ADHD face higher rates of job instability, underemployment, and difficulties in maintaining steady employment (Ahlberg et al., 2023; Gordon & Fabiano, 2019). Challenges associated with ADHD, such as disorganization and impulsivity, can lead to conflicts with supervisors and colleagues, further complicating their employment outcomes (Bjerrum et al., 2017;

Fuermaier et al., 2021). Individuals with ADHD exhibit a diminished self-esteem profile more often than their healthy peers, highlighting the importance of early recognition of psychological well-being in this population to alleviate the consequences associated with ADHD symptoms (Mazzone et al., 2013). Richelieu (2024) reported that the presence of ADHD symptoms is a considerable predictor of an individual's self-esteem. Okumura et al. revealed that the existence of undiagnosed symptoms of ADHD had a detrimental effect on individuals' psychosocial functioning, which included a reduction in self-esteem (Okumura et al., 2021). Cook et al. (2014) also revealed a correlation between symptoms of ADHD and diminished self-esteem in individuals. They further found that concerns associated with self-esteem can be alleviated to a certain degree through psychotherapeutic interventions. In high-resource settings, there are interventions designed to improve self-esteem among students with ADHD during career transitions (LaCount et al., 2019; Shaikh, 2018). However, in low-resource contexts like Nigeria, such interventions are often unavailable, and students with ADHD face additional cultural, societal, and systemic barriers (Ndukuba et al., 2017; Robertson, 2021; Song, 2024) that hinder their ability to transition successfully from school to the workforce.

Within Nigerian schools and society generally, ADHD is often poorly understood (Jimoh, 2014; Ojionuka, 2016; Omozusi & Obebe, 2024). Students exhibiting symptoms of inattention or hyperactivity are frequently mislabeled as lazy, unmotivated, or disruptive (Drinks, 2024; The Summit Academy Schools, 2023). This misconception and stigma affect how they are perceived by peers, educators and prospective employers and influence their self-perception, contributing to their low self-esteem in diverse contexts. Furthermore, the Nigerian educational system is inadequately equipped to support students with ADHD as a result of limited knowledge of the teachers about ADHD, insufficient teacher training, and a lack of specialized school-based interventions (Ibukun et al., 2015; Mandah & Osuagwu, 2020; Ojionuka, 2016). Career programs, where available, typically employ a traditional model that fails to holistically meet the transition needs of these students (Idowu et al., 2020; Issa & Nwalo, 2008). Consequently, students with ADHD are often left to navigate the transition to employment with minimal assistance, leading to suboptimal outcomes. Early career intervention and support are critical for improving the career transition trajectories of this population, yet such support in Nigeria is sparse (Edunetix, 2023), leaving many individuals with ADHD facing significant barriers in their pursuit of stable and fulfilling careers.

Self-esteem plays a vital role in career transition, particularly for those with ADHD, who may struggle with feelings of inadequacy due to past academic and social concerns (Eccleston et al., 2019; Holthe & Langvik, 2017; Levkovich & Elyoseph, 2021; Patton, 2024). Low self-esteem has been associated with decreased motivation, limited job performance, and higher rates of job turnover among individuals (Gabriel, 2022; Kline, 2023; Macasarte & Quines, 2024; Nadeau, 2005; University of Washington, 2002). Conversely, interventions that boost self-esteem can lead to improved outcomes by fostering resilience and enhancing individuals' ability to cope with workplace demands (Kuster et al., 2013; Pierce & Gardner, 2004; Riopel, 2020). Despite the recognized impact of self-esteem during students' career transition (Ali et al., 2024; Bin, 2015; Foley-Nicpon et al., 2012), evidence-based interventions focused on boosting career transition self-esteem among Nigerian students with ADHD are lacking. This gap highlights the need for innovative interventions that provide supportive and accessible resources to help these students build confidence and prepare for the workforce. Virtual career interventions, which utilize technology to deliver flexible and engaging career guidance, represent a promising approach in this context.

Virtual career interventions have emerged as an innovative approach towards bridging the gaps in traditional career counselling, especially where in-person resources are limited or inaccessible (Epueme, 2024). These interventions leverage digital platforms to deliver personalized support, offering students the opportunity to explore career options, develop job-related skills, and receive guidance from career counsellors without the constraints of geographical location or physical infrastructure (Ardi et al., 2022). When it comes to supporting students with ADHD, virtual interventions can be particularly beneficial, as they allow for tailored content delivery that accommodates individual learning styles, attention spans, and needs (Grinblat & Rosenblum, 2023; Oddo et al., 2021). Career interventions can help students develop essential skills such as time management, goal setting, and job search strategies, which are critical for successful transitions to employment (Akkermans et al., 2015; Soares et al., 2022; Vasko et al., 2020; Whiston & Blustein, 2013; Yuen et al., 2022). However, the evidence for the efficacy of such interventions in the Nigerian context remains limited. Implementing virtual career interventions in Nigeria requires careful consideration of cultural, economic, and systemic factors that uniquely shape the experiences of students with ADHD. Cultural stigmas surrounding neurodevelopmental disorders, limited access to technology, knowledge and attitudes, and varying levels of digital literacy are challenges that must be addressed to ensure the success of such interventions (Ardi et al., 2022; Lasisi et al., 2017; Olatunji et al., 2023). Moreover, the design of virtual career intervention programs must be sensitive to the career transition needs of Nigerian students with ADHD, incorporating culturally relevant content and accessible formats that resonate with them.

In the context of ADHD, culturally appropriate virtual career interventions can play a significant role in normalizing the condition, reducing stigma, and empowering students to take charge of their career transitions (Diale, 2022; Woodley, 2023). These interventions have the potential to provide much-needed support to Nigerian students with ADHD, helping them overcome barriers and achieve their career transition goals by integrating culturally informed strategies and leveraging the strengths of digital platforms. Despite the potential of virtual career interventions, there is a significant gap in research examining their impact on Nigerian students with ADHD. Not much is known about how these interventions can be adapted and implemented in Nigeria, where cultural, economic, and infrastructural challenges may influence their effectiveness (Ardi et al., 2022; Epueme, 2024). This study seeks to fill this lacuna by evaluating the effect of a school-based virtual career intervention on the career transition self-esteem of Nigerian secondary school students with ADHD. The findings will contribute to the limited body of research on ADHD in Nigeria and offer insights into how virtual career interventions can be leveraged to support neurodivergent student populations like those with ADHD during career transition.

### **Problem Statement**

Individuals with ADHD face a 30% increased likelihood of experiencing persistent employment challenges, a 60% higher chance of being terminated from their positions, and are three times more prone to resign from a job without prior consideration (Barkley et al., 2008). Brattberg (2006) observed that a minimum of 24% of individuals on extended sick leave as a result of stress-associated conditions satisfied the criteria for ADHD. Despite the critical role of self-esteem in shaping career outcomes, there is a lacuna in research examining interventions to bolster self-esteem among Nigerian students with ADHD during career transition. While virtual career interventions have shown promise in other contexts, such as the United States (LaCount et al., 2019), their application and impact in Nigeria remain underexplored, leaving educators, parents, employers, and policymakers without



evidence-based strategies to support this vulnerable population. The current study addresses this concern by investigating the effect of a school-based virtual career intervention on the career transition self-esteem of Nigerian secondary school students with ADHD.

### **Theoretical Framework**

In line with self-esteem theory, the way people evaluate themselves significantly influences their psychological functioning and general well-being (Rosenberg, 1989). This is remarkably true for students with ADHD, who often encounter both academic and social challenges, which can negatively affect their self-esteem during career transition. Self-esteem develops through personal experiences and interactions, especially during the formative stages of childhood and adolescence (Rosenberg et al., 1995). Just as self-esteem in general is influenced by personal interactions and feedback, career transition self-esteem is shaped by professional experiences, relationships, and successes or challenges encountered during career transition. For individuals with ADHD embarking on career transition—whether by choice or circumstance—their self-esteem can be crucial to their psychological well-being and success in adapting to new professional roles and contexts. Low career transition self-esteem may lead to feelings of inadequacy, anxiety and hesitancy in pursuing new opportunities, while higher career transition self-esteem may foster resilience, adaptability, and proactive engagement with new professional challenges. Furthermore, interventions that aim to build relevant career skills and offer career guidance support to students with ADHD can help improve their career transition self-esteem, facilitating a smoother and more successful career transition. This theoretical lens, therefore, underscores the significance of creating interventions that not only equip students with critical skills but also actively work to reshape their self-perceptions and build resilience in the face of challenges during career transition.

### **Hypothesis**

1. Students in the treatment group will demonstrate similar career transition self-esteem with the wait-list control group at the pretest-test (Time 1), as measured by the Career Transition Self-Esteem Scale.
2. Students in the treatment group will show a significant increase in career transition self-esteem compared to the wait-list control group at the post-test (Time 2), as measured by the Career Transition Self-Esteem Scale.
3. The effect of the intervention on self-esteem will be significantly greater in the treatment group than in the wait-list control group at follow-up (Time 3), as assessed by the Career Transition Self-Esteem Scale.

### **Methodology**

#### **Research Design and Ethics**

The study employed a quasi-experimental pretest-posttest design (Reichardt, 2009) to evaluate the impact of a virtual career intervention on the career transition self-esteem of Nigerian students with ADHD. This design allowed for the comparison of career transition self-esteem before and after the intervention, as well as between the treatment and control groups. The research project received ethical approval (REC/FE/2024/00027). Participants provided informed assent, while parental consent and school approval were obtained before assessing the students for eligibility and inclusion in the study.

## Study Area

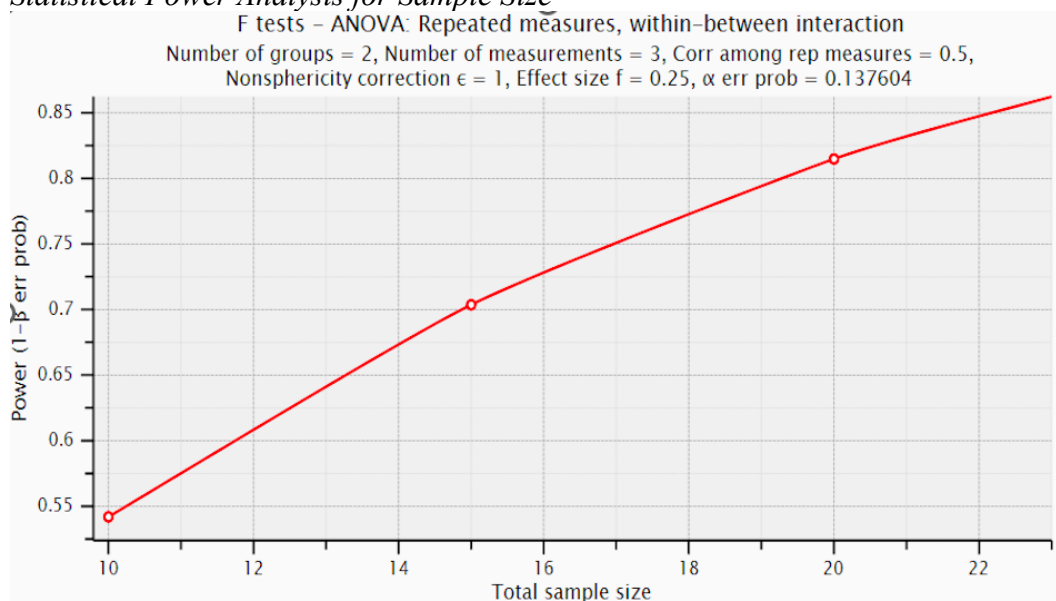
The study area was Southeast Nigeria. Southeast Nigeria is a geopolitical region that includes five states: Abia, Anambra, Ebonyi, Enugu, and Imo (Chukwu, 2008). This area is primarily populated by the Igbo ethnic group and is recognized for its strong entrepreneurial culture. It is bordered by the River Niger to the west and faces various challenges, including erosion, flooding, and security concerns, which affect its socioeconomic progress (Madubueze et al., 2024; Mohammed, 2024).

## Participants

The participants comprised 23 secondary school students aged 14-16 (Mean age =  $15.22 \pm 1.08$  years), diagnosed with ADHD by clinicians, from four urban inclusive schools in Southeast Nigeria. In a study by Shaikh (2018), students referred by clinicians showed more ADHD symptoms and reduced self-esteem compared to non-referred students. In the current study, students with ADHD were randomly allocated to either the treatment group ( $n = 12$ ) or the wait-list control group ( $n = 11$ ). Out of the sample, there were nine female students (39.1%) and fourteen male students (60.9%). Student inclusion criteria included a formal diagnosis of ADHD, willingness to participate in virtual sessions, and parental consent. Schools were chosen based on computer technology accessibility and willingness to participate in a virtual program. Figure 1, based on Gpower analysis (Faul et al., 2007), shows that the sample size was sufficient for this study.

**Figure 1**

### *Statistical Power Analysis for Sample Size*



## Intervention

The six-week intervention included weekly virtual counselling sessions. The sessions were conducted by the counsellors via Google Meet with additional in-school support from two class teachers in each school selected for the study. Students participated in each session, gathering as a group in the school's secured classroom space with laptop computers, a microphone, a video camera, a projector and a Screen, which enabled them to communicate with the counsellors delivering the intervention. The career intervention aimed to assist

students with ADHD build their self-esteem and prepare for successful career transitions through an engaging virtual platform. The wait-list control group engaged in weekly virtual interaction sessions addressing general education concerns over the same period. Table 1 is a week-by-week plan outlining objectives, activities, and counselling techniques for the treatment group intervention.

**Table 1**

*Intervention Plan*

Week	Objective	Activities	Counselling Techniques
1	Orientation and Self-Awareness	<ul style="list-style-type: none"> <li>-Welcome session introducing students to the program.</li> <li>-Understanding ADHD and its impact on career.</li> <li>-Activities to help students identify their strengths and interests.</li> </ul>	<ul style="list-style-type: none"> <li>-Motivational interviewing to boost engagement and set positive expectations.</li> <li>-Strengths-based counselling to help students recognize their unique talents.</li> </ul>
2	Discovering Career Paths	<ul style="list-style-type: none"> <li>-Guided self-assessments to explore skills and interests.</li> <li>-Virtual tours of different career fields.</li> <li>-Discussing careers that align with their identified skills.</li> </ul>	<ul style="list-style-type: none"> <li>-Person-centred counselling to explore individual career interests and values.</li> <li>-Matching skills with potential careers.</li> </ul>
3	Communication and Social Skills in the Workplace	<ul style="list-style-type: none"> <li>-Workshops on effective communication and social skills.</li> <li>-Role-play of job interviews and workplace scenarios.</li> <li>-Peer feedback sessions to practice constructive communication.</li> </ul>	<ul style="list-style-type: none"> <li>-Social skills training.</li> <li>-Feedback-focused sessions to improve skills.</li> <li>-Group coaching to foster peer learning and support.</li> </ul>
4	Creating Resumes and Understanding Job Applications	<ul style="list-style-type: none"> <li>-Resume-building workshops with tailored support for ADHD students.</li> <li>-Step-by-step guide to job applications.</li> <li>-Review sessions to provide constructive feedback on resumes.</li> </ul>	<ul style="list-style-type: none"> <li>-Practical skills coaching with a focus on individualized resume development.</li> <li>-Solution-focused techniques to refine resumes and boost self-confidence.</li> </ul>
5	Networking and Interviewing	<ul style="list-style-type: none"> <li>-Mock interviews with professionals for real-time practice.</li> <li>-Networking with industry experts virtually.</li> <li>-Tips on creating LinkedIn profiles and engaging with professionals.</li> </ul>	<ul style="list-style-type: none"> <li>-Role-playing interviews to reduce anxiety.</li> <li>-Networking coaching to build professional connections.</li> <li>-Career coaching to navigate online networking platforms.</li> </ul>
6	Reflecting on Growth and Setting Future Goals	<ul style="list-style-type: none"> <li>-Reflection on skills learned and experiences gained.</li> <li>-Goal-setting for the next steps in the career journey.</li> <li>-Collecting feedback to refine the program for future use.</li> </ul>	<ul style="list-style-type: none"> <li>-Reflective counselling to help students acknowledge growth and plan ahead.</li> <li>-Feedback sessions to gather insights for continuous improvement.</li> </ul>

## Data Collection

Data collection was by means of the Career Transition Self-Esteem Scale (CTSES), a validated instrument designed by the researcher to measure self-esteem related to career transitions among secondary school students. The items are constructed on a four-point scale (1, Strongly Disagree, SD to 4, Strongly Agree, SA), with higher scores indicating stronger self-esteem and confidence in managing career transitions. Negatively worded items in the CTSES are reverse-scored. The CTSES was administered to both groups before the intervention (pretest) and after the intervention (posttest, week 6) and follow-up (Week 16). The internal consistency reliability of the CTSES was 0.75, as measured by Cronbach's alpha. Table 2 shows the items of the CTSES.

**Table 2**

*The Career Transition Self-Esteem Scale*

No.	Statement	SD	D	A	SA
1	I am uncertain about making a career transition.				
2	I believe I can overcome challenges during my career transition.				
3	I have the skills needed to succeed in a new career.				
4	I trust my ability to adapt to new career environments.				
5	I am confident that I can learn new things required for a new career.				
6	I feel positive about my ability to plan for a career transition.				
7	I believe I can handle uncertainty in a new career.				
8	I feel unprepared to seek out resources to assist me in transitioning careers.				
9	I am confident in my ability to network with professionals in a new career.				
10	I believe I can cope with the stress of a career change.				
11	I am pessimistic about finding a job in a new career field.				
12	I have confidence in my decision-making when it comes to career choices.				
13	I am comfortable with taking calculated risks in my career transition.				
14	I believe in my capacity to adjust to new responsibilities in a new career.				
15	I am uncertain about my ability to present myself well in interviews for new career opportunities.				

## Data Analysis

Data were analyzed using Bayesian repeated measures ANOVA (Nathoo & Masson, 2016; Van Den Bergh et al., 2023) to assess changes in self-esteem scores across time points (pre-test, post-test, and follow-up) and between groups (treatment vs. control). The statistical analysis was conducted using Jeffreys's Amazing Statistics Program (JASP, version. 0.19.1) (JASP Team, 2024).

## Results

**Table 3**

*Descriptive Statistics for the CTSES Across Groups and Time*

RM Factor 1	Group	N	Mean	SD	SE	Coefficient of Variation	95% CI Lower	95% CI Upper
Time 1	Treatment	12	38.75	2.77	0.79	0.07	36.99	40.51
	Control	11	31.00	0.00	0.00	0.00	31.00	31.00
Time 2	Treatment	12	46.00	2.05	0.59	0.04	44.70	47.29
	Control	11	38.82	4.51	1.36	0.12	35.79	41.85
Time 3	Treatment	12	46.00	5.21	1.50	0.11	42.69	49.31
	Control	11	35.46	6.83	2.06	0.19	30.87	40.04

The results of this study clearly demonstrate the significant impact of the virtual career intervention on improving the career transition self-esteem of Nigerian students with ADHD. As presented in Table 3, baseline (Time 1) self-esteem levels in the treatment group were moderate, with a mean score of 38.75, while the control group had a lower mean score of 31.00. Following the six-week intervention (Time 2), the treatment group showed a marked increase in self-esteem, reaching a mean score of 46.00, whereas the control group exhibited a smaller increase, with a mean score of 38.82. At follow-up (Time 3), the treatment group maintained their higher self-esteem levels (mean = 46.00), while the control group experienced a slight decline to 35.45, indicating the lasting effects of the intervention for the treatment group.

**Table 4**

*Repeated Measures ANOVA for the Model Comparisons*

Models	P(M)	P(M data)	BF <sub>M</sub>	BF <sub>10</sub>	Error %
RM Factor 1 + Group	0.050	0.373	11.282	1.000	
RM Factor 1 + Group + RM Factor 1 * Group	0.050	0.155	3.479	0.415	1.774
RM Factor 1 + Group + Gender	0.050	0.134	2.947	0.360	2.251
RM Factor 1 + Group + Age	0.050	0.124	2.700	0.334	3.657
RM Factor 1 + Group + Age + Gender	0.050	0.073	1.505	0.197	7.286
RM Factor 1 + Group + Gender + RM Factor 1 * Group	0.050	0.058	1.176	0.156	3.794
RM Factor 1 + Group + Age + RM Factor 1 * Group	0.050	0.050	1.008	0.135	2.140
RM Factor 1 + Group + Age + Gender + RM Factor 1 * Group	0.050	0.032	0.626	0.086	8.262
RM Factor 1	0.050	$6.059 \times 10^{-6}$	$1.151 \times 10^{-4}$	$1.626 \times 10^{-5}$	1.547
RM Factor 1 + Age	0.050	$4.468 \times 10^{-6}$	$8.489 \times 10^{-5}$	$1.199 \times 10^{-5}$	1.907

The results of the Repeated Measures ANOVA in Table 4 showed that both time and group membership significantly influenced changes in career transition self-esteem. The model "RM Factor 1 + Group" provided the best fit for the data, highlighting the substantial impact of the intervention.

**Table 5**

*Analysis of Effects of Interventions Across Group*

Effects	P(incl)	P(excl)	P(incl data)	P(excl data)	BF <sub>incl</sub>
RM Factor 1	0.600	0.400	1.000	$1.475 \times 10^{-6}$	451933.256
Group	0.600	0.400	1.000	$1.558 \times 10^{-5}$	42783.294
RM Factor 1 *	0.200	0.800	0.295	0.705	1.676
Group					
Age	0.500	0.500	0.280	0.720	0.389
Gender	0.500	0.500	0.298	0.702	0.424

Bayesian analysis in Table 5 further confirmed this effect, with an exceptionally high Bayes Factor ( $BF_{10} > 1,000,000$ ), indicating strong evidence that the treatment group benefitted considerably more than the wait-list control group.

**Table 6**

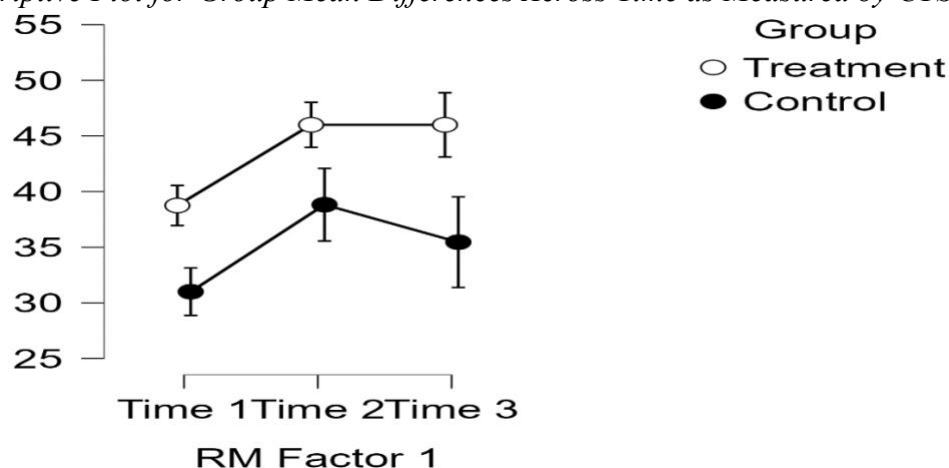
*Post-hoc Comparisons - Group*

		Prior Odds	Posterior Odds	BF <sub>10, U</sub>	error %
Treatment	Control	1.000	$1.678 \times 10^{+6}$	$1.678 \times 10^{+6}$	$2.123 \times 10^{-12}$

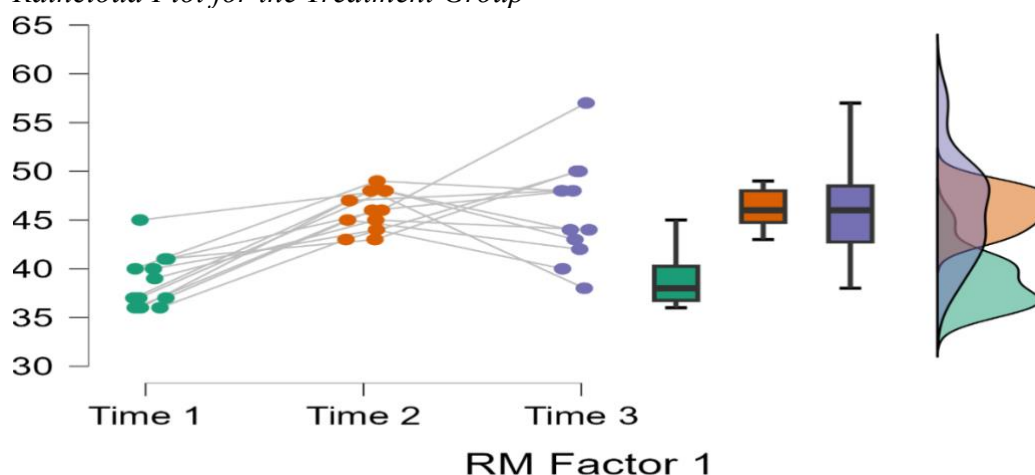
The post hoc comparisons in Table 6 underscored this finding, showing that the treatment group's self-esteem scores post-intervention were significantly higher than those of the wait-list control group.

**Figure 2**

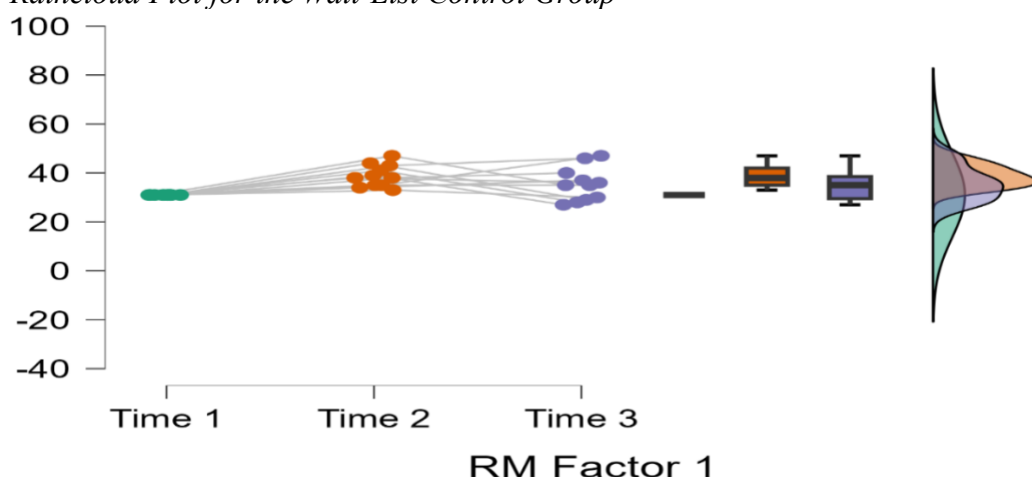
*Descriptive Plot for Group Mean Differences Across Time as Measured by CTSES*



The descriptive plot in Figure 2 reveals a clear and sustained improvement in the self-esteem of the treatment group from Time 1 to Time 2, which was maintained at follow-up. In contrast, the control group showed a modest increase after the same period, followed by a decline at Time 3. These patterns reinforce the long-term benefits of the virtual career intervention.

**Figure 3***Raincloud Plot for the Treatment Group*

A more granular view of the treatment group's progress is offered by the raincloud plot in Figure 3, which shows that most students in the treatment group experienced a consistent and substantial increase in self-esteem after the intervention. In contrast, Figure 4 shows the raincloud plot for the wait-list control group, where self-esteem scores were more variable and exhibited minimal improvement, further highlighting the relative ineffectiveness of the control condition.

**Figure 4***Raincloud Plot for the Wait-List Control Group*

## Discussion

The study indicates that the virtual career intervention was efficacious in significantly boosting the career transition self-esteem of students with ADHD. The treatment group showed meaningful and sustained improvements, while the control group experienced only minimal changes. The findings align with previous research suggesting that targeted career interventions can significantly improve career transition outcomes among students with ADHD (Ohabim, 2016). Drawing from Rosenberg's self-esteem theory (Rosenberg, 1989; Rosenberg et al., 1995), the observed improvement in career transition self-esteem among the treatment group implies that career transition self-esteem was determined by students' evaluations of their own capabilities, experiences, and values during career transition. The

structured and supportive nature of the intervention provided students with ADHD the opportunity to build relevant career transition skills, receive immediate feedback, and recognise their strengths, thereby boosting their career transition self-esteem. According to LaCount et al. (2019), specific treatment methods, including group-based strategies, can be especially effective for adolescents with ADHD during their transition. This is in consonance with the current study's intervention, which adopted a group-based approach that was shown to be efficacious in boosting the self-esteem of students with ADHD during career transition. Hoffman and Schacter (2024) also remarked that it is imperative to explore therapeutic approaches that encourage more favourable self-esteem among students, as this is vital for enhancing their general quality of life. In addition, virtual career interventions are generally more economical and easier to deploy on a larger scale compared to traditional in-person career guidance programs years (Epueme, 2024).

According to Perry et al. (2021), it is important for school-based ADHD intervention programs to focus on outcomes such as self-esteem, which are particularly important for students who are likely to gain from such programs. Henriksen et al. (2017) and Rasmussen et al. (2022) emphasized that, from a resilience standpoint, students with ADHD have the potential to build positive self-esteem via transformative experiences bolstered by protective mechanisms. These mechanisms play a vital role in nurturing their self-esteem during career transition. Therefore, the current study's results underscore the importance of accessible and early career interventions that are tailored to meet the career transition self-esteem needs of students with ADHD. In view of the scarcity of such intervention programs in Nigerian schools, virtual career interventions represent a viable and scalable option to support this underserved population. The results are particularly relevant for the Nigerian context, where most students with ADHD often lack access to tailored career guidance. These findings also highlight the potential of virtual career interventions to support students with ADHD in career transitions in other settings where in-person resources are limited or inaccessible. The study also indicates the need for sustained support, as the long-term impact of such interventions on several career transition outcomes remains unexplored among students with ADHD. Schools, policymakers, and career counsellors should consider integrating such programs into existing educational and vocational support structures to enhance the career transition readiness of students with ADHD. Bjerrum et al. (2017) indicated that policymakers can initiate campaigns aimed at employers, providing them with insights into the skills that individuals with ADHD possess and the advantages these skills can bring when work tasks are appropriately structured.

This study has several limitations. First, the small sample size and focus on students from urban schools in Southeast Nigeria limit the generalizability of the study findings to all Nigerian students with ADHD, particularly those in rural secondary schools and other regions of the country. Second, the reliance on a self-report measure may introduce response bias. The short duration of the intervention did not allow for the assessment of long-term impacts on the career transition self-esteem of the students. Future research should explore the long-term efficacy of virtual career interventions on the career transition self-esteem of students with ADHD. Increasing the scope of future research to involve a larger and more heterogeneous sample of neurodivergent students while also employing mixed methods designs could enhance the understanding of the intervention's efficacy. Rasmussen et al. (2022) suggested that school professionals working with students with ADHD should prioritize their strengths in addition to addressing their challenges when offering support to them. Braude and Dwarika (2020) advocate for a collaborative consultation approach aimed at fostering the implementation of evidence-based programs in schools for supporting



students with ADHD during career transition. Overall, future research examining specific components of the intervention that drive improvements in career transition self-esteem of students with ADHD could inform the design of more targeted and impactful programs in the future.

### **Conclusion**

This study provides evidence that a structured, school-based virtual career intervention can significantly improve the career transition self-esteem of Nigerian secondary school students with ADHD. To this end, leveraging technology to deliver accessible virtual interventions can offer a promising solution to address the career transition concerns of students with ADHD. Expanding access to such interventions has the potential to improve the career transition readiness and career transition self-esteem of secondary school students with ADHD.

## References

- Ahlberg, R., Du Rietz, E., Ahnemark, E., Andersson, L. M., Werner-Kiechle, T., Lichtenstein, P., Larsson, H., & Garcia-Argibay, M. (2023). Real-life instability in ADHD from young to middle adulthood: A nationwide register-based study of social and occupational problems. *BMC Psychiatry*, 23(1). <https://doi.org/10.1186/s12888-023-04713-z>
- Akkermans, J., Brenninkmeijer, V., Schaufeli, W. B., & Blonk, R. W. B. (2015). It's All About CareerSKILLS: Effectiveness of a Career Development Intervention for Young Employees. *Human Resource Management*, 54(4), 533–551. <https://doi.org/10.1002/hrm.21633>
- Al-Fatlawi, D. A. H., & Al-Dujaili, A. H. (2019). Assessment of attention deficit hyperactivity disorders among primary school children in AL-Najaf city. *Indian Journal of Public Health Research and Development*, 10(1), 1048–1052. <https://doi.org/10.5958/0976-5506.2019.00199.2>
- Ali, A., Collier, K., & Mayomi, T. (2024). Navigating ADHD in Higher Education: Evaluating Psychosocial Interventions for Student Self-Esteem, Well-Being, and Quality of Life. *BJPsych Open*, 10(S1), S17–S18.
- Alloway, T. P., Gathercole, S. E., & Elliott, J. (2010). Examining the link between working memory behaviour and academic attainment in children with ADHD. *Developmental Medicine and Child Neurology*, 52(7), 632–636. <https://doi.org/10.1111/j.1469-8749.2009.03603.x>
- Álvarez, J. C. P., Moya, L. R., & Rada, F. M. (2015). Prevalence of attention-deficit/hyperactivity disorder. In *Attention Deficit Hyperactivity Disorder (ADHD): Epidemiology, Treatment and Prevention* (pp. 21–29). Nova Science Publishers Inc.
- Ambuabunos, E. A., Ofovwe, E. G., & Ibadin, M. O. (2011). Community survey of attention-deficit/hyperactivity disorder among primary school pupils in Benin City, Nigeria. *Annals of African Medicine*, 10(2), 91–96. <https://doi.org/10.4103/1596-3519.82065>
- Ardi, Z., Eseadi, C., & Guspriadi, Y. (2022). A Web-Based Career Counseling Intervention for Enhancing Career Decision-Making among Prospective Polytechnic Students. *Res Militaris*, 12(2), 682–689.
- Ayano, G., Tsegay, L., Gizachew, Y., Necho, M., Yohannes, K., Abraha, M., Demelash, S., Anbesaw, T., & Alati, R. (2023). Prevalence of attention deficit hyperactivity disorder in adults: Umbrella review of evidence generated across the globe. *Psychiatry Research*, 328, 115449. <https://doi.org/10.1016/j.psychres.2023.115449>
- Barkley, R. A., Murphy, K. R., & Fischer, M. (2008). *ADHD in adults: What the science says*. Guilford Press.
- Ben Ayed, A. K., & Vandenberghe, C. (2018). Job engagement, organization-based self-esteem, and career satisfaction: A prospective study. *Psychologie Du Travail et Des Organisations*, 24(2), 203–218. <https://doi.org/10.1016/j.pto.2018.03.002>

- Bernales, V. J. S., & Araneda, V. F. E. (2021). Academic performance in higher education students with Attention Deficit Disorder. *Estudios Pedagogicos*, 47(1), 91–108. <https://doi.org/10.4067/S0718-07052021000100091>
- Bin, S.-O. (2015). Relationship of ADHD Disposition to Self-esteem in College Students. *The Journal of Korean Society for School & Community Health Education*, 16(3), 1–15.
- Bjerrum, M. B., Pedersen, P. U., & Larsen, P. (2017). Living with symptoms of attention deficit hyperactivity disorder in adulthood: A systematic review of qualitative evidence. *JBIS Database of Systematic Reviews and Implementation Reports*, 15(4), 1080–1153. <https://doi.org/10.11124/JBISRIR-2017-003357>
- Brattberg, G. (2006). PTSD and ADHD: Underlying factors in many cases of burnout. *Stress and Health*, 22(5), 305–313. <https://doi.org/10.1002/smi.1112>
- Braude, S., & Dwarika, V. (2020). Teachers' experiences of supporting learners with attention-deficit hyperactivity disorder: Lessons for professional development of teachers. *South African Journal of Childhood Education*, 10(1), 1–10.
- Cai, Z., Guan, Y., Li, H., Shi, W., Guo, K., Liu, Y., Li, Q., Han, X., Jiang, P., Fang, Z., & Hua, H. (2015). Self-esteem and proactive personality as predictors of future work self and career adaptability: An examination of mediating and moderating processes. *Journal of Vocational Behavior*, 86, 86–94. <https://doi.org/10.1016/j.jvb.2014.10.004>
- Canu, W. H., Stevens, A. E., Ranson, L., Lefler, E. K., LaCount, P., Serrano, J. W., Willcutt, E., & Hartung, C. M. (2021). College Readiness: Differences Between First-Year Undergraduates With and Without ADHD. *Journal of Learning Disabilities*, 54(6), 403–411. <https://doi.org/10.1177/0022219420972693>
- Cherry, K. (2023, December 5). *What Is Self-Esteem? Your Sense of Your Personal Worth or Value* [Online post]. Verywellmind. <https://www.verywellmind.com/what-is-self-esteem-2795868>
- Chinawa, J. M., Odetunde, O. I., Obu, H. A., Chinawa, A. T., Bakare, M. O., & Ujunwa, F. A. (2014). Attention Deficit Hyperactivity Disorder: A Neglected Issue in the Developing World. *Behavioural Neurology*, 2014, 694764. <https://doi.org/10.1155/2014/694764>
- Chukwu, P.O. (2008). *Willingness to pay for rural telephone services: implications for agricultural technology transfer and poverty reduction in Southeast Nigeria*. (Undergraduate Dissertation, University of Uyo, Akwa Ibom State, Nigeria).
- Coetzer, G., & Gibbison, G. (2016). Mediating influence of time management on the relationship between adult attention deficit and the operational effectiveness of project managers. *Journal of Management Development*, 35(8), 970–984. <https://doi.org/10.1108/JMD-06-2015-0090>
- Davidovitch, M., Koren, G., Fund, N., Shrem, M., & Porath, A. (2017). Challenges in defining the rates of ADHD diagnosis and treatment: Trends over the last decade. *BMC Pediatrics*, 17(1). <https://doi.org/10.1186/s12887-017-0971-0>

- Diale, B. M. (2022). Digital Tools Used by Teachers for Assessing Learners with Attention-Deficit/Hyperactivity Disorder (ADHD): Implications for Career Transitioning. *International Journal of Health Sciences*, 6(S7), 6819–6832. <https://dx.doi.org/10.53730/ijhs.v6nS7.13673>
- Drinks, T. (2024). ADHD and the myth of laziness. *Understood for All, Inc.* <https://www.understood.org/en/articles/adhd-and-the-myth-of-laziness-what-you-need-to-know>
- DuPaul, G. J., Reid, R., Anastopoulos, A. D., & Power, T. J. (2014). Assessing ADHD symptomatic behaviors and functional impairment in school settings: Impact of student and teacher characteristics. *School Psychology Quarterly*, 29(4), 409.
- Eccleston, L., Williams, J., Knowles, S., & Soulsby, L. (2019). Adolescent experiences of living with a diagnosis of ADHD: A systematic review and thematic synthesis. *Emotional and Behavioural Difficulties*, 24(2), 119–135. <https://doi.org/10.1080/13632752.2019.1582762>
- Edunetix. (2023, December 18). Government Collaboration: The Backbone of Scalable Career Guidance Initiatives in Emerging Economies. *Edunetix Blog*. <https://edunetix.co/government-collaboration-the-backbone-of-scalable-career-guidance-initiatives-in-emerging-economies/>
- Epueme, E. (2024, March 23). Empowering Nigerian students to explore future careers. *Teach For All*. <https://teachforall.org/blog/empowering-nigerian-students-explore-future-careers>
- Ercan, E. U. (2020). Social, academic and emotional impairment in children with ADHD. In *Understanding Children with Attention Deficit Hyperactivity Disorder (ADHD)* (pp. 217–233). Nova Science Publishers, Inc.
- Eseadi, C., & Diale, B. M. (2023). Perspective on career transition of students with visual impairments. *Journal of Research and Health*, 13(4), 241–246.
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. <https://doi.org/10.3758/BF03193146>
- Foley-Nicpon, M., Rickels, H., Assouline, S. G., & Richards, A. (2012). Self-Esteem and Self-Concept Examination Among Gifted Students With ADHD. *Journal for the Education of the Gifted*, 35(3), 220–240. <https://doi.org/10.1177/0162353212451735>
- Fredriksen, M., Dahl, A. A., Martinsen, E. W., Klungsoyr, O., Faraone, S. V., & Peleikis, D. E. (2014). Childhood and persistent ADHD symptoms associated with educational failure and long-term occupational disability in adult ADHD. *ADHD Attention Deficit and Hyperactivity Disorders*, 6(2), 87–99. <https://doi.org/10.1007/s12402-014-0126-1>

- Fuermaier, A. B. M., Tucha, L., Butzbach, M., Weisbrod, M., Aschenbrenner, S., & Tucha, O. (2021). ADHD at the workplace: ADHD symptoms, diagnostic status, and work-related functioning. *Journal of Neural Transmission*, 128(7), 1021–1031. <https://doi.org/10.1007/s00702-021-02309-z>
- Gabriel, A. (2022). Examining the Psychometric Properties of the Job-Satisfaction Survey (JSS) In Adult ADHD Patients: The Adult ADHD-Job Satisfaction Scale (ADHD-JSS). *World Journal of Pharmaceutical and Life Sciences*, 8(7), 6–13.
- Gordon, C. T., & Fabiano, G. A. (2019). The Transition of Youth with ADHD into the Workforce: Review and Future Directions. *Clinical Child and Family Psychology Review*, 22(3), 316–347. <https://doi.org/10.1007/s10567-019-00274-4>
- Grinblat, N., & Rosenblum, S. (2023). Work-MAP Telehealth Metacognitive Work-Performance Intervention for Adults With ADHD: Randomized Controlled Trial. *OTJR Occupation, Participation and Health*. <https://doi.org/10.1177/15394492231159902>
- Henning, C., Summerfeldt, L. J., & Parker, J. D. A. (2022). ADHD and Academic Success in University Students: The Important Role of Impaired Attention. *Journal of Attention Disorders*, 26(6), 893–901. <https://doi.org/10.1177/10870547211036758>
- Henriksen, I. O., Ranøyen, I., Indredavik, M. S., & Stenseng, F. (2017). The role of self-esteem in the development of psychiatric problems: a three-year prospective study in a clinical sample of adolescents. *Child and Adolescent Psychiatry and Mental Health*, 11, 1–9. <https://doi.org/10.1186/s13034-017-0207-y>
- Hoffman, A. J., & Schacter, H. L. (2024). The promise of an identity-based self-affirmation intervention in protecting against self-esteem declines at the high school transition. *Developmental Psychology*. <https://psycnet.apa.org/record/2024-99932-001>
- Holthe, M. E. G., & Langvik, E. (2017). The Strives, Struggles, and Successes of Women Diagnosed With ADHD as Adults. *SAGE Open*, 7(1), 215824401770179. <https://doi.org/10.1177/2158244017701799>
- Ibukun, A., Oluyemi, O., Abidemi, B., Suraj, A., & Ola, F. (2015). Literacy about Attention-deficit/Hyperactivity Disorder among primary school teachers in Lagos, Nigeria. *British Journal of Medicine and Medical Research*, 8(8), 684–691.
- Idowu, S. A., Ifedayo, T. E., & Idowu, E. O. (2020). *Assessing the career conflict options of senior secondary school students of Ado-Odo Ota Local Government, Ogun State, Nigeria*. <http://repository.elizadeuniversity.edu.ng/handle/20.500.12398/1133>
- Issa, A. O., & Nwalo, K. I. N. (2008). Factors Affecting the Career Choice of Undergraduates in Nigerian Library and Information Science Schools. *African Journal of Library, Archives & Information Science*, 18(1).
- JASP Team. (2024). *JASP* (Version 0.19.1) [Computer software]. Center for Digital Scholarship. <https://jasp-stats.org/download/>

- Jimoh, M. (2014). Knowledge and attitudes towards attention deficit hyperactivity disorder among primary school teachers in Lagos State, Nigeria. *Advances in Life Science and Technology*, 23(9), 7–16.
- Joshi, H. M., & Angolkar, M. (2021). Prevalence of ADHD in Primary School Children in Belagavi City, India. *Journal of Attention Disorders*, 25(2), 154–160. <https://doi.org/10.1177/1087054718780326>
- Kazdin, A. E., & Association, A. P. (2000). *Encyclopedia of psychology* (Vol. 8). American Psychological Association Washington, DC.
- Kline, J. A. (2023). *The Relationship Between Self-Esteem and Job Satisfaction in Young Adults With Attention-Deficit/Hyperactivity Disorder* [PhD Thesis, The Chicago School of Professional Psychology].
- Kuster, F., Orth, U., & Meier, L. L. (2013). High Self-Esteem Prospectively Predicts Better Work Conditions and Outcomes. *Social Psychological and Personality Science*, 4(6), 668–675. <https://doi.org/10.1177/1948550613479806>
- LaCount, P. A., Hartung, C. M., Canu, W. H., & Knouse, L. E. (2019). Interventions for Transitioning Adolescents with ADHD to Emerging Adulthood: Developmental Context and Empirically-Supported Treatment Principles. *Evidence-Based Practice in Child and Adolescent Mental Health*, 4(2), 170–186. <https://doi.org/10.1080/23794925.2018.1518120>
- Lasisi, D., Ani, C., Lasebikan, V., Sheikh, L., & Omigbodun, O. (2017). Effect of attention-deficit–hyperactivity-disorder training program on the knowledge and attitudes of primary school teachers in Kaduna, North West Nigeria. *Child and Adolescent Psychiatry and Mental Health*, 11(1), 15. <https://doi.org/10.1186/s13034-017-0153-8>
- Levkovich, I., & Elyoseph, Z. (2021). College students with ADHD and their reasons for becoming teachers despite negative childhood experiences. *Asia-Pacific Journal of Teacher Education*, 49(4), 387–402. <https://doi.org/10.1080/1359866X.2020.1789912>
- Macasarte, R. S., & Quines, L. A. (2024). The influence of individual work performance and adaptive behavior on organization-based self-esteem. *European Journal of Education Studies*, 11(3), 244–278.
- Madubueze, M.H.C., Egberi, A. E., Ejiofor, I. C., & Nwadiogbu, N. M. (2024). Climate Change in South-East Nigeria: Losing Homes and Farmlands, Changing Settlements and the Future. *Environmental Smoke*, 7, 1–13. <https://doi.org/10.32435/envsmoke-2024-0004>
- Mandah, S. N., & Osuagwu, C. E. (2020). Characteristics behaviours and factors responsible for attention deficit hyperactivity disorder (ADHD) among senior secondary school students in rivers state, Nigeria. *European Journal of Special Education Research*, 6(1). <http://oapub.org/edu/index.php/ejse/article/view/3171>

- Mazzone, L., Postorino, V., Reale, L., Guarnera, M., Mannino, V., Armando, M., Fatta, L., De Peppo, L., & Vicari, S. (2013). Self-Esteem Evaluation in Children and Adolescents Suffering from ADHD. *Clinical Practice and Epidemiology in Mental Health : CP & EMH*, 9, 96–102. <https://doi.org/10.2174/1745017901309010096>
- Mohammed, Y. (2024). Interrogating Insurgence in the South-East Nigeria: A Political Brouhaha or a Political Solution?. *NG Journal of Social Development*, 13(2), 38–53.
- Nadeau, K. G. (2005). Career choices and workplace challenges for individuals with ADHD. *Journal of Clinical Psychology*, 61(5), 549–563. <https://doi.org/10.1002/jclp.20119>
- Nathoo, F. S., & Masson, M. E. (2016). Bayesian alternatives to null-hypothesis significance testing for repeated-measures designs. *Journal of Mathematical Psychology*, 72, 144–157.
- Ndukuba, A. C., Odinka, P. C., Muomah, R. C., Obindo, J. T., & Omigbodun, O. O. (2017). ADHD Among Rural Southeastern Nigerian Primary School Children: Prevalence and Psychosocial Factors. *Journal of Attention Disorders*, 21(10), 865–871. <https://doi.org/10.1177/1087054714543367>
- Oddo, L. E., Garner, A., Novick, D. R., Meinzer, M. C., & Chronis-Tuscano, A. (2021). Remote Delivery of Psychosocial Intervention for College Students with ADHD during COVID-19: Clinical Strategies, Practice Recommendations, and Future Considerations. *Evidence-Based Practice in Child and Adolescent Mental Health*, 6(1), 99–115. <https://doi.org/10.1080/23794925.2020.1855614>
- Ohabim, H. (2016). *Career Focused: Career Interventions to Increase Self-efficacy and Employment Among College Students with ADHD* [PhD Thesis, California State University, Northridge]. <https://scholarworks.calstate.edu/downloads/n296x208t>
- Ojionuka, A. N. (2016). *Nigerian educators' attention deficit hyperactivity disorder knowledge and classroom behavior management practices*. (Dissertation, Walden University).
- Okumura, Y., Yamasaki, S., Ando, S., Usami, M., Endo, K., Hiraiwa-Hasegawa, M., Kasai, K., & Nishida, A. (2021). Psychosocial Burden of Undiagnosed Persistent ADHD Symptoms in 12-Year-Old Children: A Population-Based Birth Cohort Study. *Journal of Attention Disorders*, 25(5), 636–645. <https://doi.org/10.1177/1087054719837746>
- Olatunji, G., Faturoti, O., Jaiyeoba, B., Toluwabori, A. V., Adefusi, T., Olaniyi, P., Aderinto, N., & Abdulbasit, M. O. (2023). Navigating unique challenges and advancing equitable care for children with ADHD in Africa: A review. *Annals of Medicine and Surgery*, 85(10), 4939–4946. <https://doi.org/10.1097/MS9.0000000000001179>
- Omozusi, M. O., & Obebe, O. C. (2024). Assessment of the Knowledge, Perception, and Attitude of Parents Towards Children with Attention Deficit Hyperactivity Disorder. *Pan-African Journal of Health and Environmental Science*, 3(1), 108–123.

- Onyishi, C. N. (2024). Exploring Institutional Support Needs for Career Transitioning among Students with Visual Impairments: A Scoping Review. *International Journal of Home Economics, Hospitality and Allied Research*, 3(1), 139–161. <https://doi.org/10.57012/ijhhr.v3n1.012>
- Patton, E. (2024). *Neurodiversity and Work: Employment, Identity, and Support Networks for Neurominorities*. Springer Nature. <https://doi.org/10.1007/978-3-031-55072-0>
- Perry, R. C., Ford, T. J., O'Mahen, H., & Russell, A. E. (2021). Prioritising Targets for School-Based ADHD Interventions: A Delphi Survey. *School Mental Health*, 13(2), 235–249. <https://doi.org/10.1007/s12310-020-09408-4>
- Pierce, J. L., & Gardner, D. G. (2004). Self-esteem within the work and organizational context: A review of the organization-based self-esteem literature. *Journal of Management*, 30(5), 591–622.
- Polanczyk, G., De Lima, M. S., Horta, B. L., Biederman, J., & Rohde, L. A. (2007). The worldwide prevalence of ADHD: A systematic review and metaregression analysis. *American Journal of Psychiatry*, 164(6), 942–948. <https://doi.org/10.1176/ajp.2007.164.6.942>
- Rasmussen, I. L., Ørjasæter, K. B., Schei, J., & Young, S. (2022). Rise and shine: Exploring self-esteem narratives of adolescents living with a diagnosis of attention-deficit/hyperactivity disorder. *International Journal of Adolescence and Youth*, 27(1), 569–581. <https://doi.org/10.1080/02673843.2022.2156297>
- Reichardt, C. S. (2009). Quasi-experimental design. *The SAGE Handbook of Quantitative Methods in Psychology*, 46–71.
- Richelieu, D. (2024). *Self-Esteem Among Adults with ADHD Symptoms*. <https://scholarworks.waldenu.edu/dissertations/15521/>
- Riopel, L. (2020, January 30). 7 Most Effective Self-Esteem Tools and Activities. *PositivePsychology.Com*. <https://positivepsychology.com/self-esteem-tools-activities/>
- Robertson, G. U. (2021). *Explanatory Models of Autism in Nigeria: Exploring Sociocultural Beliefs to Inform Systems of Care*. [https://egrove.olemiss.edu/hon\\_thesis/1849/](https://egrove.olemiss.edu/hon_thesis/1849/)
- Rosenberg, M. (1989). *Society and the adolescent self-image*. Wesleyan University Press.
- Rosenberg, M., Schooler, C., Schoenbach, C., & Rosenberg, F. (1995). Global self-esteem and specific self-esteem: Different concepts, different outcomes. *American Sociological Review*, 141–156.
- Salari, N., Ghasemi, H., Abdoli, N., Rahmani, A., Shiri, M. H., Hashemian, A. H., Akbari, H., & Mohammadi, M. (2023). The global prevalence of ADHD in children and adolescents: A systematic review and meta-analysis. *Italian Journal of Pediatrics*, 49(1), 48. <https://doi.org/10.1186/s13052-023-01456-1>



- Sansosti, F. J., Cimera, R. E., Koch, L. C., & Rumrill, P. (2017). Strategies for ensuring positive transition for individuals with attention-deficit/hyperactivity disorder. *Journal of Vocational Rehabilitation*, 47(2), 149–157. <https://doi.org/10.3233/JVR-170891>
- Shaikh, A. (2018). Group Therapy for Improving Self-Esteem and Social Functioning of College Students With ADHD. *Journal of College Student Psychotherapy*, 32(3), 220–241. <https://doi.org/10.1080/87568225.2017.1388755>
- Sinnari, D., Krause, P., & Abulkhair, M. (2018). Effects of E-games on the development of saudi children with attention deficit hyperactivity disorder cognitively, behaviourally and socially: An experimental study. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 10907 LNCS, 598–612. [https://doi.org/10.1007/978-3-319-92049-8\\_44](https://doi.org/10.1007/978-3-319-92049-8_44)
- Soares, J., Carvalho, C., & Silva, A. D. (2022). A systematic review on career interventions for university students: Framework, effectiveness, and outcomes. *Australian Journal of Career Development*, 31(2), 81–92. <https://doi.org/10.1177/10384162221100460>
- Song, S. (2024). The Role of Cultural Factors in Attention Deficit Hyperactivity Disorder (ADHD) Diagnosis in Children in Nigeria. *Studies in Psychological Science*, 2(1), 40–47.
- Stark, I., Rast, J. E., Lundberg, M., Döring, N., Ohlis, A., Idring Nordström, S., Rai, D., & Magnusson, C. (2024). Completion of Upper Secondary Mainstream School in Autistic Students in Sweden. *Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s10803-024-06470-8>
- The Summit Academy Schools. (2023, October 4). Understanding ADHD in Children – Four Facts to Know. *The Summit Academy Schools*. <https://summitacademies.org/warren-elementary/2023/10/04/understanding-ad-hd-in-children-four-facts-to-know/>
- Thompson, M. N., Her, P., Fetter, A. K., & Perez-Chavez, J. (2019). College Student Psychological Distress: Relationship to Self-Esteem and Career Decision Self-Efficacy Beliefs. *Career Development Quarterly*, 67(4), 282–297. <https://doi.org/10.1002/cdq.12199>
- University of Washington. (2002, August 6). People With Low Self-Esteem Less Motivated To Break A Negative Mood. *ScienceDaily*. [www.sciencedaily.com/releases/2002/08/020806081023.htm](http://www.sciencedaily.com/releases/2002/08/020806081023.htm)
- Van Den Bergh, D., Wagenmakers, E.-J., & Aust, F. (2023). Bayesian Repeated-Measures Analysis of Variance: An Updated Methodology Implemented in JASP. *Advances in Methods and Practices in Psychological Science*, 6(2), 25152459231168024. <https://doi.org/10.1177/25152459231168024>
- Vasko, J. M., Oddo, L. E., Meinzer, M. C., Garner, A., & Chronis-Tuscano, A. (2020). Psychosocial interventions for college students with ADHD: Current status and future directions. *The ADHD Report*, 28(4), 5–12.

- Whiston, S. C., & Blustein, D. L. (2013). The impact of career interventions: Preparing our citizens for the 21st century jobs. *Policy Brief). National Career Development Association and the Society for Vocational Psychology*.
- Woodley, K. K. (2023). *Before Culturally Responsive Teaching... Do They Even Know Culture: Exploration of Virtual Middle School Teacher Perception of ADHD and Culture* (Doctoral dissertation, Texas A&M University).
- Yuen, M., Zhang, J., Man, P. K. W., Mak, J., Chung, Y. B., Lee, Q. A. Y., Chan, A. K. C., So, A., & Chan, R. T. H. (2022). A Strengths-Based Longitudinal Career Intervention for Junior Secondary School Students with Special Educational Needs: A Mixed-method Evaluation. *Applied Research in Quality of Life*, 17(4), 2229–2250.  
<https://doi.org/10.1007/s11482-021-10028-6>

**Contact email:** [chiediue@uj.ac.za](mailto:chiediue@uj.ac.za)

## **The Relationship Between Giftedness and Depression: A Systematic Review**

Felipe Rodrigues Martins, Instituto Superior de Educação do Rio de Janeiro, Brazil  
Vinicius Nunes Henrique Silva, Universidade Federal Fluminense, Brazil

The Paris Conference on Education 2025  
Official Conference Proceedings

### **Abstract**

This paper aims to answer the question: Is intellectual giftedness in human beings, when compared to the normal intelligence of individuals, associated with the experience of depression or depressive disorder? Considering this question, a systematic review was carried out in five databases (Embase, Web of Science, Scopus, SciELO and PubMed). In addition, research was also carried out in the gray literature. Considering the inclusion and exclusion criteria, the results point to depression in gifted individuals is related to: self-esteem; internalizing behaviors; stress; protective and/or risk factors; suicidal ideation; perfectionism; emotional adjustment. The diversity of criteria for giftedness or psychometric tests used restricts the possibility of conclusion; however, points of convergence are observed. In the one hand, four studies found that the gifted were less depressed than average-achieving students, but two papers found the opposite. Two studies confirm the proposition that girls are more depressed than boys in the same condition. On the other hand, the results of four papers demonstrate that, among the gifted, boys are more depressed than girls. After completing the review, the hypothesis of revising the giftedness model was considered. According to the Iceberg Model, giftedness is characterized by four factors: above-average ability, task commitment, creativity, and work capacity. The exogenous and endogenous factors, also represented in the model, do not characterize the gifted student; however, they can decisively influence its manifestation.

*Keywords:* giftedness, depression, systematic review, intelligence, iceberg model

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

Since the first academic studies on giftedness, the following question has remained: Is there a relationship between giftedness and depression? The question admits two conflicting answers. For Francis et al. (2016) and Guénolé et al. (2015), gifted individuals would be capable of a greater understanding of themselves and others due to their cognitive ability, which would protect them from depression. Neihart (1999) points out that these individuals would be more sensitive to interpersonal conflicts and stress than their peers as result of their cognitive ability.

Gifted students have characteristics that make them different from others. In addition to having the ability to understand and explain complex concepts in a variety of topics or to develop expertise in a specific area or topic (Nielsen, 2002), these individuals may experience a sense of frustration when their ability to deal with demands falls below expectations (Neihart, 2002). Since they are not accustomed to failure, feelings of frustration can cause psychological disorders such as depression, anxiety, and stress (Bakar & Ishak, 2014). The potential and uniqueness of gifted children's abilities can lead them to feel fear, existential anxiety, and personal suffering, so that they may not be able to take advantage of their abilities (Seely, 2004).

Regarding the relationship between giftedness and depression, the results of Terman's (1925) research suggested that gifted individuals exhibited a lower incidence of mental illness and adjustment problems than the average. However, the suicide of a student in 1981 triggered a series of studies on suicide, delinquency, anxiety, and depression in gifted populations (Neihart, 1999). Since the 1990s, research has moved in one direction or another: social adjustment or social maladjustment. Adolescents demonstrate socially and emotionally atypical behaviors because they are highly motivated, nonconformist, and independent (Csikszentmihalyi et al., 1993).

In the late 1990s, a new episode of suicide rekindled the discussion about maladjustment (Hyatt, 2010). In this case, as in others (Juvonen & Grahman, 2014), bullying intensified depression, which culminated in suicide. Bullying is recurrently associated with gifted individuals, whether as aggressors, victims or witnesses (Dalosto & Alencar, 2013; González-Cabrera et al., 2019). More recently, they began to experience a new situation: cyberbullying. The technological tools of the 21st century have become a very useful resource for gifted students, but they have acted as a catalyst for the asynchronous perpetuation of the development of these individuals, as well as increasing exposure to alienation by peers and/or aggression by peers (Mueller & Winsor, 2018).

Mood is a diffuse and persistent emotion or feeling that influences a person's behavior and colors their perception of being in the world. Mood disorders, also called affective disorders, constitute an important category of psychiatric illness (Sadock, 2017). The term “depression” does not refer to a pathology necessarily characterized by depressed mood, but to a syndrome characterized by mood and psychomotor changes, in addition to somatic and neurovegetative disorders (Assumpção Jr. & Kuczyński, 2012).

In clinical terms, all depressive disorders present as central characteristics the presence of anhedonia and/or sad, empty or irritable mood, combined with somatic and cognitive alterations that affect the individual's functionality (American Psychological Association [APA], 2014). Therefore, this paper was prepared with the objective of answering the

following question: Is intellectual giftedness in humans, when compared to normal intelligence of individuals, associated with the experience of depression or depressive disorder?

### Methodology

The systematic review based on the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) for the minimum reporting items that should be addressed in a systematic review (Moher et al., 2009; Page et al., 2021). Adjustments were made, allowing greater adaptation to the present question. To define the search terms, the question was outlined by the “PECO” process (Kung et al., 2010), in which “P” refers to the population = humans with giftedness; “E”, exposure = depression or depressive disorder; “C”, control = individuals with normal intelligence; “O”, outcome = association with intellectual giftedness. The systematic review was carried out in five scientific databases: Embase, Web of Science, Scopus, SciELO and PubMed. The following terms were used: (gifted OR giftedness) AND (depression OR depressive disorder).

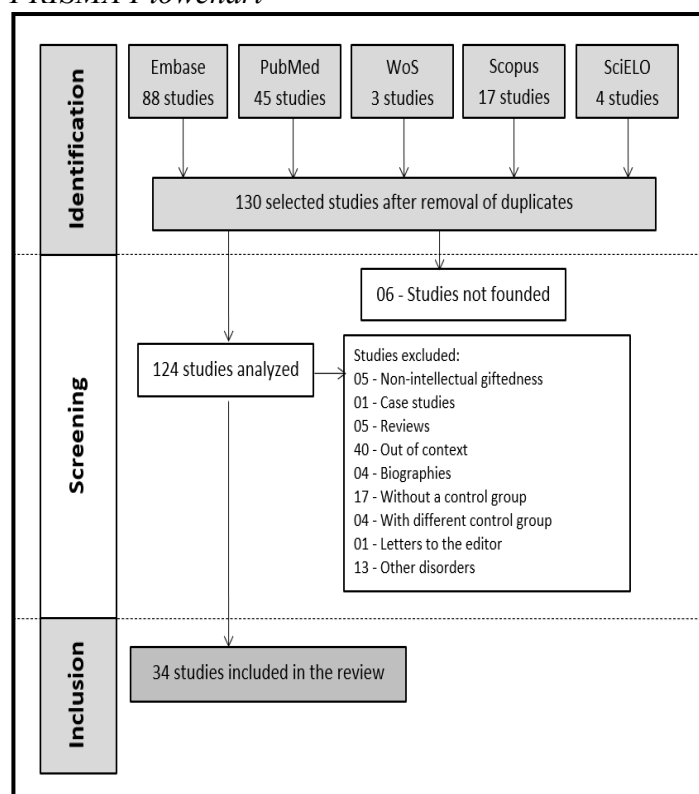
The inclusion criteria were: (a) being a scientific paper, dissertation or thesis published in a journal or platform indexed in one of the databases without date restrictions; (b) dealing with giftedness and depression. The exclusion criteria adopted were: (a) reviews; (b) biographies; (c) papers written in any language other than Portuguese, English, Spanish or French; (d) papers on non-intellectual giftedness; (e) case studies; (f) papers without a control group; (g) papers with a control group other than individuals with normal intelligence; (h) letters to the editor; (i) papers in which one of the terms had a meaning different from that of interest; (j) papers in which the terms, despite being correctly contextualized, were disconnected; (k) papers that also involved other disorders; (l) errata; (m) unavailable dissertations or theses; and (n) works of fiction or non-fiction on the research topics.

Once the review was completed, the challenge was to redesign a model that would explain the relevance of factors, named exogenous and endogenous, in the manifestation of giftedness. This model was constructed based on Sternberg's (1984) Triarchic Theory of Intelligence and Renzulli's Three-Ring Theory (1986) and Gagné's Differentiation Model of Giftedness and Talent (1985). The proposed model considered exogenous factors, such as family and school, while depression, personality, and motivation were considered endogenous factors.

### Results

The search of the five databases was conducted between February 16 and 18, 2025. After converging the database data in the Mendeley program and removing duplicates, 130 papers remained. Figure 1 below presents the flowchart, according to PRISMA (Moher et al., 2009; Page et al., 2021), for the search performed. Of the 130 results, 6 papers were not found. Of the 124 papers found, 90 papers were excluded, according to the criteria described in Figure 1, leaving 34 papers for analysis. Considering the exclusion criteria, 40 papers were excluded because the terms, despite being present, were out of context. This can be understood if we take as an example the fact that the term giftedness can be associated with a gift, such as one someone receives on their birthday.

**Figure 1**  
*PRISMA Flowchart*



Adapted from Moher et al. (2009) and Page et al. (2021).

Despite the diverse approaches used in the selected papers, depression was linked to the following issues: (a) self-esteem; (b) internalizing behaviors; (c) stress; (d) protective and/or risk factors; (e) suicidal ideation; (f) perfectionism; (g) emotional adjustment. By performing a qualitative analysis of these papers, grouped according to their proximity to each of these issues, the objective was to scrutinize the research, considering the context, limits, and boundary conditions of each study.

### Self-Esteem

Regarding self-esteem, Brody and Benbow (1986) observed a significant difference ( $p < 0.01$ ) between the mathematically gifted and verbally gifted groups. According to Field et al. (1998), on all perceived academic and social skills items, gifted students rated themselves as equal to or better than their academically normal peers; however, analyses of these skills yielded no significant differences, considering student self-reports and teacher observations.

Bartell and Reynolds' (1986) results demonstrated that gifted girls had higher self-esteem than gifted boys, while boys in the control group had higher self-esteem scores than girls in the same group (Bartell & Reynolds, 1986). A study conducted in France revealed that scores for academic self-esteem and total self-esteem were significantly lower ( $p < 0.006$  and  $p = 0.03$ , respectively) than those observed in the control group, and that depression scores were significantly higher ( $p = 0.021$ ) in gifted children. Correlation analyses revealed that the lower the total self-esteem scores, the higher the depression, hyperactivity, total psychopathology, and aggression scores (Bénony et al., 2007). Specifically, with regard to depression, Brody and Benbow (1986) observed that girls in the gifted and control groups were significantly more depressed than boys in the respective groups ( $p < 0.01$ ). For Bartell

and Reynolds (1986), gifted boys were more depressed than gifted girls, but girls in the control group were more depressed than boys in the same group.

### **Internalizing Behaviors**

Roy (2016) found that, among gifted children, the 10- to 18-year-old age group was vulnerable to behavioral problems. According to Merrell et al. (1996) and Roy (2016), gifted children had a higher percentage of externalizing behavior problems, especially among boys, than internalizing behavior problems. Roy (2016) also observed that gifted boys were less anxious than other boys, and gifted girls had fewer somatic problems. However, scores for externalizing behaviors were significantly higher ( $p < 0.01$ ) among gifted children than among children with normal intelligence. According to Merrell et al. (1996), gifted students differed more substantially from their non-gifted peers on items related to self-efficacy and perceived self-importance, which corroborates the hypothesis that these individuals may be “protected,” since their positive presence in children could act as a “protective” or “isolating” factor regarding insults to their socioemotional functioning and the development of internalizing forms of psychopathology.

### **Stress**

Based on the hypothesis that stress is associated with elevated cortisol levels, Turakitwanakan et al. (2010) compared depression between gifted and typically performing children by measuring salivary cortisol levels. Although the results alone support the proposition that gifted individuals are more susceptible to depression and the proposition that their cortisol levels are higher, an inverse correlation was observed between the Children's Depression Inventory (CDI) score and salivary cortisol levels. Furthermore, the result was not statistically significant ( $p > 0.05$ ).

A study by Fouladchang et al. (2010) aimed to investigate the relationship between depression, anxiety, stress, and life satisfaction among gifted and typically performing students. The results showed that girls had greater life satisfaction than boys, and students in the control group showed higher levels of life satisfaction than gifted students. However, girls had higher scores on anxiety and stress indices than boys.

### **Protective and/or Risk Factors**

Mueller (2009) found that gifted students were significantly less depressed than control subjects, and all protective factors moderated depression in both groups. All three protective factors (self-concept, parent-family connectedness, and school belonging) were negative predictors of depression for gifted adolescents. Also based on selecting participants from a larger sample size, Robinson et al. (2002) observed that more families of gifted students fell into the category of families with higher resources (parents with higher education and employment), White/non-Hispanic, and with English as their primary language. According to parent and teacher reports, high-achieving children were thriving both socially and academically, and although they self-reportedly lacked passion for school, they demonstrated less dissatisfaction. Teachers perceived significantly ( $p < 0.001$ ) more positive parental attitudes in high-achieving students, more strongly encouraging their children's progress (Robinson et al., 2002).

While Blumen and Lanao (2006) chose to work with at-risk children, Shahzad and Begume (2010) investigated differences in depression among gifted children from middle and upper socioeconomic backgrounds recruited from different private secondary schools in Pakistan. As a result, Blumen and Lanao (2006) observed that, regarding the number of responses, the gifted group obtained a higher median than the control group. This increase was interpreted as an indicator of intellectual potential and productive capacity. The gifted group exhibited differences in intellectual control and emotion processing. Regarding stress management and tolerance, it was observed that the gifted group presented lower values than the control group, indicating a greater tendency toward tension. However, at the same time, they showed higher "adjustment" scores, revealing a greater ability to cope with everyday situations (Blumen & Lanao, 2006). According to Shahzad and Begume (2010), gifted students clearly tended to report substantially stronger positive feelings and thoughts, with low levels of negative affect and low levels of negative self-evaluation.

In addition to the hypothesis that gifted individuals in vulnerable situations may be more susceptible to risk than others, it is also considered that gifted individuals who experience more stressful events are more likely to become depressed. The results of Johnston's (1996) study revealed that both students reported lower levels of negative affect than reported in the literature (see Kovacs, 1981). Gifted students scored lower on this measure, but these results were not significant ( $p = 0.10$ ). Furthermore, boys reported slightly lower negative affect than girls (Johnston, 1996).

### **Suicidal Ideation**

Using tests to measure depression and suicidal ideation, Baker (1995) demonstrated that girls reported more depression than boys in all groups, but no significant differences were found ( $p = 0.90$ ). According to the study by Metha and McWhirter (1997), based on the results of stress measures, depression inventories, and suicidal ideation tests, it was observed that gifted students experienced significantly fewer life-changing events ( $p = 0.037$ ). Perceived stress from life-changing events, depression levels, and suicidal ideation were similar between gifted and non-gifted participants. Suicidal ideation in the entire sample was significantly and positively correlated ( $p < 0.01$ ) with both depression levels and past and recent stress levels.

### **Perfectionism**

Hypothesizing that the perfectionism structure found in North American students could be generalized to a European population, Parker et al. (2001) examined perfectionism among Czech students with giftedness in mathematics. Analyses of variance yielded statistically significant differences ( $p = 0.000$ ,  $p = 0.008$ , and  $p = 0.02$ , respectively) by group for concern about mistakes, organization, and parental criticism, with these differences being higher in the neurotypical group, while personal standards were higher for females. While non-perfectionistic individuals were found disproportionately among the gifted students, maladaptive perfectionists were overrepresented among the control group (Parker et al., 2001).

Rice and Taber's (2018) study sought evidence to support conceptualizations of perfectionism as a multidimensional construct represented by two factors: perfectionistic strivings and perfectionistic concerns. The mean differences across measures between the gifted and control groups were not statistically significant ( $p = 0.38$ ). When the participants were divided, one group was found to have high standards, low discrepancy, and low stress



(presumed adaptive); another with high standards, discrepancy, and stress (presumed maladaptive); and a third with low standards and mid-range discrepancy (presumed non-perfectionists). No group of students was disproportionately represented; however, the authors expressed concern that approximately 8% of the students appeared to be at risk for difficulties related to problematic combinations of striving and perfectionistic concerns (Rice & Taber, 2018).

### **Emotional Adjustment**

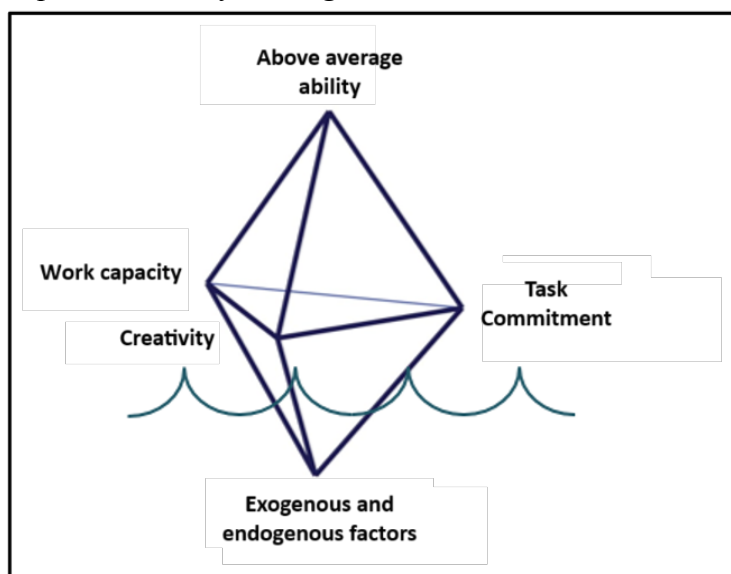
According to Richards et al. (2003), in parental assessments, gifted adolescents demonstrated lower levels of problem behavior and anxiety than their control peers, as well as fewer attention problems than adolescents with normal performance. Although teacher assessments did not indicate significant differences between the groups, adolescents' self-reports corroborated the parents' assessment. The work of Eklund et al. (2015) also demonstrates, in parent and teacher assessments, greater emotional and behavioral risk in normally performing children. Furthermore, gifted students demonstrated higher academic performance, regardless of the level of risk, suggesting that higher cognitive abilities may constitute a protective factor in mitigating the development of other social, emotional, or behavioral concerns (Eklund et al., 2015). Still using parent and teacher reports as a reference, Wilson (2015) pointed out that the concentration of gifted children was positively related to empathy and negatively related to socially maladaptive behavior. Empathy and friendship were also negatively related to socially maladaptive behavior, according to parents and teachers.

Considering self-reports, the work of Eren et al. (2018) revealed that gifted children described themselves as more inattentive, with low social functioning, and with a worse perception of their physical health. In contrast, according to an assessment by Bracken and Brown (2006), gifted students achieved significantly better results in competence and executive function ( $p < 0.05$  in both). Furthermore, gifted students scored lower on some scales, including anxiety, depression, and attention deficit. Still from a self-report perspective, students considered gifted, according to the criteria of the study by Plominski and Burns (2018), exhibited higher mean scores than those of students in the control group. Furthermore, students in the control group reported significantly lower levels of overall life satisfaction, personal satisfaction, and academic self-efficacy ( $p = 0.01$  in all cases).

### **Discussion**

After completing this review, the hypothesis of reviewing the giftedness model was considered, both in order to bring Renzulli and Gagné's models closer together and to define the conditions that may interfere with the manifestation of this condition. According to the Iceberg Model, presented in Figure 2, giftedness is characterized by four factors: above-average ability, task commitment, creativity and work capacity.

**Figure 2**  
*Representation of Iceberg Model*



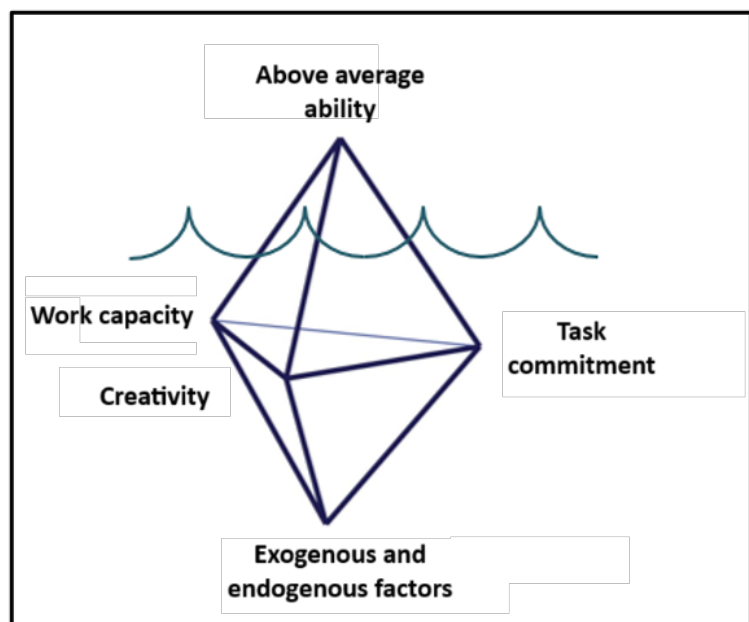
However, there is a fifth vertex in this figure that corresponds to exogenous and endogenous factors. Among the endogenous factors, one can consider depression and anxiety, for example, while social and gender issues can be exogenous factors. These factors will not characterize the gifted student. However, they can decisively influence its manifestation.

In this model, above-average ability constitutes the upper vertex of this figure, especially considering the psychometric tests adopted. The option to highlight above-average ability from the others is also justified because it is the factor least dependent on endogenous and exogenous factors. A distinction was also made between intellectual capacity and work capacity. This distinction is based on the idea that giftedness, according to Gagné's model (1985), can manifest itself as intellectual or sensorimotor. Work capacity, as well as task commitment and creativity are on the same level in the figure. To corroborate this idea, Sternberg's (1984) conception of intelligent behavior was revisited. One of the subtheories described by the author specifies three fundamental processes: (a) learning to do things, (b) planning what to do and how to do it, and (c) actually doing things.

At the opposite vertex to above-average ability, there are exogenous and endogenous factors. According to the Figure 3, these factors can be heavy enough to make the “iceberg” sink to the point of hiding the individual’s characteristics. It is being admitted that task commitment, creativity and work capacity can be “hidden” before above-average ability, however, it is not stated that these three are hidden in the same proportion.

**Figure 3**

*Representation of the Model When Exogenous and Endogenous Factors Are Heavy Enough to Sink the Iceberg*



Although the figure is a regular solid, it is not postulated that all characteristics manifest themselves in the same proportion or even under the same conditions. Creativity and task commitment, for example, can manifest themselves in a pronounced way in a stimulating and/or welcoming environment. So, even if factors are capable of sinking the iceberg, it's possible that some individual characteristics are masked and others are not. For example, it's possible that an endogenous factor like depression is significant enough to mask task commitment and creativity, but not sufficiently so for work capacity.

### Conclusion

Although some papers dealt with two or more themes related to depression, the analysis of the predominant themes, from this perspective, offers a reasonable overview: the greatest number of occurrences are found among self-esteem, protective and/or risk factors and emotional adjustment. Qualitatively, some points of convergence were observed between some studies; however, completely divergent results were found on certain issues. Considering these results, we suggest that a future meta-analysis be conducted to measure the significance and effect size of each result. In any case, the construction of a new model was postulated that would expose the influence of endogenous and exogenous factors in the manifestation of giftedness.

## References

- American Psychiatric Association. (2014). *DSM-V – Manual Diagnóstico e Estatístico de Transtornos Mentais* [The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition]. Artes Médicas.
- Assumpção Jr., F. B., & Kuczynski, E. (2012). Transtornos de humor [Mood disorders]. In F. B. Assumpção Jr. & E. Kuczynski (Eds.), *Tratado de psiquiatria da infância e da adolescência* (2a. ed., pp. 329–342). Ateneu.
- Bakar, A. Y. A., & Ishak, N. M. (2014). Depression, anxiety, stress, and adjustments among Malaysian gifted learners: implication towards school counseling provision. *International Education Studies*, 7(13), 6–13. <http://dx.doi.org/10.5539/ies.v7n13p6>
- Baker, J. A. (1995). Depression and suicidal ideation among academically gifted adolescents. *Gifted Child Quarterly*, 39(4), 218–223. <https://doi.org/10.1177/001698629503900405>
- Bartell, N. P., & Reynolds, W. M. (1986). Depression and self-esteem in academically gifted and nongifted children. *Journal of School Psychology*, 24, 55–61. [https://doi.org/10.1016/0022-4405\(86\)90042-7](https://doi.org/10.1016/0022-4405(86)90042-7)
- Bénony, H., Vanderelst, D., Chahraoui, K., Bénony, C., & Marnier, J. P. (2007). Lien entre dépression et estime de soi scolaire chez les enfants intellectuellement précoces [Link between depression and academic self-esteem in gifted children]. *L'Encéphale*, 33(1), 11–20. [https://doi.org/10.1016/S0013-7006\(07\)91554-7](https://doi.org/10.1016/S0013-7006(07)91554-7)
- Blumen, S., & Lanao, M. C. (2006). Una mirada desde el Rorschach hacia la niñez con talento intelectual en riesgo [A glance from Rorschach towards the intellectually talented children at risk]. *Revista de Psicología*, 24(2), 267–299. <https://doi.org/10.18800/psico.200602.005>
- Bracken B. A., & Brown, E. F. (2006). Behavioral identification and assessment of gifted and talented students. *Journal of Psychoeducational Assessment*, 24(2), 112–122. <https://doi.org/10.1177/0734282905285246>
- Brody, L. E., & Benbow, C. P. (1986). Social and emotional adjustment of adolescents extremely talented in verbal or mathematical reasoning. *Journal of Youth and Adolescence*, 15(1), 1–18. <https://doi.org/10.1007/BF02140780>
- Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1993). *Talented teenagers: The roots of success and failure*. Cambridge University Press.
- Dalosto, M. M., & Alencar, E. M. L. S. (2013). Manifestações e prevalência de bullying entre alunos com altas habilidades/superdotação [Bullying manifestations and prevalence among gifted students]. *Revista Brasileira Educação Especial*, 19(3), 363–378. <https://doi.org/10.1590/S1413-65382013000300005>

- Eklund, K., Tanner, N., Stoll, K., & Anway, L. (2015). Identifying emotional and behavioural risk among gifted and nongifted children: A multi-gate, multi-informant approach. *School Psychology Quarterly*, 30(2), 197–211. <https://doi.org/10.1037/spq0000080>
- Eren, F., Çete, A. Ö., Avcil, S., & Baykara, B. (2018). Emotional and behavioural characteristics of gifted children and their families. *Noro Psikiyatri Arsivi*, 55(2), 105–112. <https://doi.org/10.5152/npa.2017.12731>
- Field, T., Harding, J., Yando, R., Gonzalez, K., Lasko, D., Bendell, D., & Marks, C. (1998). Feelings and attitudes of gifted students. *Adolescence*, 33(130), 331–342. <https://pubmed.ncbi.nlm.nih.gov/9706320/>
- Fouladchang, M., Kohgard, A., & Salah, V. (2010). A study of psychological health among students of gifted and nongifted high schools. *Procedia Social and Behavioral Sciences*, 5, 1220–1225. <https://doi.org/10.1016/j.sbspro.2010.07.264>
- Francis, R., Hawes, D., & Abbott, M. (2016). Intellectual giftedness and psychopathology in children and adolescents: a systematic literature review. *Exceptional Children*, 82(3), 279–302. <https://doi.org/10.1177/0014402915598779>
- Gagné, F. (1985). Giftedness and talent: Reexamining a reexamination of the definitions. *Gifted Child Quarterly*, 29(3), 103–112.
- González-Cabrera, J., Tourón, J., Machimbarrena, J. M., León-Mejía, A., & Gutiérrez-Ortega, M. (2019). Estudio exploratorio sobre acoso escolar en alumnado con altas capacidades: prevalencia y afectación psicológica [Exploratory study on bullying in gifted students: prevalence and psychological wellbeing]. *Revista de Educación*, 386, 187–214. <https://doi.org/10.4438/1988-592X-RE-2019-386-432>
- Guénolé, F., Speranza, M., Louis, J., Fournier, P., Revol, O., & Baleyte, J. M. (2015). Wechsler profiles in referred children with intellectual giftedness: associations with trait-anxiety, emotional dysregulation, and heterogeneity of Piaget-like reasoning processes. *European Journal of Pediatric Neurology*, 19(4), 402–410. <https://doi.org/10.1016/j.ejpn.2015.03.006>
- Hyatt, L. A. (2010). A case study of the suicide of a gifted female adolescent: implications for prediction and prevention. *Journal for the Education of the Gifted*, 33(4), 514–535. <https://doi.org/10.1177/016235321003300404>
- Johnston, D. T. (1996). *Negative affect, explanatory style, and stressful life events in an elementary school population* (Doctoral dissertation, Wilfrid Laurier University). Digital Commons. <https://scholars.wlu.ca/etd/198/>
- Juvonen, J., & Graham, S. (2014). Bullying in schools: the power of bullies and the plight of victims. *Annual Review of Psychology*, 65, 159–185. <https://doi.org/10.1146/annurev-psych-010213-115030>
- Kovacs, M. (1981). Rating scales to assess depression in school-aged children. *Acta Paedopsychiatrica*, 46, 305–315. <https://pubmed.ncbi.nlm.nih.gov/7025571/>

- Kung, J., Chiappelli, F., Cajulis, O. O., Avezova, R., Kossan, G., Chew, L., & Maida, C. A. (2010). From systematic reviews to clinical recommendations for evidence-based health care: validation of revised assessment of multiple systematic reviews (R-AMSTAR) for grading of clinical relevance. *The Open Dentistry Journal*, 4, 84–91. <https://doi.org/10.2174/1874210601004020084>
- Merrell, K. W., Gill, S. J., Mcfarland, H., & Mcfarland, T. (1996). Internalizing symptoms of gifted and non-gifted elementary-age students: A comparative validity study using the Internalizing Symptoms Scale for Children. *Psychology in the Schools*, 33(3), 185–191. [https://doi.org/10.1002/\(SICI\)1520-6807\(199607\)33:3<185::AID-PITS1>3.0.CO;2-P](https://doi.org/10.1002/(SICI)1520-6807(199607)33:3<185::AID-PITS1>3.0.CO;2-P)
- Metha, A., & McWhirter, E. H. (1997). Suicide Ideation, depression, and stressful life events among gifted adolescents. *Journal for the Education of the Gifted*, 20(3), 284–304. <https://doi.org/10.1177/016235329702000306>
- Moher D., Liberati A., Tetzlaff J., Altman D. G., & The PRISMA Group. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med*, 6(7), 1–6. <https://doi.org/10.1371/journal.pmed.1000097>
- Mueller, C. E. (2009). Protective Factors as barriers to depression in gifted and nongifted adolescents. *Gifted Child Quarterly*, 53(1), 3–14. <https://doi.org/10.1177/0016986208326552>
- Mueller, C. E. & Winsor, D. L. (2018). Depression, Suicide, and Giftedness: Disentangling Risk Factors, Protective Factors, and Implications for Optimal Growth. In S. I. Pfeiffer (Ed.), *Handbook of Giftedness in Children* (1a. ed., pp. 255–284). Springer Int. Publishing.
- Neihart, M. (1999). The impact of giftedness on psychological well-being: What does the empirical literature say? *Roeper Review*, 22(1), 10–17. <https://doi.org/10.1080/02783199909553991>
- Neihart, M. (2002). Delinquency and gifted children. In M. Neihart, S. M. Reis, N. M. Robinson, & S. M. Moon (Eds.), *The social and emotional development of gifted children: What do we know?* (1a. ed., pp. 103–112). Prufrock Press.
- Nielsen, M. E. (2002). Gifted students with learning disabilities: Recommendations for identification and programming. *Exceptionality*, 10(2), 93–111. [https://doi.org/10.1207/S15327035EX1002\\_4](https://doi.org/10.1207/S15327035EX1002_4)
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ..., Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Research methods and reporting*, 372(71), 1–9. <https://doi.org/10.1136/bmj.n71>

- Parker, W. D., Portesová, S., & Stumpf, H. (2001). Perfectionism in mathematically gifted and typical czech students. *Journal for the Education of the Gifted*, 25(2), 138–152. <https://doi.org/10.1177/016235320102500203>
- Plominski, A. P., & Burns, L. R. (2018). An investigation of student psychological wellbeing: honors versus nonhonors undergraduate education. *Journal of Advanced Academics*, 29(1), 5–28. <https://doi.org/10.1177/1932202X17735358>
- Renzulli, J. S. (1986). The three-ring conception of giftedness: A developmental model for creative productivity. In: Renzulli, J. S.; Reis, S. M. (org.). *The triad reader*. Creative Learning Press.
- Rice, K. G., & Taber, Z. B. (2018). Perfectionism. In S. I. Pfeiffer (ed.), *Handbook of Giftedness in Children* (1a. ed., pp. 227–254). Springer Int. Publishing.
- Richards, J., Encel, J., & Shute, R. (2003). The emotional and behavioral adjustment of intellectually gifted adolescents: a multi-dimensional, multi-informant approach. *High Ability Studies*, 14(2), 153–164. <https://doi.org/10.1080/1359813032000163889>
- Robinson, N. M., Lanzi, R. G., Weinberg, R. A., Ramey, S. L., & Ramey, C. T. (2002). Family factors associated with high academic competence in former head start children at third grade. *Gifted Child Quarterly*, 46(4), 278–290. <https://doi.org/10.1177/001698620204600404>
- Roy, B. (2016). Prevalence of internalizing and externalizing behavioral problem among school going children in relation to their level of intelligence. *Indian Journal of Community Psychology*. <https://www.thefreelibrary.com/Prevalence+of+internalizing+and+externalizing+behavioural+problem...-a0462787911>
- Sadock, B. J. (2017). *Compêndio de Psiquiatria: ciência do comportamento e psiquiatria clínica*. Artes Médicas.
- Seely, K. (2004). Gifted and talented students at risk. *Focus on Exceptional Children*, 37(4), 1–8. <https://doi.org/10.17161/foec.v37i4.6870>
- Shahzad, S., & Begume, N. (2010). Level of depression in intellectually gifted secondary school children. *Gifted and Talented International*, 25(2), 91–98. <https://doi.org/10.1080/15332276.2010.11673572>
- Sternberg, R. J. (1984). Toward a triarchic theory of human intelligence. *Behavioral and Brain Sciences*, 7(2), 269–287.
- Swiatek, M. A. (1995). An empirical investigation of the social coping strategies used by gifted adolescents. *Gifted Child Quarterly*, 39(3), 154–160. <https://doi.org/10.1177/001698629503900305>
- Terman, L. (1925). *Mental and physical traits of a thousand gifted children. Genetic studies of genius*. Stanford University Press.

- Turakitwanakan, W., Saiyudthong, S., Srisurapanon, S., & Anurutwong, A. (2010). The comparative study of depression between gifted children and normal children. *Journal of the Medical Association of Thailand*, 93(2), S9–S14.  
<https://pubmed.ncbi.nlm.nih.gov/21299078/>
- Wilson, H. E. (2015). Social and emotional characteristics and early childhood mathematical and literacy giftedness: observations from parents and childcare providers using the ECLS-B. *Journal for the Education of the Gifted*, 38(4), 377–404.  
<https://doi.org/10.1177/0162353215607323>







©The International Academic Forum 2025  
The International Academic Forum (IAFOR)  
Sakae 1-16-26-201  
Naka Ward, Nagoya, Aichi  
Japan 460-0008  
[www.iafor.org](http://www.iafor.org)