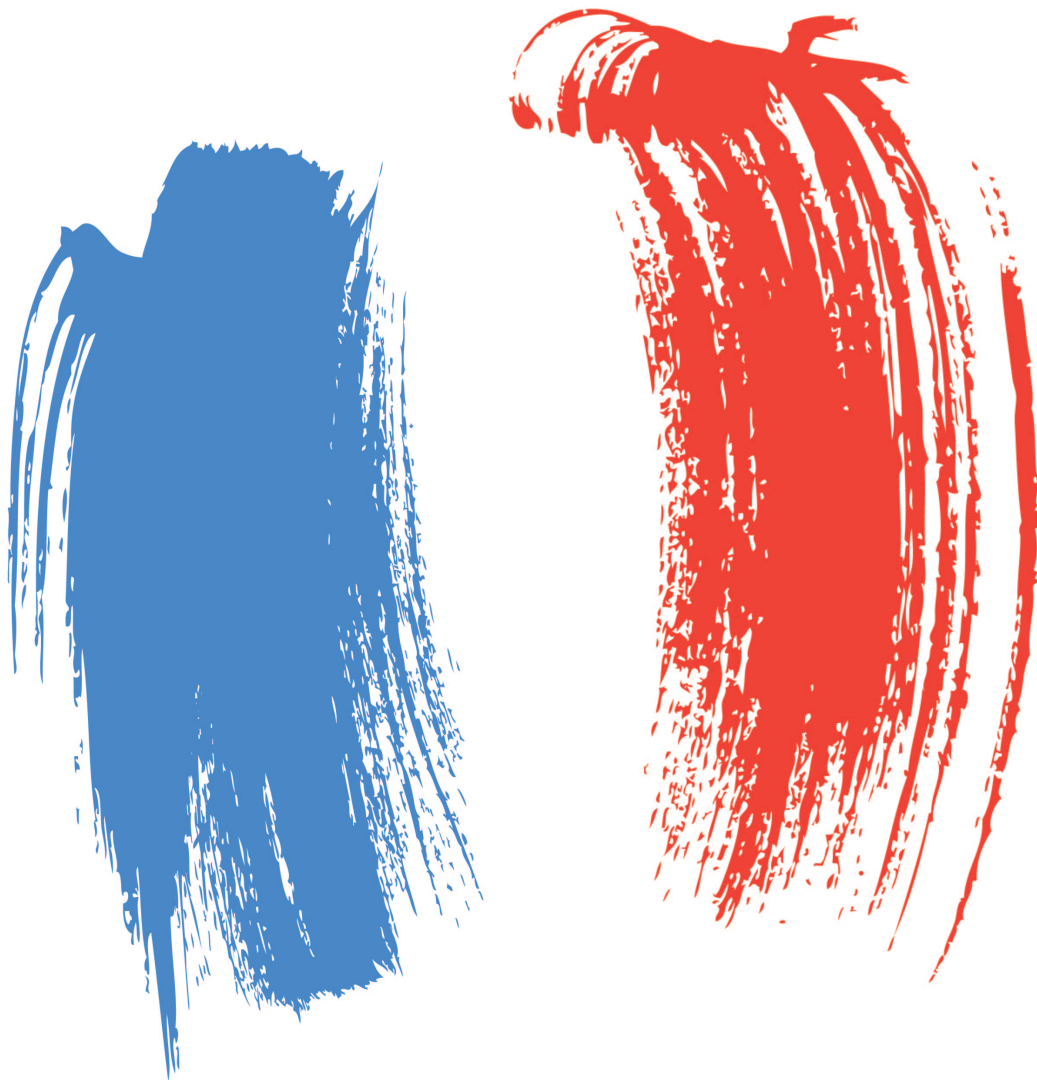


The Paris Conference on Education

June 16-19, 2023 | La Maison de la Chimie, Paris, France



Official Conference Proceedings

Organised by IAFOR in association with the IAFOR Research Centre at Osaka University and IAFOR's Global University Partners

ISSN: 2758-0962

“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

PCE/PCAH Programme Committee

Dr Grant Black, Chuo University, Japan

Professor Georges Depeyrot, French National Center for Scientific Research (CNRS), France

Dr Joseph Haldane, Chairman and CEO, IAFOR

Professor Donald E. Hall, Binghamton University, United States

Professor Barbara Lockee, Virginia Tech, United States

Professor Ljiljana Markovic, European Center for Peace and Development (ECPD), Serbia

Professor Haruko Satoh, Osaka University, Japan

Dr Krisna Uk, Association for Asian Studies (AAS)

Global Programme Committee

Dr Joseph Haldane, Chairman and CEO, IAFOR & Osaka University, Japan

Professor Jun Arima, President, IAFOR & University of Tokyo, Japan

Professor Anne Boddington, Executive Vice-President and Provost, IAFOR & Middlesex University, United Kingdom

Professor Barbara Lockee, Virginia Tech., United States

Professor Donald E. Hall, Binghamton University, United States

Dr James W. McNally, University of Michigan, United States & NACDA Program on Aging

Professor Haruko Satoh, Osaka University, Japan

Dr Grant Black, Chuo University, Japan

Professor Dexter Da Silva, Keisen University, Japan

Professor Gary Swanson, University of Northern Colorado, United States

Professor Baden Offord, Curtin University, Australia

Professor Frank Ravitch, Michigan State University, United States

Professor William Baber, Kyoto University, Japan

The Paris Conference on Education 2023

Official Conference Proceedings

ISSN: 2758-0962



© The International Academic Forum 2023
The International Academic Forum (IAFOR)
Sakae 1-16-26-201
Naka Ward, Nagoya, Aichi
Japan 460-0008
www.iafor.org

Table of Contents

<i>How Do ESL Learners Talk and Interthink in Asynchronous Online Discussions?</i> Zenía Chan	pp. 1 - 4
<i>Impact of Teacher Beliefs on Planning ESL Reading Lessons</i> Vivaldi Chung	pp. 5 - 8
<i>How to Implement Innovative Education in Senior High Schools?: From an Entrepreneurial Leadership Perspective</i> Wei-Cheng Chien	pp. 9 - 17
<i>Learner Experiences in an Activity-Based Online Course From a TPACK Perspective</i> Rajabalee Yousra Banoor Ramsaha Shailendra	pp. 19 - 31
<i>A Design Project Aimed to Promote Social Change: From the Classroom to the Community</i> Carla Cadete	pp. 33 - 41
<i>Biomedical Engineering as STEM Education in Georgia and New Challenges for Internationalisation of This Process</i> Irine Gotsiridze Giorgi Gigilashvili	pp. 43 - 56
<i>Facilitating and Measuring Health Promotion in the Learning Environment—Student Engagement and Inclusion in School</i> May Olaug Horverak Gerd Martina Langeland	pp. 57 - 67
<i>Citizens of the English Language: Sociolinguistic Perspectives on Indian Subjectivity</i> Prateek Shankar	pp. 69 - 81
<i>Re-envisioning Web Learning and Communication Experience With WebXR</i> Ming Wai Christy Chung Chi Ming Chan	pp. 83 - 95
<i>Educational Partnerships That Can Drive the Activation of Renewable Knowledge Process, Using the Public Libraries Infrastructure</i> Ioana Cornelia Cristina Crihană	pp. 97 - 104
<i>Understanding the Current Context of Leadership Development Through Dietetic Education in Canada</i> Billie Jane Hermosura	pp. 105 - 113

The Development of Instructional Design Using Animation in the Elementary Teacher Education Program of Universitas Terbuka

Astri Dwi Jayanti Suhandoko

Della Raymena Jovanka

Monika Handayani

pp. 115 - 123

Communicating the Indonesian Dietary Recommendations: Lessons Learned From Boarding School

Nutta Taneepanichskul

Syarifah Aqilah

Cindy Roviqoh

Siti Sudrajat

pp. 125 - 131

Growing Stronger Together: Are Students' Positive Resources Correlated to Teachers' Features? How Could They Be Incremented?

Tania Di Giuseppe

Giulia Perasso

Grazia Serantoni

Carmela Lillo

Alessandro Maculan

Francesca Vianello

Patrizio Paoletti

pp. 133 - 146

Simulation-Oriented Training: Analysis and Modeling of Trainer Activity During Post-simulation Debriefing (D-STAM)

Valérie Duvivier

Emilie Carosin

Antoine Derobertmeasure

Marc Demeuse

pp. 147 - 167

Analysis of Automated and Personalized Student Feedback to Improve Learner Experience

Ikechukwu Ogbuchi

Etain Kiely

Cormac Quigley

Donal McGinty

pp. 169 - 178

Controlling the Level of Anxiety in L2 Presentation Performance: Case Study of EFL Students in Japan

Ahrong Lee

Younghyon Heo

pp. 179 - 186

Framework for Filtering the Expectations of Common Behavior and Standards in a Highly Diverse Student Environment

Michelle J. Cummings-Koether

Franziska Durner

Ayelen V. Toscano Juanes

pp. 187 - 200

<i>Future Preschool Teachers' Perspectives on Integrating Music Into the Teaching Activities</i> Ligita Stramkale	pp. 201 - 213
<i>Understanding and Teaching Slam Poetry: An Empirical Research of University Students</i> Réka Sólyom Andrea Pap	pp. 215 - 226
<i>Othello: A Legal Alien in Multicultural Renaissance Venice</i> Oumeima Mouelhi	pp. 227 - 236
<i>An Evaluation of the Maltese School Literacy Environments and Practices of Students With Down Syndrome</i> Loredana Muscat Helen Grech	pp. 237 - 258
<i>Towards the Design and Implementation of a Blended Learning Framework for Student-Centredness</i> Munienge Mbodila	pp. 259 - 269
<i>Inculcating Creativity: A Study on the Creative Abilities of Educators in the Field of Design</i> Chiranjeevi Reddy Gudimetla	pp. 271 - 281
<i>Effectiveness of Incorporating Mindfulness Programs for Corporate Executives: The IMC Case Study</i> Kenneth Tan	pp. 283 - 292
<i>IIIEPE - A Laboratory for the Development of Stem Teaching Competencies Through Computational Thinking and Artificial Intelligence</i> Marcela Georgina Gómez-Zermeño Lorena Alemán de la Garza	pp. 293 - 304
<i>Can Artificial Intelligence Be Used as a Tutor to Improve Student Performance in a Technical Writing Class?</i> Samuel Horine George Pozek Brian Butka	pp. 305 - 321
<i>Experiences and Pedagogical Reflections on Virtual Teaching Practice in Mexico</i> Antonio Alanís Huerta	pp. 323 - 331
<i>Support Technology for Nonverbal Communication of Students With Autism Spectrum Disorder –Systematic Review</i> María Isabel Gómez-León	pp. 333 - 347
<i>All Work and No Play Makes Jack a Dull Boy Is No Longer True</i> Mickael Bosco	pp. 349 - 361

- The Development and Evaluation of Artificial Intelligence (A.I.) Tutor for a Java Programming Class*
Alessia Tripaldelli
Brian Butka
Casey Elder
pp. 363 - 370
- Bridging the STEM Education Gap Among Secondary School Female Learners: Need for an Integrated Secondary School STEM Education Monitoring Tool*
David Mkwambisi
Patrick Chimseu
Brighton Chunga
Jonathan Makuwira
pp. 371 - 385
- Locating Your Inclusive Practice: A Reflective Heuristic and Workshop*
Anna Carissa Rozzo
pp. 387 - 406
- UAE Female K-12 Students: Decision Influences on Bachelor's Degrees Choices*
Mohammad Amin Kuhail
Haseena Al Katheeri
Joao Negreiros
pp. 407 - 417
- Environmental Education in Indonesia Secondary School Teachers' Perspective: A Systematic Review*
Adhitya Amarulloh
pp. 419 - 428
- Rethinking Inclusive Education in Portugal*
Nuno Fraga
Gorete Pereira
Maria José Camacho
pp. 429 - 437
- Exploring AI in Education: A Quantitative Study of a Service-Oriented University Chatbot*
Mascha-Lea Fersch
Sigurd Schacht
Betiel Woldai
pp. 439 - 453
- Cultural Institutions as Spaces for Education: Artistic Expressions in Initial Teacher Training at the University of Madeira*
Ana França Kot-Kotecki
Valdemar Sousa
Natalina Cristóvão
pp. 455 - 467

<i>A Qualitative Evaluation of an AI-Supported Quiz Application to Assess Learning Progress</i> Betiel Woldai Sophie Henne Mascha-Lea Fersch Sudarshan Kamath Barkur Sigurd Schacht	pp. 469 - 479
<i>Tutorial Factors Associated With Dropout and Failure in Higher Education</i> Luz Alondra Katt Morales	pp. 481 - 492
<i>Emergency Remote Teaching (ERT) in the COVID-19 Pandemic: Impact on the Education of Higher Education Students in the Health Area</i> Olga Ribeiro	pp. 493 - 501
<i>Making Assessment Engaging for Elementary/Primary Students in Online Learning</i> Gregory Macur	pp. 503 - 508
<i>System Thinking in a Global Context to Foster Transcendent Leadership</i> Shuaa Alnifie	pp. 509 - 519
<i>Rethinking Work Integrated Learning Pedagogy: Reflections Post COVID-19</i> Natasha Janse van Rensburg Charl J Roux	pp. 521 - 531
<i>An Examination on the Role of Culture and Socialization on South Asian Women's Pursuit of STEM Education</i> Kinza Shaukat Anton Puvirajah	pp. 533 - 540
<i>Callidus Academy Project Bringing a New Vision on Professional Training Related to the Industrial Pole of Manaus (PIM)</i> Rafael Lopes e Oliveira Nathalia Cristina Mafra Bessa Antonio Cláudio Kieling Ricardo da Silva Barboza	pp. 541 - 547
<i>Mapping, Coding, Learning: When Infographic Meets Digital Education –A Pilot Programme in Design School</i> Ida Cortoni Alessio Caccamo Carlotta Belluzzi Mus	pp. 549 - 562
<i>A Blended Approach to Community Involved Education for the Wellbeing of Society</i> Joy Garfield Paul Nzacahayo	pp. 563 - 570

- The Views of Romanian Teachers on the Sexual Development and Education of Children*
Noémi Szállassy
Nándor Erős pp. 571 - 581
- The Importance of Professional Self-Knowledge in the Initial and In-Service Training of Teachers*
Noémi Birta-Székely pp. 583 - 589
- Exploring Content and Tools Tailored on Gen Z University Courses: A Case Study*
Franca Cantoni
Barbara Barabaschi
Roberta Virtuani pp.591 - 603
- An Italian Large Case Study on Emergency Remote Teaching: Factors and Predictors Which Affect Higher Education Students' Attitude*
Matteo Bozzi
Roberto Mazzola
Italo Testa
Juliana Elisa Raffaghelli
Susanna Sancassani
Maurizio Zani pp. 605 - 617
- Disrupting the Grade Imperative Through Critical Pedagogies Embedded Into Human Rights Focused Literary Study*
Jessica Terbrueggen pp. 619 - 629
- Long Distance Recordingship: Assessing the Use of Remote Recordings in Acoustic Research on Serbian EFL Students' Acquisition of English VOT*
Nina Đukić pp. 631 - 641
- Ingenuity in the Pandemic: A Cross-Course Science-Literacy Integration Project*
Brittany E. Kiser
Kelly A. Burlison pp. 643 - 652
- Mapping the Field of Quality Assurance and Transnational Higher Education Through a Bibliometrics Analysis*
Wang Jing
Eunyoung Kim pp. 653 - 667
- Just Between Meme and You: Online Memes as Health Communication Tools in Design and Media Arts Higher Education Curricula*
Heitor Alvelos
Susana Barreto
Cláudia Raquel Lima
Eliana Penedos-Santiago
Jorge Brandão Pereira
Pedro Alves da Veiga pp. 669 - 673

UX Evaluation of a School Newspaper Creation Platform

Luísa Júlio

Mariana Alves

Martinho Mota

Raquel Cabral

Telmo Silva

pp. 675 - 691

Performing Arts in Higher Education: Sensing the Body to Learn the World

Déborah Maia de Lima

Aron Rosenberg

pp. 693 - 702

Diagnosing Misconceptions in First-Year Calculus

Elsabe Weyer

pp. 703 - 716

The Implementation of an Asynchronous E-learning Course in Higher Education – Lessons Learned

Brido Schuler

Michael Pülz

Fabia Berger

pp. 717 - 730

The Role of Reflection in Changing Student's Conceptions About the Teaching Profession: Navigate Towards Meaning Physical Education

Ana Rita Águeda

Paula Silva

Paula Queirós

pp. 731 - 744

We Have Unrealistic Beliefs Until We Deconstruct Our Thinking: The Relationship Between Reflection and Epistemological Beliefs in Teacher Education Programs

Margarida Barros

Isabel Mesquita

Paula Queirós

pp. 745 - 754

Elementary School Counselors' Experiences Engaging in Advocacy Action for Transgender Youth

Melissa Anne Brennan

pp. 755 - 768

Analytic Recommendation of Learning Graphs Based on User's Learning History

Massra Sabeima

Myriam lamolle

Mohamedade Farouk Nanne

pp. 769 - 776

Assessment of STEM Competences – Systematic Overview of Model Solution and Practices

Nadezhda Kaloyanova

pp. 777 - 790

- Using Biometrics to Fortify E-learning Platforms Security*
Spyros Kopsidas
Eleni Ioannou-Sougleridi
Dimitris Zisiadis
George Stamoulis pp. 791 - 800
- Means of Expression of Metaphorical Thinking in Primary School
Lithuanian Language Textbooks*
Vaida Padgurskytė
Daiva Malinauskienė pp. 801 - 809
- Automatic Formative Assessment of Programming Tasks*
Janet Liebenberg pp. 811 - 824
- Factors Influencing Faculty Willingness to Engage in Academic Service-
Learning Approach With Businesses for Graduates Employability Skills
Development: Benin Perspectives*
Hermine, C. Sossouhounto
Utz Dornberger pp. 825 - 835
- Cultivating a Social Justice Pedagogy in an Introductory Japanese
Language Course Through Pronunciation Instruction*
Ryuichi Suzuki pp. 837 - 853
- Addressing the Root Causes: An In-Depth Analysis of Uzbekistan's
Approach to Resolving the Issue of Underqualified Preschool Teachers*
Munis Khusanova pp. 855 - 871
- Czech Higher Education in Continuity With the Challenges of the
Contemporary World*
Marcela Göttlichová pp. 873 - 887

How Do ESL Learners Talk and Interthink in Asynchronous Online Discussions?

Zenia Chan, University of Cambridge, United Kingdom

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Education in the post-pandemic era is presented with prospects to reconfigure the mode of teaching and learning with the affordances of technology. Despite the prominence of classroom talk and its associations with students' thinking, little is known about such effects when talk is conducted in a purely asynchronous online context among students and teachers who learn English as L2. The current study explored how Hong Kong ESL learners talk and think together using a micro-blogging tool, Padlet. Twenty-five students from a HK secondary school were recruited to post their individual views on news articles before engaging in open-floor discussions about their opinions. They were then asked to write a short self-evaluation on their discussion process and evaluate their talk. The Scheme for Educational Dialogue Analysis was adopted for coding written contributions while thematic coding was adopted for oral transcriptions for analysis. Results showed that the online talk had short turn-taking and was dominated by reasoning and questioning. However, this type of online talk exposed students to a wider range of views and future learning opportunities. It also promoted the depth and breadth of their thinking and triggered internalisation of co-constructed ideas for individual production with a heightened sense of self-evaluative awareness. Based on these salient findings, the significance of learning via online talk is identified. It is also recommended that self-evaluation should be integrated in the learning process to facilitate students' interthinking.

Keywords: Asynchronous Online Discussion, Interthinking, Mixed Methods, ESL

iafor

The International Academic Forum
www.iafor.org

Introduction

The need for online teaching and learning since the pandemic has provided greater affordances for technology and distance learning. One such form of distance learning within language instruction involves asynchronous online discussions (e.g. Wang & Woo, 2007). The study herein, as part of a larger study on students' online talk and thinking, presents preliminary results on how English as a Second Language (ESL) learners talk and interthink in asynchronous online discussions in a Hong Kong (HK) secondary school classroom.

Literature Review

Classroom talk has been well-established in the field of education. In the past decades, studies have looked into the effects of classroom talk on content instruction (e.g. Mercer, Dawes, & Staarman, 2009) and the process of learning (e.g. Edwards-Groves, Anstey, & Bull, 2014), specifically how learners think and co-construct knowledge (Atwood, Turnbull, & Carpendale, 2010). Existing literature has attempted to characterise and categorise the types of classroom talks that contribute to learning according to talk features (Mercer, 2010). One such categorisation is offered by Littleton and Mercer (2013), who contended that classroom talk included cumulative, disputational, and exploratory talk, with exploratory talk offering the greatest potential in learning as it allows interlocutors to build ideas upon each other in a constructive manner.

Drawing from the tenets of exploratory talk, scholars have also attempted to study the effectiveness of talk in relation to students' thinking, particularly the notion of interthinking (Knight & Littleton, 2015), which concerns the collective thinking process and idea engagement through talk between interlocutors (Pantaleo, 2007). For example, Mercer, Hennessy, and Warwick (2019) studied how learners were encouraged to use language to think together for better text comprehension with the use of the Kate's Choice software. The results indicated that students were able to offer reasons, critically engage, and evaluate alternatives in the discussion, which demonstrate features of exploratory talk. Yet, most existing studies have yet to focus on the student talk and thinking within asynchronous online discussions, nor have they explicated, in great detail, how interthinking is brought about through online discussions, as opposed to using technology to stimulate face-to-face discussions. The present study hence posits the following research question: How do HK ESL learners talk and interthink in asynchronous online discussions?

Participants

The study adopted purposive sampling in order to identify participants that had similar characteristics as other HK students. In total, twenty-five ESL learners from a HK secondary school participated in the study. The group of students, aged 13 to 14, were of mixed gender. All students belonged to the same Year 8 English class. Therefore, they had similar levels of English proficiency, which facilitated data comparison.

Methodology

At the start of the study, participants were asked to share their individual views on news articles via a micro-blogging tool, Padlet. They would then read others' posts and participate in open floor discussions, which took the form of asynchronous online discussions. They then wrote a piece of self-evaluation on this experience.

With regards to data analysis, on the one hand, the Scheme for Educational Dialogue Analysis framework proposed by Hennessy et al. (2016) was adopted to analyse the online discussions by learners. On the other hand, thematic coding was used to analyse the self-evaluations of participants.

Results

The results revealed the enormous potential of asynchronous online discussions in promoting learner development and thinking. To start with, the breadth and depth of students' thinking was promoted through exploratory talk. Participants stated that the mutual questioning during online discussions helped them broaden and widen their ideas and scope of thinking. They also highlighted that questioning helped to deepen their understanding of the news articles and relevant social issues. Moreover, the act of giving reasons and understanding reasoning during online discussions helped students develop their depth of thinking. These are achieved since more thinking time was allowed for students to formulate their responses during asynchronous online discussions, which helped to enrich their thinking.

Another significant finding was that the process of self-evaluation promoted the internalisation of interthinking. Since students had to read each other's views before formulating their own opinions, their contributions indicated that they had developed a higher awareness of different perspectives through this process. By engaging in the discussion process, they were co-constructing knowledge by making their reasons and thoughts transparent for speculation and exploration. Asking learners to reflect on this interthinking process through self-evaluations helped them to internalise the ideas that they generated together. Participants also reported that they were also more aware of the need to reflect on their own thinking and ideas.

In summary, the results highlighted that asynchronous online discussions enabled ESL learners to make their reasoning and questioning explicit and promoted the depth and breadth of their thinking. By exposing them to a wider range of views, they could also better internalise their co-constructed ideas through the process of self-evaluation.

Conclusion

The preliminary results presented in this study indicates that asynchronous online discussions have capacity to promote students' thinking and trigger the internalisation of co-constructed ideas. Further research can be directed at fleshing out the nuances of this type of online talk and differentiate it from other types of classroom talk. It should also study, in greater detail, the process in which self-evaluation is brought about during the interthinking and internalisation process.

References

- Atwood, S., Turnbull, W., & Carpendale, J. I. (2010). The construction of knowledge in classroom talk. *Journal of the Learning Sciences*, 19(3), 358-402. doi:10.1080/10508406.2010.481013
- Edwards-Groves, C., Anstey, M., & Bull, G. (2014). *Classroom talk: Understanding dialogue, pedagogy and practice*: PETAA Newtown.
- Hennessy, S., Rojas-Drummond, S., Higham, R., Márquez, A. M., Maine, F., Ríos, R. M., Barrera, M. J. (2016). Developing a coding scheme for analysing classroom dialogue across educational contexts. *Learning, culture and social interaction*, 9, 16-44. doi:10.1016/j.lcsi.2015.12.001
- Knight, S., & Littleton, K. (2015). Thinking, interthinking, and technological tools. *The Routledge international handbook of research on teaching thinking*, 467-478.
- Littleton, K., & Mercer, N. (2013). *Interthinking: Putting talk to work*: Routledge.
- Mercer, N. (2010). The analysis of classroom talk: Methods and methodologies. *British journal of educational psychology*, 80(1), 1-14. doi:10.1348/000709909X479853
- Mercer, N., Dawes, L., & Staarman, J. K. (2009). Dialogic teaching in the primary science classroom. *Language and education*, 23(4), 353-369. doi:10.1080/09500780902954273
- Mercer, N., Hennessy, S., & Warwick, P. (2019). Dialogue, thinking together and digital technology in the classroom: Some educational implications of a continuing line of inquiry. *International Journal of Educational Research*, 97, 187-199.
- Pantaleo, S. (2007). Interthinking: Young children using language to think collectively during interactive read-alouds. *Early Childhood Education Journal*, 34, 439-447. doi:10.1007/s10643-007-0154-y
- Wang, Q., & Woo, H. L. (2007). Comparing asynchronous online discussions and face-to-face discussions in a classroom setting. *British journal of educational technology*, 38(2), 272-286. doi:10.1111/j.1467-8535.2006.00621.x

Contact email: stc44@cam.ac.uk

Impact of Teacher Beliefs on Planning ESL Reading Lessons

Vivaldi Chung, University of Cambridge, United Kingdom

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The challenges brought about by the pandemic have reaffirmed that individuals' beliefs are integral to humans, as they help orient and interpret our social and personal experiences. Similarly, teacher beliefs towards education are shown to be an ever more important factor in shaping frontline practitioners' teaching practices. In the Chinese classroom, however, teacher beliefs and their knowledge are often downplayed because of the prevailing classroom practices influenced by the enduring Confucian Heritage Culture. Despite the substantial number of studies on the correlation between teacher beliefs and their classroom practices, there are limited studies which investigate the interplay between practitioners' beliefs and lesson planning, a crucial stage that informs and guides the actual classroom practices. This study set out to investigate Hong Kong teachers' beliefs and their interplay with instructional planning for ESL reading lessons. Adopting a multiple case study approach, four in-service teachers with varying years of experience were invited to partake in the study. Data collected from the teachers' self-designed lesson plans, teaching materials, self-reflections, and semi-structured interviews were inductively coded and analysed. The findings revealed that both teachers' epistemological and pedagogical beliefs had significant impacts on instructional planning in terms of structuring and designing lesson activities. However, these elements were subject to the influence of contextual and external factors. Results suggested that there is an urge to further develop teachers' awareness towards their own belief systems through professional development.

Keywords: Teacher Belief, Lesson Planning, Reading Instruction, Case Study, ESL

iafor

The International Academic Forum
www.iafor.org

Introduction

The study of teacher beliefs has become more prolific in recent years. Researchers have begun to focus more on the belief systems of language teachers and their relationships with classroom practices, with burgeoning studies directing their attention towards the beliefs of language teachers in English as a Second language (ESL) contexts (e.g. Turnbull, 2018). The study herein, as part of a larger study on ESL teacher beliefs and Pedagogical Content Knowledge (PCK), reports preliminary results as to the impacts of teacher beliefs in planning reading lessons in Hong Kong (HK) ESL classrooms.

Literature Review

Nested in the field of teacher cognition, teacher beliefs have long been the subject of investigation in promoting the understanding of teacher development and decision making in classroom settings (Fang, 1996). However, given its complex nature, it has proven difficult for theorists to offer a comprehensive definition. While some argue that beliefs form a general system of “what [teachers] do in the classroom with students and materials” (Eisenhart, Shrum, Harding, & Cuthbert, 1988, p. 59), others propose that it should be segregated into various domains, including but not limited to the subject matter, pedagogy, curriculum, and teaching and learning (Muliyah & Aminatun, 2020; Rubie-Davies, Flint, & McDonald, 2012). Some researchers divide teacher beliefs into epistemological and pedagogical beliefs (Chung, 2018). Regardless of the theoretical grounding one takes, studies have shown that teacher beliefs are closely related to their classroom practices (Burns, 1992).

Within the field of ESL teaching, studies on teacher beliefs focused mainly on its relationship with English language instruction. For instance, Rahman, Singh, and Pandian (2018) explored the relationship between teachers’ espoused beliefs and their teaching practices in Communicative Language Teaching (CLT) classrooms. They described the convergences and divergences between belief and practice, specifically in relation to the communicativeness of classroom activities, arguing that external factors, such as lesson time and class size, often had an impact on the actualisation of ESL teaching. Scant attention, however, has been placed on the lesson planning process that led to these instructional practices. Thus, the proposed study aims to address this gap by proposing the following two research questions: (1) What are the beliefs of HK ESL teachers about planning reading lessons? and (2) How do teacher beliefs impact the planning of secondary ESL reading lessons?

Participants

Four ESL teachers (two males and females respectively) teaching at the KS3 level (ages 12 – 15) were solicited via purposive sampling to take part in the current study. Participants had a range of different educational backgrounds and years of professional experiences. Their students were also of diverse abilities and were from different schools across the city.

Methodology

This study adopted a multiple case study approach, in which each individual teacher forms a unit of investigation. The results from each case (each individual teacher) are analysed first before compared across different cases.

In the study, participants were asked to design a reading lesson and instructional materials that they find suitable for their students. Afterwards, they were asked to write a self-reflection on the design process. These documents were then collected and analysed briefly. A stimulated recall interview was then conducted to tease out teacher beliefs that were highlighted through the planning and reflective process. At the final stage, the self-reflections and interview transcripts were coded inductively, and the final codes were aggregated through axial and selective coding (Yin, 2018).

Results

Beliefs espoused by teachers included a range of different epistemological and pedagogical beliefs. First and foremost, participants were shown to hold epistemological beliefs about lesson planning and reading instruction. They believed that lesson planning ensures the quality of instruction and helps promote student learning and engagement. However, they also believe that the process of planning should be flexible. With regard to reading instruction, participants believed that reading is an innate ability possessed by students, and hence the instructional process concerns the development of reading skills and promoting literacy.

Furthermore, pedagogical beliefs of teachers were also highlighted. Not only were teachers found to possess beliefs about the objectives of reading instruction, but also the specifics in the planning of reading lessons. In terms of the goals of reading instruction, participants believed that they hope to help students apply reading strategies and language features to understand a range of different reading texts. Through the teaching process, they believed that students' awareness towards social issues could also be developed. Given the pervasiveness of exam-oriented culture in the HK education system, participants also noted that one of the main goals of teaching reading is to prepare students for summative assessments.

In terms of the pedagogical beliefs in planning a reading lesson, six categories of beliefs were identified. Teachers believed that they factored in the use of teaching materials and students' learning when they planned a reading lesson. They would also consider the interactivity of the lesson at hand, the time that they have and may use, as well as the resources that they possess, including various technological tools. They also believed that the washback effect of assessment had a substantial impact on how they would construct individual reading lessons.

Conclusion

Preliminary results of the study have pointed to the complex and eclectic epistemological and pedagogical beliefs that teachers embody when they plan ESL lessons. Future work may focus more on the interrelationships and possible interactions between different types of beliefs within ESL teachers, and their effects on lesson planning and subsequently, classroom practices.

References

- Burns, A. (1992). Teacher beliefs and their influence on classroom practice. *Prospect*, 7(3), 56-66.
- Chung, E. (2018). Revisiting second language vocabulary teaching: Insights from Hong Kong in-service teachers. *The Asia-Pacific Education Researcher*, 27(6), 499-508. doi:10.1007/s40299-018-0412-3
- Eisenhart, M. A., Shrum, J. L., Harding, J. R., & Cuthbert, A. M. (1988). Teacher beliefs: Definitions, findings, and directions. *Educational policy*, 2(1), 51-70. doi:10.1177/0895904888002001004
- Fang, Z. (1996). A review of research on teacher beliefs and practices. *Educational research*, 38(1), 47-65. doi:10.1080/0013188960380104
- Muliyah, P., & Aminatun, D. (2020). Teaching English for Specific Purposes in Vocational High School: Teachers' Beliefs and Practices. *Journal of English Teaching*, 6(2), 122-133. doi:10.33541/jet.v6i2.1756
- Rahman, M. M., Singh, M. K. M., & Pandian, A. (2018). Exploring ESL Teacher Beliefs and Classroom Practices of CLT: A Case Study. *International Journal of Instruction*, 11(1), 295-310. doi:10.12973/iji.2018.11121a
- Rubie-Davies, C. M., Flint, A., & McDonald, L. G. (2012). Teacher beliefs, teacher characteristics, and school contextual factors: What are the relationships? *British journal of educational psychology*, 82(2), 270-288. doi:10.1111/j.2044-8279.2011.02025.x
- Turnbull, B. (2018). Examining pre-service ESL teacher beliefs: Perspectives on first language use in the second language classroom. *Journal of Second Language Teaching & Research*, 6(1), 50-76.
- Yin, R. K. (2018). *Case study research and applications* (6 ed.): Sage.

Contact email: lhc38@cam.ac.uk

How to Implement Innovative Education in Senior High Schools?: From an Entrepreneurial Leadership Perspective

Wei-Cheng Chien, National Academy for Educational Research, Taiwan

The Paris Conference Education 2023
Official Conference Proceedings

Abstract

In the rapidly changing global environment, innovative education in senior high schools serves as an important connecting link in the process of cultivating talents, and the leadership of principals is also the core of school reform. Therefore, the purpose of this study is to explore how to develop innovative education in senior high schools through the entrepreneurial leadership of principals. Based on this, this research starts from the concept of entrepreneurial leadership and innovative education, and constructs the indicators of entrepreneurial leadership of senior high school principals. It uses research methods such as expert interviews, expert focus group discussions, and Fuzzy Delphi. The study obtains the following conclusions: 1. The entrepreneurial leadership of senior high school principals can be divided into five dimensions (general entrepreneurial leader behavior, explorer behavior, miner behavior, accelerator behavior, integrator behavior) and 49 indicators; 2. General entrepreneurial leader behavior (GELB) is the most important dimension of the entrepreneurial leadership of senior high school principals.

Keywords: Entrepreneurial Leadership, Innovative Education, Senior High School

iafor

The International Academic Forum
www.iafor.org

Introduction

Principal leadership plays an important role in the development of innovative education in the internal and external environment (Eyal & Kark, 2004; Eyal & Inbar, 2003; Park, 2012). What exactly can the principals do, and make that be the key to the development of innovative education? Especially in today's environment of increasing uncertainty, principals need to have entrepreneurial leadership skills, as well as the knowledge and ability to execute innovation education. The research on the relationship between principals' entrepreneurial leadership and school innovation education is still relatively rare (Park, 2012). However, a few studies have pointed to a significantly high correlation between principals' entrepreneurial leadership and innovation education (Pihie, Asimiran, & Bagheri, 2014; Pihie & Bagheri, 2013). Based on this, facing the rapid international changes, innovative education has become the key to a country's development of international competitiveness. Senior high school innovation education is an important link in cultivating innovative talents, and the leadership of principals is also the core of school reform. Therefore, this research aims to establish the indicators of principals' entrepreneurial leadership, so as to become a guide for leaders to develop innovative education of senior high school.

Entrepreneurial Leadership Model

Pihie et al. (2014) used the entrepreneurial leadership questionnaire (ELQ) of Thornberry (2006) to explore the structure of entrepreneurial leadership. It divides leaders into two categories, namely *activist* and *catalyst*; the leaders is also divided into two different types, *internal* and *external*; the leader role is further divided into four dimensions: *explorer*, *miner*, *accelerator*, and *integrator*; and the combination of these dimensions is called *general behavior*. Among the entrepreneurial leadership models, the Thornberry (2006) model explains leadership behaviors at the individual and organizational levels. The activism role involves the leader's personal behavior, while the catalyst role involves the leader's organizational behavior. Activist leaders play an active role as key entrepreneurs, taking the first step to seek opportunities for advancement without waiting for others. Conversely, catalyst leaders cannot directly drive the reformation, they need to create a supportive environment that stimulates innovation, new ways of doing things, and innovative action among followers. According to the Thornberry's model, miners and explorers are classified as activists, while accelerators and integrators act as catalysts.

Although the entrepreneurial leadership models of Gupta et al. (2004) are more commonly used, most of their research are not about the educational organizations. In the field of education, although researches based on the Thornberry (2006) models are still very rare, the models have been preliminarily verified for their applicability in the educational environment (Pihie et al., 2014; Yusof, 2009). In addition, the dimensions covered by the Gupta et al. (2004) models include the entrepreneurial leader's ability to respond to challenges, absorb uncertainty, and advocate, enable members to recognize opportunities to create sustainable competitive advantage for the organization, emphasize motivating members and mobilize resources to inspire members to achieve organizational vision goals; and in order to improve organizational work performance and competitive advantage, entrepreneurial leaders also need to seek and identify new opportunities, and take action to take advantage of these opportunities (Chen, 2007; Gupta et al., 2004; Huang, Ding, & Chen, 2014; Kyndt & Baert, 2015; Thornberry, 2006). In fact, most of these views are covered in Thornberry's (2006) models. It can be seen that Thornberry's model is more suitable for school education research. Therefore, this study will take this as a basis to develop the indicators system of

entrepreneurial leadership of senior high school principals. The actions that can be divided into five role levels are defined as follows:

1. General entrepreneurial leader behavior (GELB): The principal exhibits entrepreneurial behavior and establishes a favorable atmosphere for the school to support innovative behavior, so that the innovative thinking, behavior and achievement of faculty members become part of their daily work.
2. Explorer behavior (EXPB): It means that leaders discover and seize new opportunities to improve organizational creativity and performance. In a school, it represents the principal's willingness to work hard to explore new ideas and opportunities to improve the school, working closely with networks inside and outside the school to build on the school's own strengths and overcome its weaknesses.
3. Miner behavior (MINB): It refers to the behavior of leaders when they adopt innovative methods to solve problems, which expand the organization's competitive advantage by adopting innovative methods to members, systems and processes. In the school environment, MINB means that the principal will not limit himself and wait for the opportunity, but will make changes through a series of internal administrative actions to make the school more competitive and efficient.
4. Accelerator behavior (ACCB): Leaders take good use of skills and focus on encouraging their followers to embrace innovative behaviors and ideas, thereby developing an innovative environment for members. In a school setting, principals motivate staff to develop innovative ideas and actions, demonstrate creativity and innovation in the implementation of educational tasks, and provide a supportive environment for them to experiment with innovative approaches.
5. Integrator behavior (INTB): Leaders apply their innovative spirit and thinking to the entire organization by effectively organizing overall actions to promote organizational goals. In a school, the principal is responsible for obtaining resources and funds from outside the school to establish a system with innovative education support, conveying the vision and mission of innovative education to all teaching staff, and integrating, communicating and coordinating resources to realize the school's vision of innovative education.

Method

This study uses the Thornberry (2006) Entrepreneurial Leadership Model to construct the indicators of the entrepreneurial leadership of senior high school principals. In order to develop an questionnaire tool with high reliability and validity, the "expert interviews" will be adopted, and 5 principals who have been recognized for their leadership, as well as 5 scholars in the field of related research on principals' leadership will be selected. A total of 10 experts from Taiwan will join. After the first draft is established, the above 10 experts are invited to conduct "expert focus group discussions" to collect their opinions on the connotation and dimensions of the principal's entrepreneurial leadership. After holding 2 expert symposiums, the first draft of the questionnaire of the Fuzzy Delphi survey of principals' entrepreneurial leadership indicators is developed. Finally, Fuzzy Delphi analysis is adopted, and triangular fuzzy numbers are used to measure and integrate expert opinions, in order to construct an index system for the entrepreneurial leadership of senior high school principals, and the Fuzzy Delphi expert group is also composed of the above 10 experts.

Results

After synthesizing relevant theories and literature, and the opinions of "expert interviews" and "expert focus group discussions," the index topics for the entrepreneurial leadership of senior high school principals are established as shown in Table 1. Then, according to the results of the experts' questionnaire and applying the Fuzzy Delphi operation steps of Ishikawa et al. (1993), Microsoft Excel is used to obtain the geometric mean of the most conservative cognition score (Ci) and the most optimistic cognition score (Oi), Min and Max values, as well as the test value $Mi-Zi$ which is calculated from the difference between Oi and Ci (Mi) and the gray zone value (Zi), and the expert consensus value (Gi), as shown in Table 2.

Table 1: Dimensions and indicators of entrepreneurial leadership of senior high school principals

Dimension	No.	Indicator
General entrepreneurial leader behavior (GELB)	1-1	The principal breaks through the limitations of the school system in a timely manner and completes innovative educational goals and tasks.
	1-2	The principal has the demonstration ability and action force of innovative education.
	1-3	The principal pays attention to the improvement of school effectiveness and sets challenging strategic goals for the development of school affairs.
	1-4	The principal creates an atmosphere of entrepreneurial innovation in the school.
	1-5	When the original innovation approach doesn't work, the principal can instantly overcome obstacles with different approaches.
	1-6	The principal presents entrepreneurial spirit in the development of school affairs.
	1-7	The principal actively avoids the consumption of innovation energy caused by the bureaucratic system.
	1-8	When the school is carrying out innovative reforms, the principal is willing to listen to the suggestions of other different voices.
	1-9	Principals develop innovative characteristics according to new education trends.
Explorer behavior (EXPB)	2-1	The principal properly analyzes school affairs information and studies new strategies for the future development.
	2-2	The principal takes the initiative to check the school's weaknesses and find out countermeasures to overcome them.
	2-3	The principal listens to the complaints or suggestions of the stakeholders and adopts improvement strategies actively.
	2-4	The principal actively devises the innovative ways to develop the school.
	2-5	The principal motivates the staff to come up with innovative ways to develop the school's characteristics to enhance the school's competitiveness.
	2-6	The principal explains to the competent authority about the school's idea of promoting innovative education, and strives for the approval and support of the competent authority.

	2-7	The principal clearly communicates to staff the strengths, weaknesses, opportunities, threats (SWOT) of the school, and the strategies to respond.
	2-8	The principal actively identifies, develops and pursues new opportunities for school development.
	2-9	The principal leads the teaching staff to actively apply for government or private experimental or innovative plans to develop new school characteristics.
	2-10	The principal grasps the essence of the new curriculum, and systematically develops a distinctive school-based curriculum.
Miner behavior (MINB)	3-1	The principal communicates with the competent authorities firmly and professionally, so that the competent authorities can better assist the school to run the school affairs smoothly.
	3-2	The principal looks for innovative ways to manage, operate or rearrange school hardware & software equipment, and resources.
	3-3	The principal ensures that all school stakeholders are considered when staffs are doing changes to the school.
	3-4	On faculty work affairs, the principal can come up with innovative ways, and get twice result with half the effort.
	3-5	The principal analyzes workflows, resources and procedures to understand how to enable staff to do their jobs better and faster.
	3-6	The principal expects staff to identify and balance issues of competition and cooperation across schools.
	3-7	The principal supports staff in making changes to improve the school's outdated operating mechanism.
Accelerator behavior (ACCB)	4-1	The principal encourages staff to be entrepreneurial and innovative.
	4-2	The principal encourages staff to challenge the status quo and strive for change.
	4-3	The principal listens to and supports staff suggestions to improve the school.
	4-4	The principal encourages and supports staff doing innovative reform at work.
	4-5	The principal inspires staff to develop professional communities, learn new skills, and provide support.
	4-6	When the new school development goals fail to achieve the expected results, the principal will quickly find the crux of the problem and solve it.
	4-7	The principal inspires staff to think about how to carry out teaching, classroom management, administration, school activities, etc. in innovative and effective ways.
	4-8	The principal encourages staff to work hard to share their innovative ideas to inspire colleagues.
	4-9	The principal allocates resources and schedules properly to help staff find out the way to improve school effectiveness.
	4-10	The principal plays the leader role of curriculum, actively encourages teachers to conduct new curriculum experiments, and promote teachers to develop multiple elective courses.
	4-11	The principal creates an environment where teachers can independently experiment with innovative teaching.

Integrator behavior (INTB)	5-1	The principal shapes the school's constantly changing vision for the future, driving staff committed to school innovation.
	5-2	The principal identifies, encourages and protects innovators who may think and behave differently from most faculty members.
	5-3	Principal-led school administration is fast and flexible, allowing staff to respond quickly as new development opportunities arise.
	5-4	The principal has good public relations and can introduce resources inside and outside the school in a timely manner to meet the needs of the school during innovation.
	5-5	The principal integrates internal and external resources and establishes a support system that encourages continuous improvement and innovation.
	5-6	The principal can respond quickly to remove obstacles as promoting school reform,.
	5-7	The principal encourages open communication and ideas sharing across divisions.
	5-8	The principal enables the school to understand and practice new educational trends and approaches to enhance students learning and achievement.
	5-9	The principal leads the administrative team to integrate the many reform proposals put forward inside and outside the school, and formulates implementation strategies and steps.
	5-10	The principal pushes schools to focus on developing core strategies, and makes staff support new educational initiatives more.
	5-11	The principal strives for additional funding to fund and support the implementation of innovative ideas within the school.
	5-12	The principal can vertically integrate and utilize the resources of junior high schools and colleges to achieve the common goal of prosperity with the community.

Table 2: Weight value and ranking of the dimensions and indicators

Dimension	Weight Value	Ranking	Indicator	Gi	Weight Value	Ranking
General entrepreneurial leader behavior (GELB)	0.204	1	1-1	7.47	0.0203	28
			1-2	7.93	0.0216	4
			1-3	7.80	0.0212	6
			1-4	7.44	0.0203	31
			1-5	7.42	0.0202	33
			1-6	7.41	0.0202	35
			1-7	7.17	0.0195	45
			1-8	7.93	0.0216	3
			1-9	8.03	0.0219	2
Explorer behavior (EXPB)	0.200	3	2-1	7.38	0.0201	38
			2-2	7.47	0.0203	29
			2-3	7.40	0.0202	36
			2-4	7.35	0.0200	41
			2-5	7.59	0.0207	13
			2-6	7.21	0.0196	44
			2-7	7.46	0.0203	30

			2-8	7.65	0.0208	9
			2-9	7.53	0.0205	22
			2-10	7.38	0.0201	38
Miner behavior (MINB)	0.196	5	3-1	7.01	0.0191	48
			3-2	7.04	0.0192	47
			3-3	7.59	0.0207	14
			3-4	7.16	0.0195	46
			3-5	7.71	0.0210	7
			3-6	6.88	0.0187	49
			3-7	8.09	0.0220	1
Accelerator behavior (ACCB)	0.198	4	4-1	7.23	0.0197	43
			4-2	7.64	0.0208	10
			4-3	7.37	0.0200	40
			4-4	7.56	0.0206	18
			4-5	7.64	0.0208	11
			4-6	7.51	0.0204	24
			4-7	7.65	0.0208	8
			4-8	7.49	0.0204	26
			4-9	7.24	0.0197	42
			4-10	7.42	0.0202	34
			4-11	7.53	0.0205	21
Integrator behavior (INTB)	0.201	2	5-1	7.59	0.0207	14
			5-2	7.43	0.0202	32
			5-3	7.52	0.0205	23
			5-4	7.49	0.0204	25
			5-5	7.57	0.0206	17
			5-6	7.55	0.0205	19
			5-7	7.91	0.0215	5
			5-8	7.62	0.0207	12
			5-9	7.54	0.0205	20
			5-10	7.39	0.0201	37
			5-11	7.59	0.0207	14
			5-12	7.47	0.0203	27

Among them, in the part of the gray zone test value Z_i , the Z_i in this study is greater than 0, indicating that the gray zone exists. If $M_i > Z_i$, indicating that the opinions of experts tend to be consistent and the indicators have reached convergence. If $M_i < Z_i$, it means that the opinions of experts are too divergent, and the index has not reached convergence. In this study, for the convenience of calculation, M_i is subtracted from Z_i , and if the value is greater than 0, means the index has reached convergence, if its value is less than 0, means the index has not reached convergence, and it will be deleted. All the verification values of $M_i - Z_i$ are greater than 0, indicating that the expert opinions are concentrated and the convergence degree has been reached. In the part of the expert consensus value G_i , since the expert consensus value is an important factor in the selection of indicators, G_i is the intersection of the max value of C_i and the min value of O_i , when the higher G_i , the higher the degree of consensus, and the higher importance. Therefore, this study will use 6 as the threshold for deletion of indicators. Table 2 shows that the expert consensus value G_i of each indicator in this study is higher than the threshold value 6 set in this study, so they are all reserved.

The indicators of entrepreneurial leadership initially proposed in this study were finally determined as five dimensions and 49 evaluation indicators after a questionnaire survey by Fuzzy Delphi by experts, as shown in Table 1. Since the importance of each dimension and indicator is different, the expert consensus value G_i is converted into the hierarchy relative weight value, and the relative weight results of each hierarchy in this study are calculated, as shown in Table 2. From Table 2, it is shown that in the dimensions of entrepreneurial leadership in this study, the weight values of each dimension are in order of "GELB" (0.204), "INTB" (0.201), "EXPB" (0.200), "ACCB" (0.198), "MINB" (0.196). The relative weight value of "GELB" dimension is the highest. As for the indicators, the top three are "3-7" (0.0220), "1-9" (0.0219), "1-8" (0.0216), the importance of these three indicators is the highest among all.

Conclusion

This research divides the entrepreneurial leadership of senior high school principals into five dimensions: GELB, EXPB, MINB, ACCB, and INTB. The relative weight of the GELB dimension is the highest, and it can be seen that the importance is the highest. The spirit of GELB is to require principals to exert entrepreneurship and infect all members of the school, so that all members can seek opportunities to create value for the school without being limited by existing resources, and through innovation to meet the needs of the school's development goals, and promote the growth of the school. This is also the core of the implementation of innovative education in senior high schools. Therefore, through the joint implementation of entrepreneurship by the principal and school members, a solid foundation for innovative education in schools will be laid.

Acknowledgements

This work was supported by the National Science and Technology Council, Taiwan.

References

- Chen, M.-H. (2007). Entrepreneurial Leadership and New Ventures: Creativity in Entrepreneurial Teams. *Creativity and Innovation Management*, 16(3), 239-249.
- Eyal, O., & Kark, R. (2004). How do transformational leaders transform organizations? A study of the relationship between leadership and entrepreneurship. *Leadership and Policy in Schools*, 3(3), 211-235.
- Eyal, O., & Inbar, D. E. (2003). Developing a public school entrepreneurship inventory. *International Journal of Entrepreneurial Behavior & Research*, 9(6), 221-244.
- Gupta, V., MacMillan, I. C., & Surie, G. (2004). Entrepreneurial leadership: Developing and measuring a cross-cultural construct. *Journal of Business Venturing*, 19(2), 241-260.
- Huang, S., Ding, D., & Chen, Z. (2014). Entrepreneurial Leadership and Performance in Chinese New Ventures: A Moderated Mediation Model of Exploratory Innovation, Exploitative Innovation and Environmental Dynamism. *Creativity and Innovation Management*, 23(4), 453-471.
- Ishikawa, A., Amagasa, M., Shiga, T., Tomizawa, G., Tatsuta, R., & Mieno, H. (1993). The max-min Delphi method and fuzzy Delphi method via fuzzy integration. *Fuzzy Sets and Systems*, 55(3), 241-253.
- Kyndt, E., & Baert, H. (2015). Entrepreneurial competencies: Assessment and predictive value for entrepreneurship. *Journal of Vocational Behavior*, 90, 13-25.
- Park, J. H. (2012). The effects of principal's leadership style on support for innovation: evidence from Korean vocational high school change. *Asia Pacific Education Review*, 13(1), 89-102.
- Pihie, Z. A. L., Asimiran, S., & Bagheri, A. (2014). Entrepreneurial leadership practices and school innovativeness. *South African Journal of Education*, 34(1), 1-11.
- Pihie, Z. A. L., & Bagheri, A. (2013). The impact of principals' entrepreneurial leadership behaviour on school organizational innovativeness. *Life Science Journal*, 10(2), 1033-1041.
- Thornberry, N. (2006). *Lead like an Entrepreneur*. Blacklick, OH: McGraw-Hill.
- Yusof, M. (2009). Entrepreneurial leadership and academic entrepreneurship in Malaysian public research universities. *Asia Pacific Journal of Innovation and Entrepreneurship*, 3(3), 63-84.

Learner Experiences in an Activity-Based Online Course From a TPACK Perspective

Rajabalee Yousra Banoor, Mauritius Institute of Education, Mauritius
Ramsaha Shailendra, Mauritius Institute of Education, Mauritius

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

In this study, we applied the TPACK framework to design and develop an online course on 'Digital Storytelling in Education' using the activity-based learning approach. The course was designed with different learning activities developed around the TPACK knowledge domains, to develop the techno-pedagogical skills of educators. It was offered over 4 consecutive academic years (2020-2023) with a cumulative total of 164 learners. In this study, the aim is to examine and understand learners' experiences in terms of their perceptions, reflections, and challenges in the "Digital Storytelling in Education" module. Data related to the learners' experiences were collected from their reflective portfolio which is a feedback activity assigned to them. Learners were encouraged to work out this activity in a personal journal online. From the feedback activity, important information such as learners' opinions about the effectiveness of the course, their expectations, and perceptions were collected. The data was used to study the learners' perceptions of their learning experiences and skills acquired in terms of their TPACK competencies. From the feedback gathered, learners in general appreciated the level and types of tutor support throughout the course, especially when they had to manipulate new software and develop new digital competencies through semi-structured learning activities. The classification of the learner feedback from the records shows that most of the learners reported gains in technological knowledge followed by content knowledge and then pedagogical (content) knowledge.

Keywords: Digital Storytelling, TPACK, Activity-Based Learning, Teacher Education

iafor

The International Academic Forum
www.iafor.org

Introduction

The integration of technology in education has become increasingly important in the digital age with its potential to enhance teaching and learning experiences (Kozlova & Pikhart, 2021; Özdemir, 2017). Digital learning, e-Learning, online learning, blended learning, and remote learning are all terms that are often used interchangeably to describe courses which has an online or blended mode of instruction, which can be delivered either in synchronous or asynchronous ways (Kumar Basak, Wotto & Belanger, 2018). Such courses have gained in popularity given their ability to offer flexibility, accessibility, and interactive learning opportunities to geographically dispersed learners. Digital learning has the potential to support educators in improving their pedagogical methods and can also benefit students in their learning journey, providing a platform for effective communication (Dagada & Chigona, 2013). However, for meaningful learning experiences to occur, it is important to dedicate careful attention to the design and development of online courses. There are factors such as learning design principles, technological tools, and content knowledge that need to be considered to promote active learning through student engagement and interaction as well as to support the different needs of the learners (Gameil & Al-Abdullatif, 2023; Lieser, Taf & Murphy-Hagan, 2018). The Technological Pedagogical Content Knowledge (TPACK) framework provides a comprehensive approach to designing and developing technology-enhanced learning experiences (Mishra & Koehler, 2006).

In this study, we applied the TPACK framework to design and develop an online course on ‘Digital Storytelling in Education’ using the activity-based learning approach. Given the importance to prepare educators to develop their digital competencies to integrate ICTs in their teaching, the course ‘Digital Storytelling in Education’ was implemented within the B. Ed. Primary Programme. The course aimed to contribute to the development of the so-called 21st-century skills expected from educators in a technology-enabled learning context. The focus is on the development of diverse skill sets such as digital literacies, language learning, visual conceptualization, and global literacy (Robin, 2016).

The course was designed with different learning activities developed around the TPACK knowledge domains, to develop the techno-pedagogical skills of educators. It was offered over 4 consecutive academic years (2020-2023) with a cumulative total of 164 learners. In this study, the aim is to examine and understand learners’ experiences in terms of their perceptions, reflections, and challenges in the “Digital Storytelling in Education” module, which was developed using the TPACK framework. This study adopts a design-based research approach and is mainly qualitative. It explores learner experiences through feedback to gain insights into the effectiveness of the online course design.

Literature Review

The TPACK framework is being widely used by researchers and educators, given the global accelerated development and adoption of digital technologies (Bingimlas, 2018). The core learning design principle behind TPACK is the balance between the integration of technology with pedagogical and content knowledge (Koehler, Mishra & Cain, 2013; Koehler & Mishra, 2005). Consequently, as the TPACK framework acknowledges the importance of education technology integration for effective teaching and learning, it is also important to understand the three core components it encompasses and their various facets of knowledge (Su, 2023; Mishra, 2019). These components are:

- **Technological Knowledge (TK):** Refers to the teacher's knowledge about different technologies and digital tools and the ability to use them effectively to enhance students' learning experiences.
- **Pedagogical Knowledge (PK):** Describes the teacher's knowledge about the methods and practices of teaching. It also includes an understanding of instructional strategies, processes, and techniques for effective teaching and learning experiences.
- **Content Knowledge (CK):** Refers to the teacher's knowledge of the subject matter to be taught, including an understanding of the concepts, theories, and principles.

These three components interplay and interact with each other to form the TPACK framework that establishes a basis for teaching using educational technology. They are fundamental components for teachers, to effectively integrate technology in their teaching practices within a balanced understanding of technology, pedagogy, and content for enhanced teaching and learning experiences. The TPACK framework also forms two additional intersections namely the Technological Content Knowledge (TCK) and the Technological Pedagogical Knowledge (TPK). TCK is basically knowledge of how to apply technology to a specific content area to improve student experiences and learning outcomes in that specific content area. According to Mishra and Koehler (2006), teachers need to know “not just the subject matter they teach, but also the manner in which the subject matter can be changed by the application of technology”. On the other hand, TPK refers to the “knowledge of the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, and conversely, knowing how teaching might change as the result of using technologies” (Mishra & Koehler, 2006).

The effectiveness of the TPACK framework is established through its coherent inter-relationship with the domains of content, pedagogy, and technology-related knowledge and results from its integration in technology-enabled educational contexts (Angeli, Valanides & Christodoulou, 2016). There are also several studies that highlighted how TPACK has been successfully implemented in teaching (Rienties et al. 2013; Lee & Kim, 2014; Wang, Gu & Liu, 2020; Lachner et al. 2021). Su (2023) argued that teachers should employ the TPACK framework in their practices. She explained that TPACK is an inclusive framework that allows teachers to use it as an effective tool to integrate technology into teaching and equip students with the necessary digital literacy skills. The application of TPACK was also found to be helpful and effective, promoting positive outcomes in language learning courses and platforms (Tseng et al. 2020).

The effectiveness of TPACK in teacher education has also been a subject of interest by educational researchers. Ortega-Sánchez and Gómez-Trigueros (2020) used the TPACK framework to design a teacher training course in Geography and History. Their study reports that the approach was generally effective in developing the techno-pedagogical skills of the trainee teachers in addition to their core content knowledge in the subject area. Hofer and Grandgenett (2012) sought to study the development of technological pedagogical content knowledge (TPACK) of trainee teachers over an 11-month period for an MA in Education course. Their study revealed significant development of the participants' technological pedagogical knowledge (TPK) and technological pedagogical content knowledge (TPACK), but only limited growth in technological content knowledge (TCK). As part of their research findings on TPACK knowledge of pre-service educators, Santos and Castro (2021) reported that TPACK applications were primarily influenced by TPK and TCK with TPK exerting a higher influence on the applications of TPACK by pre-service teachers. In other words, their confidence level in terms of knowledge and appreciation of how technology can improve their

outcomes, will more likely result in their adoption of TPACK. However, applying TPACK in teacher training may not necessarily result in better technological knowledge depending on the subject's nature and the learning design approaches used by course designers. This is evident in the research of Valtonen et al. (2019) where they observed a gain mainly in PCK for the pre-service teachers in a biology course using the TPACK framework. They argue that to support the development of pre-service teachers' more balanced TPACK, it is important to make the role of technology a more explicit target for learning within the context of biology and inquiry learning.

One of the approaches to address this issue is through technology-enabled activity-based learning designs. Santally and Senteni (2004) defined the occurrence of authentic learning in online modules as a three-phased process consisting of knowledge acquisition, knowledge application, and knowledge construction through reflective practices. Cooper (1998) examined active learning vs. passive lecture-based instruction in chemistry courses. The results showed improvements in student grades, completion rates, attitudes towards chemistry, and conceptual mastery. Santally (2013) further outlined a set of good practices for the application of activity-based learning designs in teacher education to address the new set of competencies needed from educators in the 21st century. Schneider (2003) postulated that activity-based learning allowed the creation of learning environments that provide a “clear focus” (learning activity support, management, and scenario orchestration) but also necessary “fuzzy edges” (community support). Ozgur (2021) applied the concept of activity-based learning to improve the TPACK competencies for 16 in-service teachers. Findings obtained in the study revealed that teachers' scores on the TPACK-deep scale increased significantly compared to the pre-study.

An Overview of the “Digital Storytelling in Education” Course

The ‘Digital Storytelling in Education’ course is generally offered as an elective option in the B. Ed. Primary Programme at the Mauritius Institute of Education. The course was offered online, and it was assessed fully by coursework. The course was structured into five main themes that were covered over one semester of 15 weeks. Basically, the duration of each theme was determined based on the depth of the topic and the anticipated level of effort that learners needed to dedicate to learning, collaborating, and practicing. For each theme, there was an overview and the learning objectives that were provided, to give learners a comprehensive understanding of the topic that would be covered, including the learning outcomes they will achieve at the end. Each theme has a learning resources section, which contains all the pedagogical resources relevant to that specific theme. The resources were in the form of online presentations, weblinks, pdf documents, and even educational videos. Each theme has also a learning activity section, which consisted of coursework to be completed for that specific theme. Finally, each theme has also a support forum section, where learners seeking clarifications can post their queries, pertaining to that specific theme. The coursework given across all the themes are different learning activities, in the form of participation in discussion forums, reflection exercises, creation of storyboard and digital story, and journal activity. For one semester, the learners studied digital storytelling as an innovative tool in the classroom and developing digital stories. The course was hosted on Moodle and the schema below gives an indication of how the course was structured on the e-Learning platform:

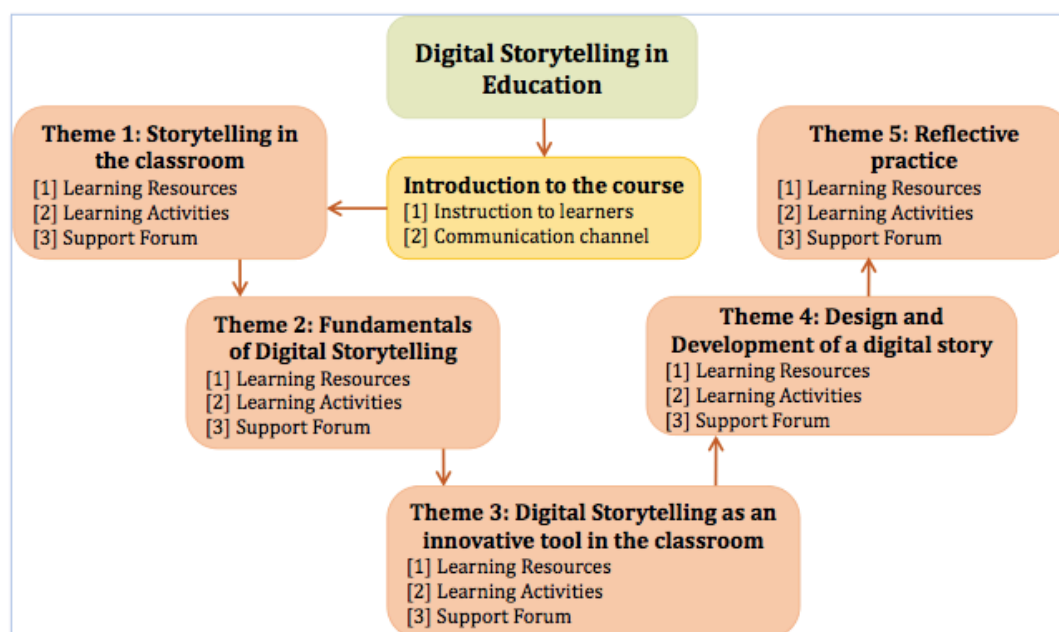


Figure 1: The course structure on the Moodle platform, using an activity-based approach.

Research Context

Research Design

The main purpose of this study is to explore the learner experiences in an activity-based online course on “Digital Storytelling in Education” which was developed using the TPACK framework. The research seeks to capture their learning experiences in terms of their perceptions, reflections, and challenges encountered during their learning journey. This study adopts an exploratory design-based research approach. It explores learner experiences from a descriptive approach through feedback to gain insights into the effectiveness of the online course design. The main research question for this study is related to the learners’ perceptions of their overall learning journey in the online course “Digital Storytelling in Education” from the TPACK perspective.

Participants

The participants for this study are learners enrolled in the B.Ed. Primary Programme at the Mauritius Institute of Education and who chose the ‘Digital Storytelling in Education’ course as their preferred elective. The profile of learners for this study are primary school educators, who seek to extend their knowledge and skills in the teaching and learning of specific domains. They aspire to pursue their expertise in specialized areas of interest. A total number of 164 learners participated in the course which was offered from 2020-2023.

Data Collection

Data related to the learners’ experiences were collected from their reflective portfolio which is a feedback activity assigned to them. Learners were encouraged to work out this activity in a personal journal online. From the feedback activity, important information such as learners’ opinions about the effectiveness of the course, their expectations, and perceptions were collected. The data was used to study the learners’ perceptions of their learning experiences and skills acquired in terms of their TPACK competencies.

Data Analysis

Each feedback from the theme 5 activity was assessed to look for elements related to each of the categories of the TPACK framework. The number of occurrences of each category was noted. This process was carried out using expert evaluation by the course developers. Learner perceptions and general experience with the course were also analyzed mainly using a descriptive approach from the perspectives of (i) tutor support, (ii) workload, (iii) feel-good factor, and (iv) overall achievement. We could process only 137 out of the 164 student feedback statements based on their relevance to the TPACK skills development.

Ethical Considerations

As part of the learning activity, the learners were also informed beforehand that their feedback will be shared solely with their lecturer and treated in confidentiality. In this paper, we have ensured the anonymity and confidentiality of the data, before the data analysis process.

TPACK Framework Integration in Course Design

As the course was designed using the TPACK framework within an activity-based learning approach, we integrated the TPACK components (technological knowledge, pedagogical knowledge, and content knowledge) into the learning resources, activities, and assessments. Basically, there are three approaches – one can focus initially on the content or technological knowledge to start with, or with the pedagogical knowledge depending on the preference of the learning designer, or the learning outcomes. In our case – we focused on content and pedagogical content knowledge first as storytelling is a learning design method. This was the main approach in theme 1. Below is a brief description of how each theme was structured:

Table 1: Description of course themes and learning activities.

Theme	Description	TPACK Components
# 1: Storytelling in Education	The learning resources provided in this theme, give learners an understanding of how storytelling can be applied in different educational contexts, including the classroom. The theme also focused on developing learners' pedagogical knowledge to understand the effectiveness of storytelling as a teaching method. The learning activity in this theme is based on a presentation that learners are required to prepare, based on a story they want to introduce in the classroom. Such activity will help them to prepare a story in a pedagogical way, that highlights a relevant context, a rationale, and the intended learning outcomes.	PK – CK – PCK
# 2: Fundamentals of digital storytelling	The learning resources in this theme, are carefully designed and chosen to guide learners on the content. It also provides learners with improved possibilities to maximize the pedagogical benefits of storytelling as an educational method while improving other skillset that form part of the 21 st -century education models. The learning activity in	TK – TCK – TPACK

	this theme is three-fold, and it helped learners to populate a glossary of terms related to digital storytelling, carry out a reflective exercise on the usefulness of digital storytelling in teaching and learning and develop a podcast to address an audience with appropriate tone and language.	
# 3: Digital Storytelling as an innovative tool in the classroom	The learning resources in this theme, elaborate on how storytelling can be used to achieve intended learning outcomes using innovative tools. This approach contributes to technological improvements such as using authoring tools, video editing, and animation software. This allows the learner to focus on his or her creative thinking and abilities to develop engaging, interactive, and impactful stories. As such, the learner can master the content while developing the necessary technical skills to design pedagogical stories. The learning activity in this theme aims to allow learners to critically reflect on the use of digital storytelling as an innovative tool in the classroom.	TPK – PCK - TPCK
# 4: <i>Design and Development of a digital story</i>	The learning resources in this theme, engage learners in the process of designing and developing a digital story that can be integrated as part of a teaching practice session, using an appropriate tool. Guided tutorials were prepared to support and empower the learners with step-by-step instructions on the use of the different tools. The learning activity in this theme, allows learners to develop a storyboard and implement a digital story using a specific tool. As part of the assignment, they also developed a lesson plan to explain how they will integrate their digital story into a specific teaching session.	TK- TPK - TPCK
# 5: Reflective Practice	This theme is based on a feedback activity, that was designed to allow learners to relate about their learning journey, the valuable insights they have gained, as well as the challenges they encountered especially in terms of integration of technology, pedagogy, and content. In this reflective activity, the learners' perception of the pedagogical use of storytelling in the classroom for teaching and learning and its impacts on students' engagement and learning experience was gathered.	TPCK

Findings and Discussion

Overall Learning Experiences

From the feedback gathered, learners in general appreciated the level and types of tutor support throughout the course, especially when they had to manipulate new software and develop new digital competencies through semi-structured learning activities. Tutor support as reported by the learners related to the timely response to their queries, feedback on their submitted works, and online/face-to-face sessions as and when needed to clarify their issues. This aspect helped to boost their confidence levels, especially for those learners whose digital literacies were limited.

At the beginning, I did not choose Digital Story Telling as I was somewhat afraid of the word 'digital'...

...The different assignments were rewarding and have given me opportunities to develop several skills e.g., using different applications to do a podcast, to write a script, using PowerPoint presentations, or creating a digital story...

...I am not used to advancing digital tools, but I managed to overcome all these through 'trial and error' and with the help of the lecturer in charge of my group, who was ready to give quality support.

Learner A1 (Cohort 2020)

In terms of workload and learner effort, although there were some apprehensions from those who had limited digital competencies, they managed to complete the learning activities requiring the use of software tools in the time frame provided to them. This achievement in turn resulted in an overall feel-good factor and confidence for them to integrate such practices in their classrooms.

Prior to the start of this module, I thought that creating and using Digital stories in my classroom would require advanced technical knowledge... I can confidently state that I can create any Digital story... The online classes and our lecturer's guidance also helped me become a confident Digital Story creator.

Learner A2 (Cohort 2022)

The digital storytelling module was something that I was not so well versed in and was even a bit afraid of whether I would be able to complete all the necessary tasks given... The module brought me more than I expected, and I am glad to say that now I am more confident in the use and production of my own digital stories... Difficulties were overcome with the different tutorials given on how to do the digital story. These tutorials helped a lot in helping how to make the montage.

Learner A3 (Cohort 2022)

In general, learners expressed high satisfaction levels from the module, with some students suggesting that a few hands-on practical sessions could have accelerated the acquisition of practical skills as they spent quite some time searching for further help from tutors, peers, and

online resources to address their technical issues or blockages. However, they ultimately report to have managed to solve the issues which in turn improved their technological competencies.

Though self-instructional, my learning journey for this module has been very enriching. Notes and links provided on the Moodle platform and the guidance of the tutor were of great help. Support of peers is also crucial to overcome difficulties while using any software. We built on the experience of each other and finally, each one becomes savvier.

Learner A4 (Cohort 2023)

While practical sessions to teach learners how to use software step-by-step would have accelerated the process of knowledge transfer in terms of knowing what to do and how to do it, it would not have promoted the use of creativity by educators and the originality of their digital story designs. Such sessions tend to create a stereotyped process that everyone would follow to achieve the same output. As highlighted by Santally (2013) and Schneider (2003), the aspect of having “fuzzy edges” in activity-based learning helps to develop learners’ creativity and originality in the artifacts that they produce to result in an authentic and unique learning experience.

With Respect to TPACK Knowledge

The classification of the learner feedback from the records shows that most of the learners reported gains in technological knowledge followed by content knowledge and then pedagogical (content) knowledge. In the digital storytelling course, we considered pedagogical knowledge to include pedagogical content knowledge as well, in alignment with the course design approach. It is notable that technological content knowledge and technological pedagogical knowledge were the least developed skills as reported.

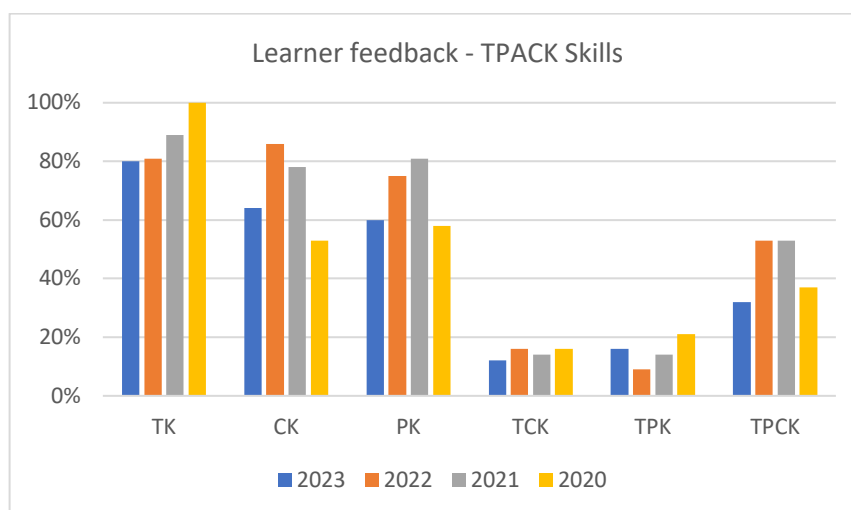


Figure 2: Skills and Competencies developed in the TPACK categories.

Overall, for all the cohorts merged, 47% of the processed feedback reported the development of TPACK skills. A similar trend was observed across the different cohorts.

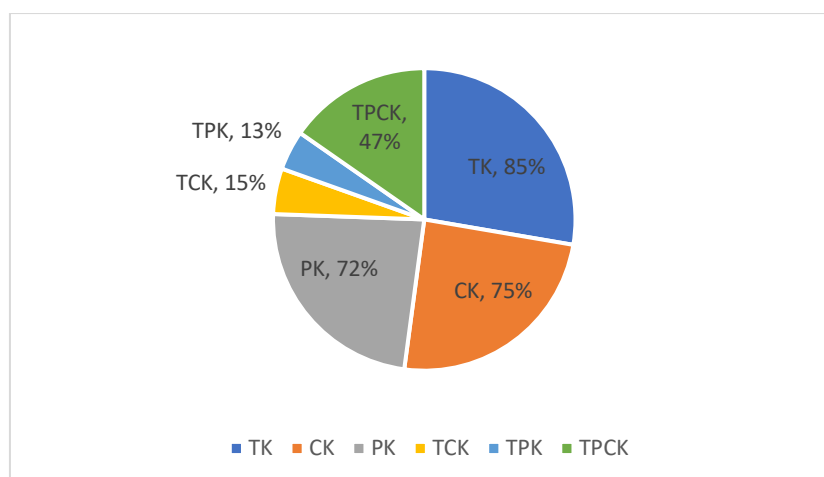


Figure 3: Overall reported TPACK skills development for all cohorts combined.

This consistency reveals that the type of skills and competencies that were acquired is most probably linked to the learning design approach of the course. Furthermore, we can observe that although the students acquired (as reported by them) technological knowledge (85%), content knowledge (75%), and pedagogical (content) knowledge (72%), it does not necessarily relate to the same level, in terms of knowledge gains, to the overall TPACK skills (47%). The relatively low reported gains in TPK (13%) and TCK (15%) may have an implication on the overall TPACK skills development. This finding and reasoning is in line with Santos and Castro (2021) reported that TPACK applications were primarily influenced by TPK and TCK with TPK exerting a higher influence on the applications of TPACK by pre-service teachers. Therefore, in line with Valtonen et al. (2019), our course design approach may need a rethink to focus on TCK and TPK if the overarching goal was to improve the TPACK skills of learners more significantly.

On the other hand, our findings differ significantly from Hofer and Grandgenett (2012) whose study revealed that participants developed significant TPK and TPCK while limited development in TCK. In our case, we noted similar but limited growth in both TCK and TPK which ultimately limited the growth of TPCK as compared to the individual growth in TK, CK, and PK. The difference may be explained due to the nature of the subject matter. Our course mainly focused on digital technology using the activity-based approach, while Hofer and Grangenett (2012) studied participants in different courses that formed part of a full-fledged master's in education course.

Conclusion

From this research findings, and drawing from the literature, we deduce that the development of educators' TPACK skills requires careful learning design for the conception of appropriate learning activities. TPACK skills may not be fully developed in one course only, but it may take a set of courses that are interlinked within the teacher training context where each course promotes the development of skills within one or more TPACK categories. The learning gains for the overall TPACK skillsets may then be more significant.

References

- Angeli, C., Valanides, N., & Christodoulou, A. (2016). Theoretical Considerations of Technological Pedagogical Content Knowledge. *Handbook of technological pedagogical content knowledge (TPACK) for educators*, 21-42. <https://doi.org/10.4324/9781315771328>
- Bingimlas, K. (2018). Investigating the level of teachers' knowledge in technology, pedagogy, and content (TPACK) in Saudi Arabia. *S. Afr. J. Educ.* 38, 1–12. doi:10.15700/saje.v38n3a1496
- Cooper, M. (1998). Experimenting on how students learn from lectures. *Journal of Chemical Education*. 75(11). 1459-1463.
- Dagada, R., & Chigona, A. (2013). Integration of e-learning into curriculum delivery at the university level in South Africa. *International Journal of Online Pedagogy and Course Design (IJOPCD)*, 3(1), 53-65.
- Gameil, A. A., & Al-Abdullatif, A. M. (2023). Using Digital Learning Platforms to Enhance the Instructional Design Competencies and Learning Engagement of Preservice Teachers. *Education Sciences*, 13(4), 334. <https://doi.org/10.3390/educsci13040334>
- Hofer, M. & Grandgenett, N. (2012). TPACK Development in Teacher Education: A Longitudinal Study of Preservice Teachers in a Secondary M.A.Ed. Program. *Journal for Research of Technology in Education*. Available from: <https://files.eric.ed.gov/fulltext/EJ991840.pdf>
- Koehler, M. J., & Mishra, P. (2005). What happens when teachers design educational technology? The development of technological pedagogical content knowledge. *Journal of Educational Computing Research*, 32(2), 131–152. doi:10.2190/0EW7-01WB-BKHL-QDYV
- Koehler, M. J., Mishra, P., & Cain, W. (2013). What is technological pedagogical content knowledge (TPACK)? *Journal of Education*, 193(3), 13-19.
- Kozlova, D., & Pikhart, M. (2021). The use of ICT in higher education from the perspective of the university students. *Procedia Computer Science*, 192, 2309-2317.
- Kumar-Basak, S., Wotto, M., & Belanger, P. (2018). E-learning, M-learning and D-learning: Conceptual definition and comparative analysis. *E-learning and Digital Media*, 15(4), 191-216.
- Lachner, A., Fabian, A., Franke, U., Preiß, J., Jacob, L., Führer, C., et al. (2021). Fostering pre-service teachers' technological pedagogical content knowledge (TPACK): A quasi-experimental field study. *Comput. Educ.* 174, 1–14. doi:10.1016/j.compedu.2021.104304

- Lee, C. J., and Kim, C. (2014). An implementation study of a TPACK-based instructional design model in a technology integration course. *Educ. Technol. Res. Dev.* 62, 437–460. doi: 10.1007/s11423-014-9335-8
- Lieser, P., Taf, S. D., & Murphy-Hagan, A. (2018). The Webinar Integration Tool: A Framework for Promoting Active Learning in Blended Environments. *Journal of Interactive Media in Education*, 2018(1).
- Mishra, P. (2019). Considering contextual knowledge: The TPACK diagram gets an upgrade. *Journal of Digital Learning in Teacher Education*, 35(2), 76-78. <https://doi.org/10.1080/>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: framework for teacher knowledge. *Teachers' college record*, 108(6), 1017-1054.
- Ortega-Sánchez, D., and Gómez-Trigueros, I. M. (2020). MOOCs and NOOCs in the training of future geography and history teachers: A comparative cross-sectional study based on the TPACK model. *IEEE Access.* 8, 4035–4042. doi:10.1109/ACCESS.2019.2963314
- Özgür, H. (2021). Improving Teachers' Qualifications for Preparing ICT-Based Educational Materials. *Malaysian Online Journal of Education Technology*. <http://dx.doi.org/10.17220/mojet.2021.9.1.245>
- Özdemir, S. (2017). Teacher views on barriers to the integration of information and communication technologies (ICT) in Turkish teaching.
- Rienties, B., Brouwer, N., Bohle Carbonell, K., Townsend, D., Rozendal, A.-P., van der Loo, J., et al. (2013). Online training of TPACK skills of higher education scholars: A cross-institutional impact study. *Eur. J. Teach. Educ.* 36, 480–495. doi:10.1080/02619768.2013.801073
- Robin, B. R. (2016). The power of digital storytelling to support teaching and learning. *Digital Education Review*, (30), 17-29.
- Santos, J. & Castro, R. (2021). Technological Pedagogical content knowledge (TPACK) in action: Application of learning in the classroom by pre-service teachers (PST). *Social Sciences and Humanities Open*. Available from: <https://doi.org/10.1016/j.ssaho.2021.100110>
- Santally M, Senteni A (2004). A cognitive approach to evaluating web-based distance learning environments. *Instructional Technology and Distance Learning* 1(3): 45–53.
- Santally, Mohammad Issack. (2013). "Training of In-service Educators through Online Activity-based Learning." *The International Journal of Technologies in Learning* 19 (2): 1-19. doi:10.18848/2327-0144/CGP/v19i02/49077

- Schneider, D. (2003). Conception and implementation of rich pedagogical scenarios through collaborative portal sites: clear focus and fuzzy edges. Proceedings of the ICOOL 2003 Conference. Mauritius. Available from:
<https://tecfa.unige.ch/proj/seed/catalog/docs/icool03-schneider.pdf>
- Su, Y. (2023). Delving into EFL teachers' digital literacy and professional identity in the pandemic era: Technological Pedagogical Content Knowledge (TPACK) framework. *Heliyon*. <https://doi.org/10.1016/j.heliyon.2023.e16361>
- Tseng, J.-J., Chai, C. S., Tan, L., & Park, M. (2020). *A critical review of research on technological pedagogical and content knowledge (TPACK) in language teaching. Computer Assisted Language Learning, 1–24*. doi:10.1080/09588221.2020.1868531
- Valtonen, T., Sointu, E., Kukkonen, J., Mäkitalo, K., Hoang, H., Häkkinen, P., Järvelä, S., Näykki, P., Virtanen, A., Pöntinen, A., Kostiaainen, E., & Tondeur, J. (2019). Examining pre-service teachers' technological pedagogical content knowledge as evolving knowledge domains: A longitudinal approach. *Journal of Computer Assisted Learning, 35*(4), 491–502.
- Wang, Y. X., Gu, X. M., and Liu, S. F. (2020). The investigation and analysis of pre-service teachers toward TPACK competencies. *Open J. Soc. Sci.* 8, 327–339. doi:10.4236/jss.2020.812027

Contact emails: y.rajabalee@mie.ac.mu
s.ramsaha@mie.ac.mu

A Design Project Aimed to Promote Social Change: From the Classroom to the Community

Carla Cadete, Lusófona University, Portugal

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This study reports on pedagogical practice carried out in an academic context with undergraduate students from the 1st year of Communication Design at Lusófona University of Porto (ULP) in the first semester of 2021/22. A collaboration project with Pedro Hispano Hospital (PHH). Students were invited to design posters integrated into The Organization for Economic Cooperation and Development (OECD) – *Learning Compass 2030*, a framework that aims to help navigate towards future well-being – attitudes, values, skills and knowledge for 2030, Personal and Social development of children and adolescents. Twenty-four posters were displayed in strategic areas of the hospital, educating patients and their families about competencies to acquire based on core values such as respect, equality, equity, empathy, solidarity and resilience – a strategy from the hospital to engage and change community behaviours through a creative initiative. The creative process used the *Design Thinking methodology* (problem definition, project ideation, prototyping and implementation). The article has four parts: Introduction, literature review, work methodology and conclusion. An enjoyable and appealing way of communication that motivates patients to make sustainable life changes. This is an opportunity for students to blend a pedagogic activity with a collaborative stakeholder in a real-world project and play an essential role in generating creative ideas, interacting with the local community and promoting sustainable change. A concrete chance for students to learn, gain experience and aid the community.

Keywords: Co-design, Design Skills, Design Educators, Pedagogical Practice, The Role of Design, Design for Change, Social Design

iafor

The International Academic Forum
www.iafor.org

Introduction

At Lusófona University of Porto (ULP), we believe that design students must develop sensitivity to social problems. A way for students to work with real projects helping those most in need, and allows them, among other things, to find good use of their skills in praxis. A collaboration project was developed with Pedro Hispano Hospital (PHH). Students were invited to design posters integrated into The Organization for Economic Cooperation and Development (OECD) – *Learning Compass 2030*, a framework that aims to help navigate towards future well-being – attitudes, values, skills and knowledge for 2030, Personal and Social development of children and adolescents (OECD, 2018). Twenty-four posters were displayed in strategic areas of the hospital, educating patients and their families about competencies to acquire based on core values such as respect, equality, equity, empathy, solidarity and resilience – a strategy from the hospital to engage and change community behaviours through a creative initiative.

Design Skills for the Common Good and the Importance of Collaborative Project

During a conference held at OCAD in Toronto, Margolin (2014, p.3) introduced the idea of a "citizen-designer." This term describes designers who fulfil various roles, each with its own political and social implications. He named these roles "Action Matrix" and divided them into three levels. The first level is an individual action, which includes topics like art schools and universities. The second level serves as a mediator between individuals. The third level is made up of the government, international organizations, and big corporations. Design scholars must motivate design students to develop projects not only for profit but also to help those most in need. They must prepare young students and future designers to face contemporary challenges, using their skills as an alternative way to promote social change. Clune (2010, p.75) states that design for behavioural change has an important role to play in bringing a sustainable society and has indicated "(...) a process for encouraging design students to engage in design for behavioural change. The outcome of this process is an altered understanding of the vocational roles designers could adopt as agents of large-scale behavioural change."

Design scholars must have intervention methods in social issues through collaborative projects to prove to their students the role of design in promoting positive change. These projects also offer a solid opportunity to prepare graduates for the real working world and encourage engagement through innovative practice; as argued (Tromp, et al, 2021), hands-on, inspiring and exciting to use design skills for the common good. We need to inspire the new generation of designers to have an empathetic mentality and not only work for profit but also for a better world.

Work Methodology

In the Autumn term of 2021/22, students from the 1st year of Communication Design Bachelor in the module of Introduction Design were invited to design a set of posters integrated into The Organization for *Economic Cooperation and Development* (OECD) – *Learning Compass 2030*, a framework that aims to help navigate towards future well-being – attitudes, values, skills and knowledge for 2030 — Personal and Social development of children and adolescents. Twenty-four posters were displayed in strategic areas of the hospital, informing patients and their families about competencies to be learned with core values such as respect, equality, equity, empathy, solidarity and resilience.

Client: *Pedro Hispano Hospital*, Matosinhos, north of Portugal.

Briefing: Students were invited by the Hospital to design a set of six posters integrated into The Organization for *Economic Cooperation and Development* (OECD) – *Learning Compass 2030*, a framework that aims to help navigate towards future well-being – attitudes, values, skills and knowledge for 2030. A guide to defining competencies needed today for children and adolescents' future Personal and Social development. Twenty-four posters were displayed in strategic areas of the hospital, informing patients and their families about competencies to be learned with core values such as respect, equality, equity, empathy, solidarity and resilience.

(2 classes a week/3, hours each). The creative process was done through the *Design Thinking methodology* in the following order: *problem definition, ideation, prototype and implementation (problem-solution)* [Lupton & Philipps, 2011].

Stage 1. *Problem definition*: Participants (n=17) from the first year of Communication Design undergraduate were divided into small work groups of two or three. Each group must carry out a set of four posters on the following themes from each topics Autonomy, Solidarity, Diversity and Democracy, based on a table shared by the Hospital (Figure 1).

Poster dimension, A2 format (410X594 mm), preference for vertical orientation; unlimited colour according to Johannes Itten contrasts (Itten, 1970); analogue, digital or blended technique; and hierarchies through the basic elements including the type size, typeface choice, and things like weight, colour, capitalisation, and style, that make a visually appealing and easy to read. Also, highlights the most important content, guiding the reader to pay attention through a visual focus that attracts the reader's initial attention to the most important element.

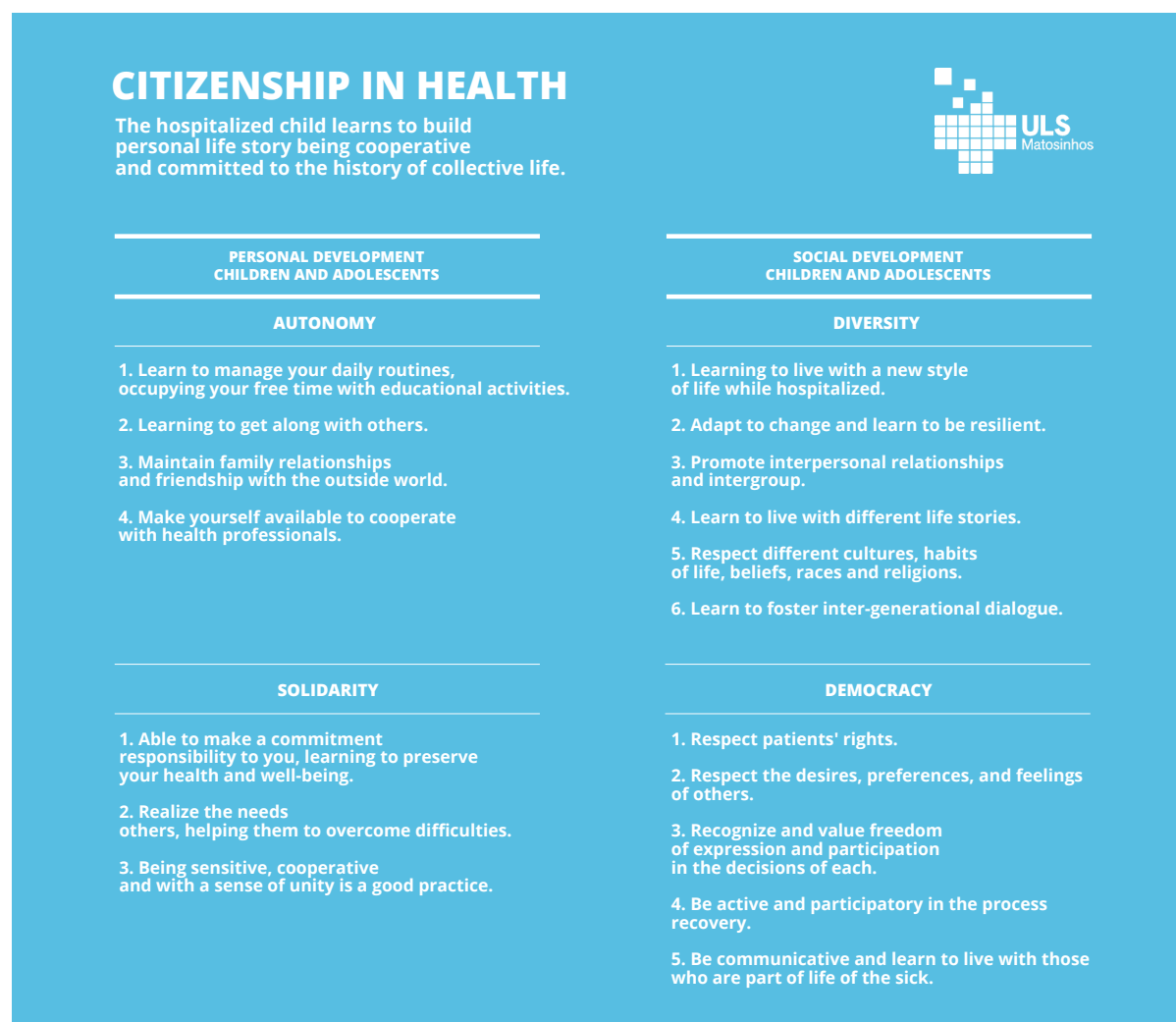


Figure 1 – Citizenship in Health, Empathy, Creativity, and Main errors of thought, based on the table shared by the Hospital.

Stage 2. *Ideation and Prototype*: ideas were generated with tools such as words, images, colours and shapes through brainstorming, keywords, action verbs, brain dumping, a mind map and a mood board. During the creative process, meeting groups facilitate dialogue and share ideas rather than issuing instructions. Creating a collaborative class is a way to learn through engaging students, sharing insights, and gathering feedback from the group. A collaborative process where everyone involved benefits from a positive discussion where solutions are found and sometimes lost ideas are rescued (Figure 2 and 3).

MINDMAP



Figure 2 – Joel Maia student mind map.

PESQUISA VISUAL

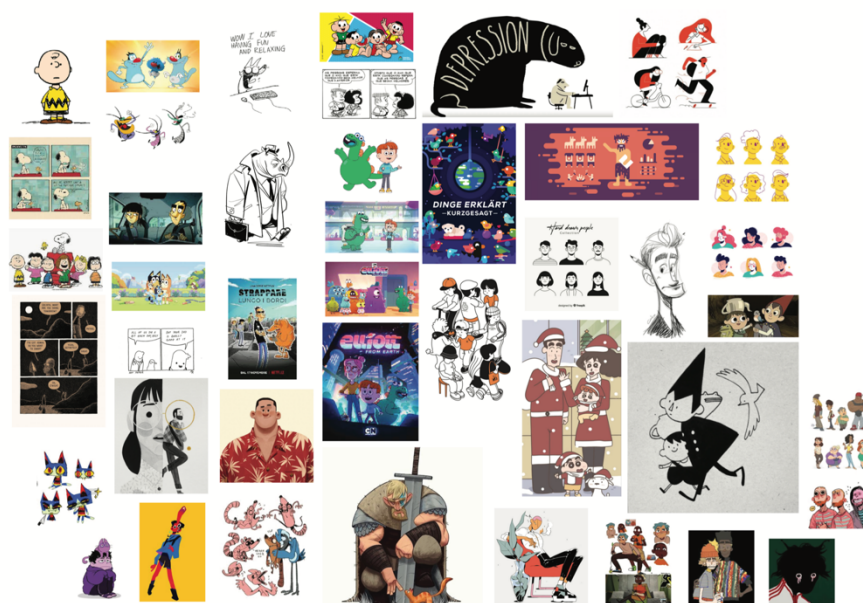


Figure 3 – Joel Maia student mood board.

Stage 3. *Prototype*: Testing ideas through an exploratory process. Different materials and techniques were tested to find the best proposals. In this term, students presented the advantages and disadvantages of each possible solution in a convergent approach after testing their ideas. From each critique, students were expected to analyse and consider all feedback to make progress on their projects (Figure 4).

BRAINDUMPING



Figure 4 – Joel Maia student visual brain dumping.

Stage 4. *Implementation (problem-solution)*: Student groups prepared a 10-minute presentation of their project. The final solution was developed, finished, and presented to the whole group with the creative process, and all the steps were justified accordingly. The final assessment considered creativity, relevance, impact, hierarchy and legibility.

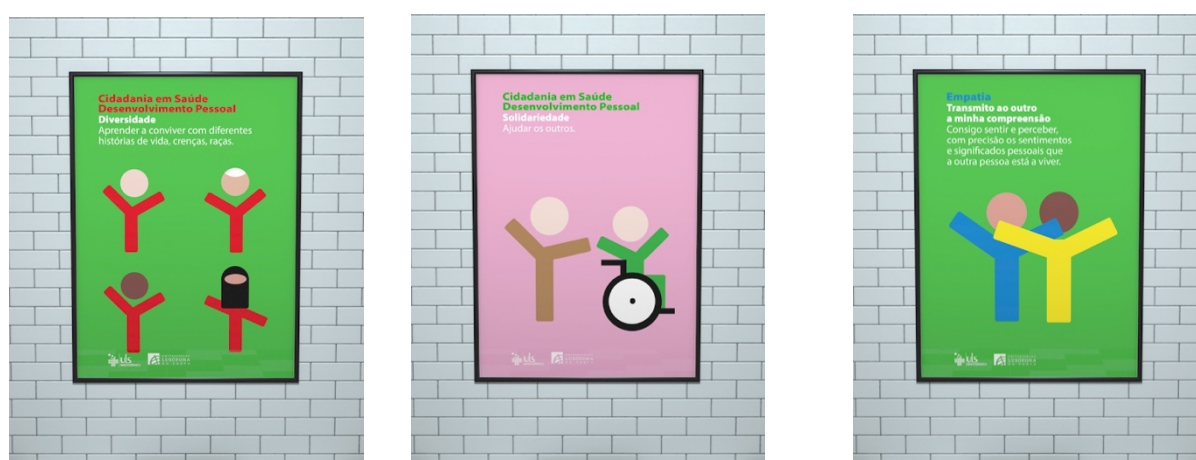
Figures 5 to 19 show examples of the student's final work.



Figures 5, 6 and 7 – Joel Maia student.



Figures 8, 9 and 10 – Student Carolina Freitas and Sarah Chaves.



Figures 11, 12 and 13 – Student Klára Svobodová and Sofia Neves.



Figures 14, 15 and 16 – Student Gustavo Silva, Danilo Luvuno and José Soares.



Figures 17, 18 and 19 – Student Gustavo Silva, Danilo Luvuno and José Soares.

Conclusion – Final Considerations

The Communication Design course at Lusófona University of Porto is designed to encourage the development of competencies in several areas, such as design methodology, critical and creative thinking, co-creation, multidisciplinary teams, and innovative ideas. We believe that test ideas, processes and techniques challenge the traditional way of teaching.

This pedagogical practice proved to be an opportunity for design students to have an immersive design project that focuses on a specific social situation and the possibility of applying the tools and methods learned in the curriculum course for a better world. Students must believe that design should play a role in social issues and not work just for profit. Also, it was an opportunity to prepare students by engaging through innovative practices for real problems and preparing them for the challenges they will face and will positively impact society. This academic project also proved that going beyond traditional university practices could be an opportunity to develop core skills for the workplace. A partnership between the university and Pedro Hispano Hospital that proved to be valuable: The Hospital benefited from a multitude of solutions, free of charge; students from the advantage of seeing their posters displayed in a public place; for patients and their families, the possibility of being informed creatively about attitudes, values, skills and knowledge.

Acknowledgements

This study was funded by the Foundation for Science and Technology – FCT (Portuguese Ministry of Science, Technology and Higher Education), under the grant UIDB/05380/2020.

References

- Clune, S. (2010). "Design for Behavioural Change." *Journal of Design Strategies* 4(1 Spring): 68-75. www.newschool.edu/WorkArea/DownloadAsset.aspx?id=52655
- Itten, J. (1970). *The Elements of Color*. A Treatise on the Color System of Johannes Itten Based on his Book *The Art of Color*. New York: Van Nostrand Reinhold Company.
- Lupton, Ellen; Philipps, J. (2011). *Graphic design thinking: Beyond brainstorming*. New York: Princeton Architectural Press.
- Margolin, V. (2014). *Design e Risco de Mudança*. Vila do Conde: Verso da História.
- OECD (2018). *The future of education and skills: Education 2030. The Future we want*. Retrieved from [https://www.oecd.org/education/2030/E2030%20Position%20Paper%20\(05.04.2018\).pdf](https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf)
- Tromp, N., & Hekkert, P. (2021). *Designing for Society*. London: Bloomsbury Publishing.

Biomedical Engineering as STEM Education in Georgia and New Challenges for Internationalisation of This Process

Irine Gotsiridze, Georgian Technical University, Georgia
Giorgi Gigilashvili, Georgian Technical University, Georgia

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This paper presents some aspects of developing STEM education in Georgia, and internationalization of this process by preparing Biomedical Engineering Program for ABET accreditation. Methodology for using Project courses for assessing a number of ABET outcomes. In the advent of EC 2000, Engineering programs have grappled with methods for assessing some of the ABET outcomes, especially those skills which are not taught in the traditional engineering programs. Team and Capstone Design courses taken by IV year in the Georgian Technical of Engineering over a two-semester period. Each course is team-taught by professors in Biomedical Engineering Departments consisting of Biomedical engineering Program Student teams. The capstone design courses are used to assess ABET 1-7 outcomes. Students' abilities in these outcomes are quantitatively measured using outcome specific project related lectures and assignments given throughout the semesters. The methodology discussed in the paper has made it possible to identify problems encountered by students in these outcome skills, thereby, facilitating adjustment in course content and delivery, and formulation of plans to assist students to improve on these skills. Education specifically related to scientific research, technology, engineering and mathematical disciplines (STEM) are the best measure for increasing Georgia's economic prosperity interests.

Keywords: STEM, Biomedical Engineering, Education, Assessment

iafor

The International Academic Forum
www.iafor.org

Introduction

European countries and period from 1995 to 2019, we found significant contribution by STEM educated workers to output growth. Contribution to output growth by tertiary educated employees and the outcome of the investment in research and development in the high-knowledge manufacturing and knowledge-intensive services were above all sectors' average. This is relevant as output and employment growth in these sectors surpass the same in other sectors, therefore contributing to higher income per persons and GDP growth. As STEM skills and investment in research and development have positive impact on GDP per person growth.

The fourth Industrial Revolution (the industry 4.0) is the currently fast-growing and rapid development of digital technologies in STEM fields.

At the tertiary education level, countries have focused attention on their population's preparedness for a rapidly changing, globally interconnected world requiring increased scientific literacy, and high-level STEM research skills. Accordingly, participation in tertiary education STEM disciplines has been closely monitored, as have efforts to increase graduates' transferable skills and to develop curricula responsive to industry needs. Science and technology advances have encouraged a reimagination of the future world of work, and the place of disciplinary knowledge in preparing for this. Participation in broadly defined STEM disciplines, including engineering, sciences, information technology, health, and agriculture, varies by country/territory and region, over time.

For the period 2011 to 2015, participation was highest in some Western European (Finland, Germany, Sweden, United Kingdom) and East Asian (South Korea, China) economies, as well as Singapore. Comparatively, the United States and Australia lagged behind (UNESCO Institute of Statistics [UNESCO], 2018; Ministry of Education of the People's Republic of China, 2015). Large numbers of tertiary education students enrolled in these STEM programs are located in the three largest higher education systems, that is, China, India and the United States (UNESCO, 2018; Ministry of Education of the People's Republic of China, 2015).

Over the period 2011 to 2015, participation remained relatively static in most countries across the STEM disciplines however, there were some exceptions. Enrolments in natural sciences, mathematics and statistics tertiary education programs increased in the United Kingdom, India, and France. At the same time, enrolments in information communication technologies increased in Brazil and Israel, and enrolments in agriculture, forestry, fisheries and veterinary increased in Brazil. Greater volatility was recorded in engineering, manufacturing and construction, where enrolments dropped marginally in Brazil and Finland, and considerably in India, while increasing in Norway (UNESCO, 2018).

MCC's (Millenium Corporation Challenges) Georgia II Compact (2013–2019), funded the STEM Higher Education Project, which aimed to improve science, technology, engineering, and mathematics (STEM) university education to give graduates better employment opportunities with higher incomes, leading to an increase in economic growth of Georgia. Three public Georgian universities and one university from the United States worked to give Georgian students an opportunity to earn a high-quality STEM bachelor's degree, improve the Georgian partners STEM-related infrastructure, and prepare the partners for international program accreditation. nicate, analyze and use the information to face the uncertainty of the future.

What is main motivation for STEM education? -related jobs are on the rise. Workers are required to exercise critical thinking and decision-making skills while being knowledgeable and competent in domains related to Science, Technology, Engineering, and Math (STEM). The exploring the Future of Innovative Learning Environments Workshop, hosted by the Georgian Technical University in November of 2018, allowed stakeholders to make informed decisions about the adoption and use of innovative learning environments (ILEs) in higher STEM education. Participants had the opportunity to consider four emerging technologies that could assist in this effort: personalized and adaptive learning, multimodal learning formats, and artificial intelligence and machine learning. The research team gathered shared ideas through online meetings and collaborative activities that reflect on the opportunities and challenges to expect while implementing ILEs in higher education STEM curricula. Since these immersive technologies are quickly evolving, it has been challenging for institutes to implement integrated STEM education programs that utilize them.

Qualifying Biomedical Engineering Program for ABET Accreditation

The ABET Foundation has a contract with MCA-Georgia to provide information relative to the readiness of selected STEM programs at public Georgian universities for a review by ABET for possible program accreditation. Among them was Biomedical Engineering Bachelor Programa which is implemented in Georgian Technical University.

Programs that are accredited by ABET (formerly the Accreditation Board for Engineering and Technology) have been thoroughly evaluated and found to meet agreed-upon quality standards for the engineering profession. The organization only offers specialized accreditation for engineering, computing, technology and applied science programs.

ABET requires that engineering programs have a continuous improvement process in place that leads to program improvement based on the assessment and evaluation of the level of attainment of student outcomes.

Despite significant reforms, important gaps remain. Georgia lacks sufficient science, technology, engineering, and mathematics (STEM) programs to sustain strategic STEM fields of study and research and to fulfill the demands of the labor market. The Soviet legacy of highly centralized control over the education system has prevented greater synchronization between the Georgian market demands and higher education offerings. In addition, when it comes to STEM education, significant gender gaps still exist: Female students represent only about one-third of all students enrolled in STEM-related fields of higher education. Finally, if the opportunity is available to them, many young Georgians prefer to be educated abroad, and those with the best skills also tend to seek employment abroad. To address these challenges, the Millennium Challenge Corporation (MCC) made a major investment aimed at facilitating high-quality inclusive university-level STEM education in Georgia. Through this investment, San Diego.

State University (SDSU) partnered with three Georgian public universities—Tbilisi State University (TSU), Georgian Technical University (GTU), and Ilia State University (ISU)—to offer SDSU's U.S. bachelor's degrees in a range of STEM disciplines to Georgian students. The primary goal of this effort, the Georgia II STEM. Observations in this introduction are drawn from the evaluation solicitation (MCC, 2018b), the monitoring and evaluation plan (MCC, 2018), and our interviews Higher Education Project is to develop a system to assure and enhance the long-term delivery of high-quality STEM bachelor's degrees in Georgia. The

Project has also aimed to increase capacity of the Georgian public universities to offer internationally accredited programs.

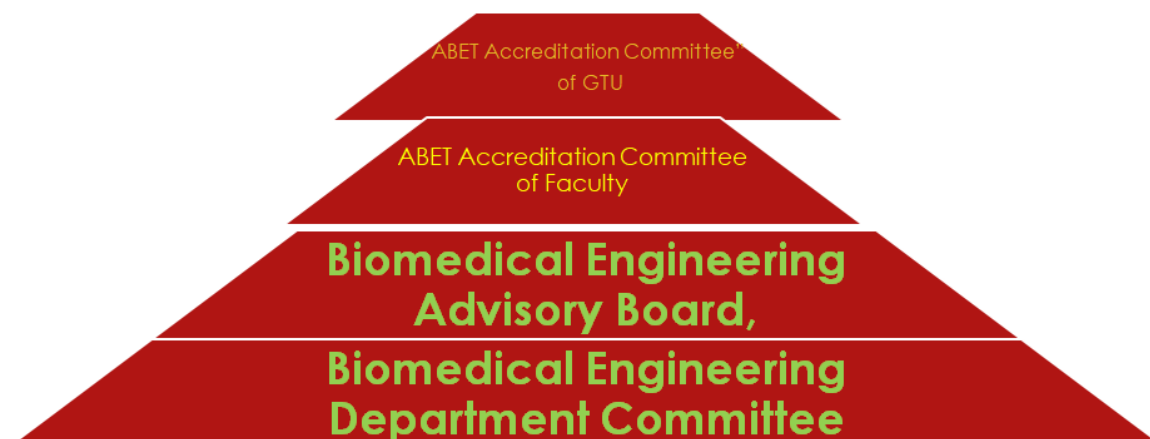


Figure 1: Units for preparing BME Program for ABET accreditation

Background Information and Student Admission

The development of such a process by the GTU BME program has provided to a faculty members as stated above will be required to develop such a process and to implement it.

At the Georgian Technical University (Georgian Polytechnic Institute) the Department of Biomedical Techniques was established in 1983. To stay in tune with the fast pace of innovative technologies in the field, the increased demands on medical technology specialists and the worldwide trends in the implementation of educational programs in this area, a new undergraduate educational Georgian Language Program -"Biomedical Engineering" was prepared in 2013, which received accreditation by the Georgian Educational Programs Accreditation Council.

A new English language program “Biomedical Engineering” was authorized in 2013 by National center for Educational Quality Enhancement of Georgia, and it has been implemented since 2014, with the first graduates from this program in 2021.

Currently the Biomedical Engineering programs are implemented in two independent programs: Georgian Language and English Language and submitted for potential ABET accreditation. The program is administered within the Department of Biomedical Engineering of the Georgian Technical University Faculty of Informatics and Control Systems.

Both programs, Georgian and English Language, are offers degree “Bachelor of Science in Biomedical Engineering.” During the fourth year, Students in the Georgian Language Track select a specialization in either Medical Computer Systems or Medical Informatics.

Generally, the classes are offered during days on campus. Sometimes, we offer one or two sections of a course that has multiple sections in the evenings. The classes are lecture classes or lecture-lab classes. We also develop on-line content for all courses by using Zoom – Cloud platform for video lectures and webinars. Clinical engineering practice is implemented in hospitals where students will do their clinical internship, before they graduate. In this environment, they have the opportunity to work with large-scale, expensive and critical equipment that is not available in the university laboratories.

Higher education in Georgia is regulated by the Laws on Higher Education, on "Education Quality Enhancement" and other sub-legislative acts. Georgian students who have passed the Unified National Examinations may enroll in a state accredited program at an accredited higher education institution, based on the ranking of scores he/she received at the examinations.

Only holders of the state certificates confirming full general education or persons equalized with them have a right to study in undergraduate programs. The Unified National Exams are the precondition for admission to undergraduate programs.

Holder of a state certificate of complete general education or a person who has passed the Unified National Examinations and gained the right to enroll in the Georgian Technical University (hereinafter - GTU) in accordance with the rules established by the legislation of Georgia has the right to study in the bachelor's educational program of the GTU.

In order to be admitted to the Biomedical Engineering (BME) program at GTU a student should pass mathematics along with other exams organized by the National Assessment and Examinations Center (NAEC) through "Unified National Exams" and receive enough scores to be admitted to the Faculty of Informatics and Control Systems (FICS). "Unified National Exams" provided through Computer Adaptive Testing (CAT) are created by the experts of NAEC.

Student Outcomes

Before graduation, students of the Georgian Technical University's Biomedical Engineering programs will demonstrate:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The plan of study for students in the program including information on course offerings in the required curriculum in the form of a recommended schedule by year and term along with maximum section enrollments for all courses in the program over the last two terms the course was offered. Apart from acquiring discipline specific knowledge, the curriculum requires that graduates have sufficient knowledge of calculus, physics, statistics, chemistry, biology and differential equations as well as an ability to apply this knowledge to the

understanding of the core Biomedical Engineering concepts, including the analysis, design and realization of such concepts. The students are also required to be sufficiently familiar with computer applications for Biomedical Engineering in addition to developing professional, life-long learning, and ethical skills required by professional environment.

Laboratory instructions and design components play important role in Biomedical Engineering education. Therefore, it is important to ensure that the undergraduate courses are accompanied with extensive design experience and carry out laboratory works in order to provide the students with sufficient practical experience in the various fields of Biomedical Engineering. Hence, the department has always been concerned with the development, updating and modernization of its laboratory facilities. An important component of the curriculum are Project embedded courses, Team Project and a Capstone Design Project. The Capstone Design Project is intended to culminate the skills of the BME undergraduate degree. The students are required to take the course and complete the project in their senior year (last semester). During the Capstone Design Project course, the students gain valuable exposure to various types of activities involved in Biomedical Engineering.

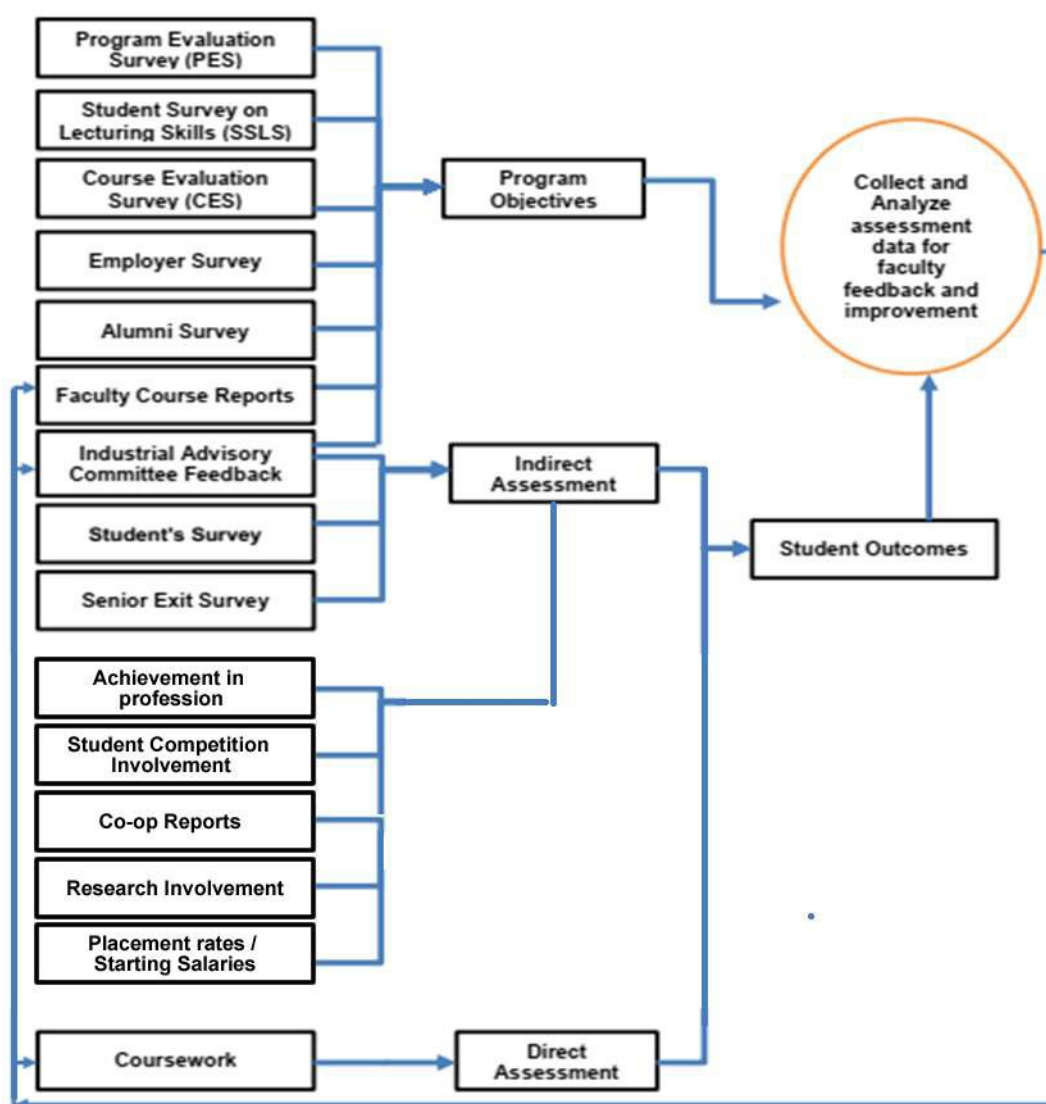


Figure 2: A summary of tools for assessment and evaluation process

Assessment and Evaluation

At the end of each year, the department carries out a survey of its graduating students. The survey sought to find out how the students evaluate the SOs for the program. The questions in the surveys assessed graduating students' satisfaction in their preparedness for each of the SOs they have encountered before graduation. The survey results are shown in Figure 3.



Figure 3: Exit survey results of the final year students, academic year 2020- 2021

Figure 3 represents the exit survey results of the final year students based on a-k ABET student outcomes, which was transferred to new outcomes -1-7 for the followed academic years. The results show that the students believe that their level of knowledge of all student outcomes are satisfactory and were above 70% criteria set by the department.

The Biomedical Engineering Department has adopted a benchmark level of attainment of an average score of 3.5 on a scale of 5. For an outcome to be considered to have been attained by a student, at least a 70% average score must be achieved as evidence illustrating that the level of the student outcome achievement is satisfactory. Similarly, at least 75% of students must achieve this benchmark value.

The process of direct assessment of Student Outcomes is carried out by using combinations of course work such as quizzes, exams, projects, presentations, homework, etc. Where the achievements on these exercises are directly tied to program outcomes. Let us describe the direct assessment of a course say.

During the semester, he selected various assessment tools and their relative weights as shown below in Table 4-3. The students' actual achievements in this course are given in Table 4-4.

Table 1: Assessment Tools for Clinical Diagnostic Laboratory Systems
English Language BME Program

Assessment Task	ABET Students' Outcomes (SOs)		
	1	2	5
Assesment Task	1	2	5
Quizzes (12)		4	8
Assignment(9)	9		
Pract(9)		3	6
Midterm Exam (30)	7.5	7.5	15
Final Exam (40)	10	10	20
Total (A)	26.5	24.5	49

Assesment Task	1	2	5
Quizzes (12)		2.47	4.95
Assignment(9)	7.3		
Pract(9)		2.38	2.38
Midterm Exam (30)			
Midterm Exam (30)	7.25	7.25	14.5
Final Exam (40)	6.7	6.7	13.4
Total (B)	21.25	16.33	30.28

0.801887

0.666531

0.618

Achievement = B/A (%) 80, 66. 61.8

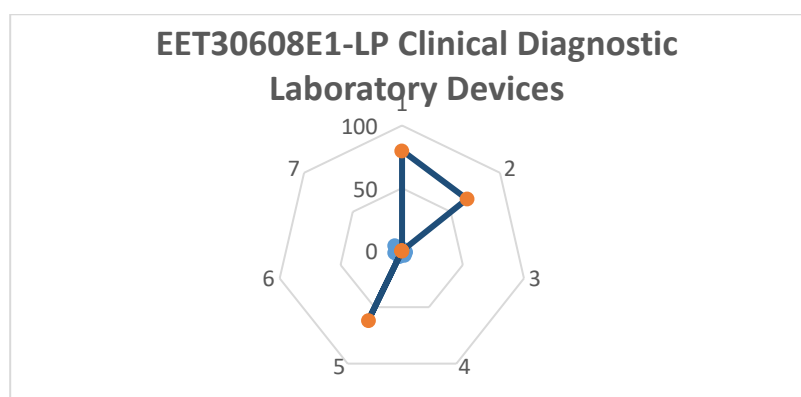


Figure 4

Capstone Projects and Team Projects

In this paper we also present a methodology for using Capstone Design Project, Team Project and other Project Embedded learning courses for assessing a number of ABET outcomes. In the advent of EC 2000, Engineering programs have grappled with methods for assessing some of the ABET outcomes, especially those skills which are not taught in the traditional engineering programs.

Capstone design courses and Team Project, taken by seniors in the BME program over a two-semester period. Each course is team-taught by professors.

Depending on the type of projects selected, student teams could be interdisciplinary, or discipline specific. The capstone design courses are used to assess ABET 1-7 outcomes consisting of the ability to: design a system, function on multi-disciplinary teams, adhere to professional and ethical responsibilities, communicate, understand global and local impact of engineering solutions on society, engage in lifelong learning, have knowledge of contemporary issues, and use modern engineering tools for engineering practice. Students' abilities in these outcomes are quantitatively measured using outcome specific project related lectures and assignments given throughout the semester.

The methodology discussed in the paper has made it possible to identify problems encountered by students in these outcome skills, thereby, facilitating adjustment in course content and delivery, and formulation of plans to assist students to improve on these skills. The methodology also makes it possible to document students' performance in these outcomes. The documentation is used to generate outcome specific binders of students' work that are vital for ABET accreditation.

This course is important because it provides the student, an opportunity to practice design in a way that parallels what will be encountered in professional practice. Students are required to apply a systematic design process, incorporate engineering codes, standards, and realistic constraints that include economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political considerations in solving the design problem. In addition, Senior Design Project is the primary course used to satisfy ABET criterion 4 which requires students to be prepared for engineering practice through the curriculum culminating in a major design experience. The latter should be based on the knowledge and skills acquired in earlier course work and should incorporate appropriate engineering standards and multiple realistic constraints. Senior design is also used to satisfy outcome C of criterion 3. This outcome requires students to have the ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

In the Georgian Technical University BME bachelor program of study takes four academic years to complete, where each academic year is made up of two semesters or terms. Each term is 15 weeks long. All admitted students must follow a prescribed path to achieve their degree. However, duration for completion is not the same for all students. To graduate a student must meet the following requirements:

- Complete a minimum of 240 credit hours (ECTS) of approved course works along with minimum of twelve credit hours of Capstone Design Project
- Spend not less than 45 hours in order to get his/her critical Clinical Practical experience
- Maintain a CGPA of 2.75 throughout the program
- Retake technical courses with grades lower than "C," to meet the minimum CGPA 2.75 criteria (only if he/she is fulfilling all other graduation requirements)

The important part for completing Bachelor Program in GTU is Capstone Design Project, main objective of which is to enable the students to integrate the knowledge gained as a result of pursuing a given degree program in university. The course should enable the students to integrate the skills and concepts learned systematically during their stay at the university. This means that the course content is focuses on refreshing the student's memory on what he

or she was taught in class. This helps them to remember the entire content of the degree program and its application.

The students should be able to integrate all aspects of the course which includes the theory, practical skills, and communication skills. They should be in a position to combine the diverse skills acquired in class and apply them in a work environment. This is based on the fact that the ultimate objective of the pursued course is to enable the students to transfer or apply their skills to the challenging work environment.

The courses have main objectives, with each objective related to one of the ABET “1” to “7” outcomes measured in the course, and having a number of anticipated outcomes.

Main Learning Outcomes for Capstone Project

The main Learning Outcome of course are given in Table 2.

Table 2: Learning Outcomes

№	Knowledge and skills acquired as a result of studying the subject
1	Knowledge and understanding: Has knowledge for demonstrate the ability to critically, autonomously and creatively identify, formulate and handle complex issues. Demonstrate the ability to participate in research or development work and thereby contribute to the development of knowledge. Has ability to plan with scientific and engineering methods implement qualified tasks within the given limits. Demonstrate the ability to critically and systematically integrate knowledge acquired in central and qualified courses within the program.
2	Skills: The student will be able to use the obtained knowledge for solving practical problems on the modern level Apply and understand essential skills, methods, and procedures basic to professional performance in the process of developed and implement new medical devices. demonstrate the ability to present, at the national and international level for the exam, an oral and written account clearly and discuss their conclusions and the knowledge and arguments underlying them. Consistent and multilateral assessment of their own learning process, Determining further learning needs;
3	Responsibility and Autonomy: Ability to make judgments on the basis of critical analysis of complex and incomplete information, including recent researches. Understand and be aware of the necessity of clinical devices safety and standard precautions. independently identifying relevant sources of information, conducting information searches, evaluating the relevance of the information, and using correct reference management.

There are two culminating design experiences for BME students in GTU. The Team Project (EET31008E1-K / EET36908G1-K), which is taken in the second semester of the junior year in the Georgian track and first semester of the senior year in the English track), and the Capstone Design Project (EET30908E1-K / EET38908G1-K) which is taken in the final semester of the senior year in both tracks.

Team Project students work in a team, usually of 4-6 students, to develop design specifications, create design concepts, and evaluate them, design the product, and then validate the design through further evaluation. They also consider safety, environmental issues, and the societal impact of their designs in addition to ethics and professional responsibility, as part of the course outcomes. The project selection for each team is a collaborative decision between the students and the course coordinator. At the end of the

course, student groups are required to demonstrate and validate their design through a final formal presentation to a committee of BME Department. Students are also required to write a detailed design report, which has sufficient information for manufacturing and users.

The procedure followed for B.Sc. Capstone Design Project is more formal than for the Team Project. The Capstone Design project teams are smaller than for the Team Project, typically being 2-3 students and sometimes even only one student. All BME faculty members provide potential project topics in their fields of specializations to the course coordinator. There may also be projects proposed by a company. These projects are normally presented in one or two paragraph statement. They are designed to be open-ended, thus requiring the students to investigate deeply into the issue to decide what data is needed, what the underlying problem is, and what methodologies are appropriate to apply as analysis tools. The course coordinator announces the project topics to the students, and after some discussion among the students and the course coordinator, the coordinator assigns a project to each team. Procedure for completing and defense for the Capstone Design project is defined by special order of Academic Council of Georgian Technical University. The Capstone Design report is evaluated by a commission of 3 members, which is approved and nominated by the Academic Department by order of the Faculty Dean.

The anticipated outcomes are that students are able to use a systematic design process and modern engineering tools such as solid Modeling in Electronic Workbench, CAD Systems.

The Capstone design courses in Biomedical Engineering Bachelor Program at Georgian Technical University are intended to provide capstone design experience. The courses draw on the students' skills and knowledge gained from previous years of theoretical and practical classes in mathematics, sciences, engineering science and design. The Capstone design project should be sufficient in scope and technical content to demonstrate the students' technical competence in Biomedical Engineering area of study. The successful completion of senior design project is indicative of the students' preparedness to pursue professional practice of engineering. The following guidelines are provided in the Capstone Design Projects Manual to help faculty and project sponsors identify suitable senior project topics:

There are two types of Projects for defense: Individual and Team Projects. For Capstone Projects in general, there are two members in each group.

To ensure active participation of individual members to the group effort, most assignments are first given as individual assignments. It is possible because members are responsible to implement separate part for Capstone Project. For example: Hardware and Software parts, or modeling and construction etc. After grading the individual contributions, the assignment is then assigned as a group assignment.

Essentially every project related to biomedical engineering presents numerous opportunities for students to learn about how constraints influence the design process. For instance, although design of a medical instrument may not be restricted by Regulation (EU) 2017/745 regulatory process, it very likely may be constrained by regulations related to MDE (Medical Devices Regulation) and it very likely may be constrained by regulations related to Occupational Safety and Health (EU OSHA) standards for laboratory safety. Constraints arise naturally through functional, safety, quality, time available, technical, economic, social, environmental, and political requirements and considerations. There must be clear evidence

in the Capstone Design project that the constraints that are relevant to the project are addressed.

Similarly, most devices that are constructed use, or should use, appropriate engineering standards for each device. Students are expected to investigate and use appropriate standards in their Capstone Design projects.

Students must discuss both relevant constraints and relevant engineering standards for their projects in the Capstone Design report. This is intended to require the students to think about the constraints that they have encountered in the project, and other constraints that might exist for the project in a different context, and to likewise think about engineering standards in a similar way.

The senior design final report and project demonstration is graded on a 1000 point system. To facilitate easy tabulation of the score in the various outcomes, a spreadsheet version of the rubric is used in the grading.

Conclusions

Global knowledge sharing and innovation development are increasingly important is happening for Georgia. An increasing number of academic programs are chasing various accreditation programs to secure quality and competitiveness. Successful factors can be summarized that will be considered whenever the university program seeks ABET accreditation. First, senior management is aware of the importance of international accreditation of the program. Second, program sustainability involves developing sustainable assessments and improving a sustainable process, which is critical and requires sustainable data collection through a process balanced to institutionalize. process efficiency and automation through an efficient management system that automates data collection, data analysis, actions and improvements, cycle closure, and archiving, resulting in reliable and sustained continuous process improvement, which is typically the primary criterion for most program failures.

Faculty participation is important to spread a culture of accreditation and awareness among them with expected outcomes from all toward the program. We found that the commitment of faculty and staff to achieving high-quality outcomes is an important factor in obtaining accreditation. We believe that the approach presented reproduces other programs seeking ABET accreditation. Our approaches represent a comprehensive, continuous process of improvement that can be applied elsewhere.

Obtaining accreditation will promote the continuation of quality STEM programs in Georgia, although more work needs to be done with employers and other stakeholders to raise awareness of the value of these accredited programs in Georgia.

Research-based education is one of the cornerstones of high-quality teaching and learning. Creation and transfer of new knowledge, innovations and technologies. It should become an integral part of the agenda of higher education. In order to promote the integration of scientific research with learning, it is necessary to develop both project-based courses and to refine their assessment and continuous development methods.

Education specifically related to scientific research, technology, engineering and mathematical disciplines (STEM) are the best measure for increasing human capital, innovation and production of workers capable of managing and responding to technological progress that lies at the center of Georgia's economic prosperity interests. Government policy must be revised to sustain accredited programs. Initial discussions started to address changes needed to make the accredited programs.

sustainable and affordable, including the need to allow universities to charge higher than the standard programs, possibly by modifying the model for financing higher education programs in Georgia in general. Financial aid will also be essential for these programs to be accessible to a wide portion of Georgian society in the future.

References

- ABET, Criteria for Accrediting Engineering Programs 2022-2023.
<https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2022-2023/>
- Biney Paul, Prairie View A&M University AC 2007-1556: Assessing ABET outcomes using capstone design courses” American Society for Engineering Education, 2007.
- Biney, Paul, and Bryant, Milton., “A Novel Strategy for the Direct Assessment and Improvement of Engineering Programs Developed and Implemented by the College of Engineering, Prairie View A&M University.
- Charles A. Goldman, Rita T. Karam, Katya Migacheva, Matthew Cefalu, Monica Rico, Katheryn Gigilio “Georgia II STEM Higher Education Interim Evaluation Report Published by the RAND Corporation, Santa Monica, Calif. © Copyright 2021 RAND Corporation R® is a registered trademark.
- Digital technologies for a new future“, United Nations publication LC/TS.2021/43
 Distribution: L Copyright © United Nations, 2021.
- Hafni, T Herman , E Nurlaelah and L Mustikasari. “The importance of science, technology, engineering, and mathematics (STEM) education to enhance students’ critical thinking skill in facing the industry 4.0”.
- International Conference on Mathematics and Science Education 2019 (ICMScE 2019).
 Journal of Physics: Conference Series 1521 (2020) 042040 IOP Publishing
 doi:10.1088/1742-6596/1521/4/042040
- John Enderle, John D Gassert, Susan M Blanchard, Paul H. King David B. Beasley, P.Jr. Hale, D.. Aldri “ The ABCs of preparing for ABET” IEEE Engineering in Medicine and Biology Magazine 22(4):122 – 132, DOI:10.1109/MEMB.2003.1237513 IEEE Xplore.
- Maja Bacovic, Zivko Andrijasevic, Bojan Pecovic STEM Education and Growth in Europe Article in Journal of the Knowledge Economy, July 2021.

Contact emails: i.gotsiridze@gtu.ge
 g.gigilashvili@gtu.ge

Facilitating and Measuring Health Promotion in the Learning Environment –Student Engagement and Inclusion in School

May Olaug Horverak, Birkenes Learning Centre, Norway
Gerd Martina Langeland, Lillesand Upper Secondary School, Norway

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Over the last years, surveys in Norway have shown an increase in mental health problems and socio-emotional challenges among youths. To deal with these challenges, health promoting programmes have been implemented, among others a project called SAMM -*A systematic approach to mastering life – the five-step motivation method*. This study presents findings from a secondary school, where the SAMM-approach has been applied in student council work to increase student participation. The student representatives have led processes in their classes to create an inclusive learning environment by asking the following five questions: 1) What is important for us as a group to be okay in school? 2) What are we as a group good at? 3) Is something difficult for us as a group? 4) What do we need to focus on? and 5) How can we work with this? To investigate whether the students experience the learning environment to be health promoting, a questionnaire has been developed based on Antonovsky's health promoting theory. Preliminary findings (n=267) reveal that the majority report giving (76 %) and receiving (79 %) trust, showing (97 %) and being shown (81 %) respect, and giving (93 %) and receiving (72 %) acknowledgement, in the learning environment. Other important aspects of health promotion are mastery and participation, and only 62 % report mastering exercises in school and 42 % that they get to participate in decision-making. In order to create a health promoting learning environment, it seems like changes are needed beyond what students themselves can change.

Keywords: Mental Health Issues, Motivation, Health Promotion, Secondary School

iafor

The International Academic Forum
www.iafor.org

Introduction

Mental health issues is a challenge in Norway, and this leads to reduced health and quality of life (Reneflot et al., 2018). The most common problems for children and youth are anxiety, behavioural and affective disorders. Already before the pandemic, there was a worrying increase in number of young girls who report and seek help for mental health problems, and there has been further increase in self-reported mental health issues among children, youth and young adults in general since then, especially in terms of anxiety and depression (Bang et al., 2023). After more than a year with measures for infection control, young people in Norway reported reduction in life quality (Haugseth & Smestad, 2021), such as reduced well-being, missing the opportunity to meeting friends and participating in activities with others. Before the pandemic, 69.5 % of the Norwegian children and youths reported that they had good friendship relations, a number that was reduced to 43.9 % in 2020. The youth also reported having more worries, and that they experienced social arenas as unsafe after the pandemic. In 2019, just above 70 % children and youth reported having a good life quality, and this percentage was reduced to 45 % in 2020 and 40 % in 2021. This shows that there is a need to focus on supporting young people to regain friendship relations, create safe social arenas and increase quality in life in general. This is the concern of the intervention carried out in the current project, facilitating inclusion, and building positive relations between students in upper secondary school.

Also reports from surveys in school, show a negative development in recent years (Bakken, 2019, 2022). There has been an increase from 20 % in 2019 to 27 % in 2022 in young people reporting that they dread going to school. Almost one fifth of the students experience that they do not fit in with the others in school, 26 % agree that they are lonely and 13 % do not believe they have friends. Reports also show that about 32 % do not complete upper secondary school in Norway (Bratholmen, 2022), and this could be related to how the students feel about being in school, and whether they have any relations to others in school. This negative trend has continued despite various health promoting measures that have been implemented in Norwegian schools. As pointed out in the final report of one of these projects on which the current study builds, *Health promoting kindergartens and schools*, there is a need to work knowledge-based in health promotion efforts in education, and there is a need for an efficient and objective approach to measure health promotion in school (Hellang & Helmersen, 2022). In addition to presenting an intervention that aims at improving the learning environment for youths, the current study also presents some measures on whether the students experience the learning environment as health promoting. These measurements are developed based on Antonovsky's health promotion theory (2012), which will be described below.

The research question in this study is: How can health promotion be facilitated in secondary school? To answer this, two sub-questions have been investigated, focusing on inclusion and student participation as aspects of health promotion: 1) How can students be engaged in creating an inclusive learning environment? 2) To what extent do the students experience the learning environment as health promoting after the intervention of the student representatives? A five-step approach was applied through the student council in an upper secondary school, and student representatives worked with their class to create a positive and inclusive environment. To measure whether the students perceived the environment as health promoting, a scale was developed based on Antonovsky's health promotion theory (2012). The results from the parts of the scale that concerns inclusion, which was in focus in the intervention, are reported here.

The understanding of inclusion in this study is based on a broader understanding of the term, as defined by UNESCO (2005) and in Norwegian guidelines for education (Meld. St. 6, 2019-2020), emphasising participation and belonging. According to these understandings, inclusion is about all students experiencing that they have a natural place and belong in the social environment, and that their participation and contributions are significant and influence teaching and learning strategies. Inclusion can also be related to health promotion theory, as understanding, participating in, and influencing situations are central elements of experiencing what Antonovsky calls sense of coherence (2012), which will be elaborated on below.

Theoretical Foundation

Health promotion theory was developed by Aaron Antonovsky, professor in medical sociology, as he was investigating what made people survive and handle challenges, despite extreme stress in life (2012). His theory is also called the salutogenic theory, and he focused on what promotes health and well-being, rather than on pathological symptoms and diagnoses. He investigated common features in the experiences of women who survived holocaust, and identified the three key elements comprehensibility, manageability, and meaningfulness, which together formed a sense of coherence, also called SOC (Figure 1).

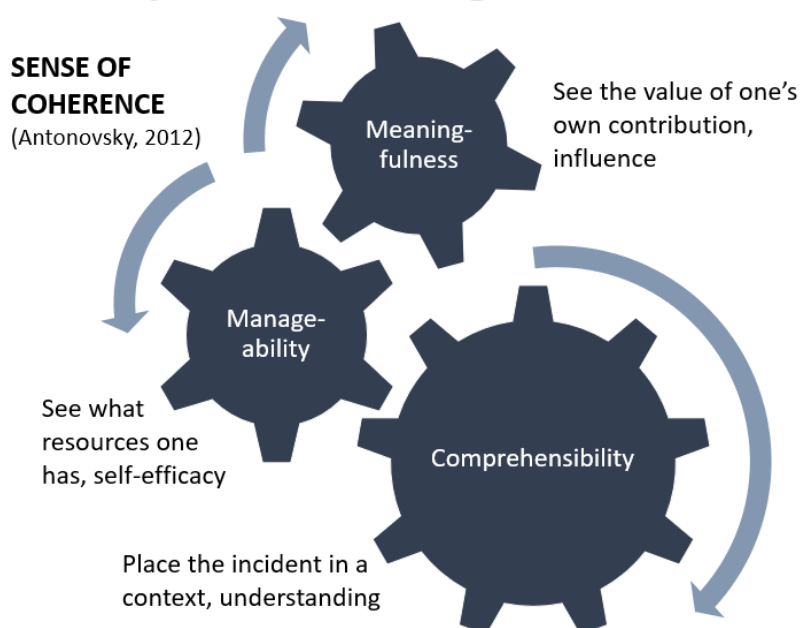


Figure 1: Antonovsky's salutogenic theory (published in Horverak & Langeland, 2022)

If people experience a strong sense of coherence, meaning that they understand a situation, see that they have resources to handle the situation, and consider acting as valuable and meaningful, they will be better prepared to handle stressful situations, and end up on the positive end of a health scale continuum. Antonovsky (2012) calls these elements resistance resources, that help a person develop resilience. In resilience theory, there is a focus on different protective factors, that may help children survive despite living in challenging conditions, and researchers have identified different sources of protection, such as personal skills, or people they have a relationship to (Borge, 2018). An important point is that resources to handle situations can be found within the individual, or in a person's surroundings. For example, a teacher or a friend could be resources for a student that

struggles with loneliness, or with difficult exercises and tests in various subjects. Being acknowledged and building a good self-esteem could also contribute to building resilience (Olsen & Traavik, 2010), which is something that can be facilitated by making an inclusive and accepting learning environment in school.

Developing a sense of coherence and identifying resources to handle stressful situations could be compared with learning to swim in a river (Antonovsky, 2012). Without a sense of coherence, meaning that one can understand a situation, handle it, and consider acting to be meaningful, a person would perhaps end up in chaos without the ability to deal with challenges in life, as falling down a river fall without control (Figure 2).



Figure 2: Antonovsky's river metaphor (Published in Langeland & Horverak, 2021)

To handle the river, the person needs to learn to swim. Related to real life, learning to swim could be to learn to deal with participating in various social settings, and it could be learning to identify resources in the surroundings. These are elements emphasised in the methodology applied in the intervention in the current study.

According to a review on health promotion measures in kindergartens and schools, health promotion in educational contexts concerns developing (Helmersen & Stiberg-Jamt, 2019) 1) capacity for action through participation and self-management, 2) social and emotional competence through relations, engagement, motivation, self-consciousness and participation in social activity, 3) stress management competence through mastery, resilience and autonomy and 4) health promotion competence through knowledge of good mental health. The approach applied in this study particularly facilitates capacity for action and social and emotional competence, as the students are engaged in a process where they are agents of change in their own learning environment, and work with social relations to ensure that everyone feels included in their classes. Further details of the intervention will be described in the following methodology chapter.

Methodology

To investigate how health promotion can be facilitated and measured in an educational context, an intervention has been carried out, and a scale developed, based on among others Antonovsky's health promotion theory. The intervention was carried out through student council work, and all student representatives applied a five-step approach in their classes to work with creating an inclusive learning environment. The student representatives asked their class the following five questions (figure 3): 1) What is important for us as a group to be

okay in school? 2) What are we as a group good at? 3) Is something difficult for us as a group? 4) What do we need to focus on? and 5) How can we work with this?

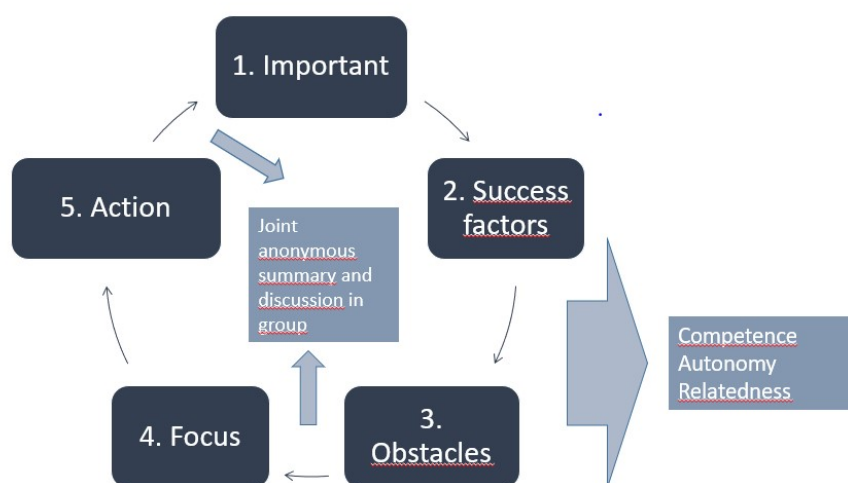


Figure 3: The five-step method (published in Horverak & Aanensen, 2019; Horverak, 2020)

The students first received training in the approach in a student council meeting, and then they collected anonymous, written answers to the first three questions from their class. The answers were brought to another student council meeting, and all student representatives made summaries based on what the students in their class had written about what was important, what was already good and what was difficult for the class. This was followed by a discussion on what the different classes needed to focus on and what they could do. After the student council meeting, the student representatives brought their summaries and presented for their class, suggested some focus areas and actions, and then the class decided on a plan to improve the learning environment. After a period of some weeks, the student representatives reported in another student council meeting how the class had managed to follow up the plan. This intervention was carried out in the first semester the school year 2021-2022. The next school year, the process was repeated, and then the first three questions were adjusted to focus on inclusion: 1) What is important to make everyone feel included? 2) What do we already do to create an inclusive environment in class? 3) What can be challenging when working with inclusion? This will be referred to as the second round of the intervention in the following.

The intervention was carried out in an upper secondary school with about 440 students, most of them between the ages 16 and 18, and some adult students. About half of the students were general studies students, the rest vocational students, youths, or adults. During the second round of applying the method, the students were asked to fill in a questionnaire with questions concerning how they perceived the learning environment, and 267 students responded. A five-point Likert scale was used in the questionnaire, with the following categories: totally disagree, disagree, neither agree nor disagree, agree, and totally agree. The students considered the following claims: I feel seen and heard by others, I listen to others, I experience being trusted by others, I trust others, I feel respected by others, I show respect to others, I master exercises I get, and I participate in decision-making at school. The same questionnaire was distributed in the spring term, after the intervention was completed, and 261 students responded. All data was collected anonymously, and no sensitive or personal information was collected.

Results

To investigate how health promotion can be facilitated in school, the students' reflections from the second round of the intervention have been summed up. This includes answers to the questions why it is important with inclusion, what they already do to create an inclusive learning environment, what is challenging, and what they planned to focus on and do to be inclusive. In addition, results from two test rounds with a survey developed to measure health promotion will be presented.

To the first question, why it is important that everyone is being included, the students said that it affects the everyday life, and that people need to feel equal, accepted, good and worthy, and not lonely and excluded. To the second question, about what they are already doing to create an inclusive environment, they pointed out both what the teachers do and what the students do. They said that the teachers facilitate for group work, peer partners, class rules and regularly 'class's hour' where important subjects are discussed. Furthermore, they said that the students smile, say 'hi', try to respect each other and include each other in group work. To the third question, about what might be challenging when trying to include everyone, the students admitted that it is easy to forget and ignore others. They also said that it is difficult to include those who do not 'match' themselves due to different backgrounds or values. Sometimes they do not know who wants to be included and who wants to be alone, and who is shy or introverted.

Based on the answers to these questions, the students were to suggest what to focus on and how to do this the next few weeks to make everyone feel included. The students suggested that they could pay attention and see if someone is alone, say 'hi,' smile and be nice. Another example of what the students agreed on was that they were to start a conversation with someone they did not usually talk to. Others wanted to focus on how they communicated, and they were to be conscious about having positive body language. Four weeks later, the students evaluated their chosen foci and action plans. They reflected on how they had worked on inclusion, if they had followed up on their plans, and what they had succeeded in. One class had decided to do things together in their spare time, and they successfully arranged a movie night at school. Others reported that the students in class had become better at giving compliments, smiling, greeting, communicating, and not leaving peers alone unless they preferred it.

To investigate whether the students experienced the learning environment as health promoting, a questionnaire was developed based on Antonovsky's health promoting theory. Results from questions concerning acknowledgement, trust, respect, mastery and participation are included here. Preliminary findings ($n = 267$) reveal many positive aspects in the learning environment (figure 4). As much as 93 % reported that they gave acknowledgement to others by listening to them, and 72 % felt that they were seen and listened to by others, meaning that they felt acknowledged. A majority of 76 % reported giving trust, and 79 % perceived that they received trust. In addition, 79 % reported showing respect, and 81 % that they were being shown respect. Other important aspects of health promotion are mastery and participation, and only 62 % reported mastering exercises in school and 42 % that they get to participate in decision-making.

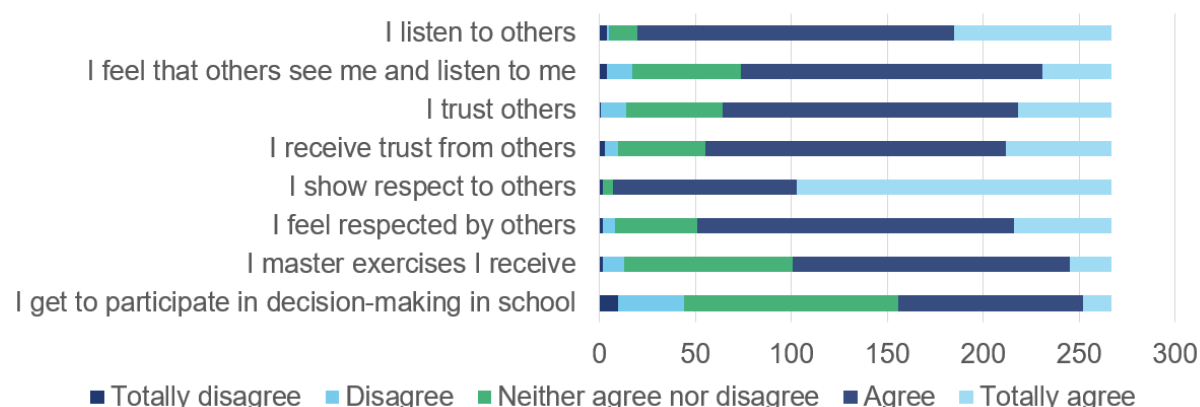


Figure 4: Results of questionnaire on health promotion in learning environment, n = 267

Results from the second round of data collection (n = 261) with the questionnaire measuring health promotion in the learning environment showed that the students had changed their perception somewhat from the first time the questionnaire was distributed (table 1). There was little change in how students perceived their own behaviour concerning giving acknowledgment by listening to others and showing trust. When it comes to respect, there is a significant change in behaviour, as 18 % more of the students reported showing respect to others the second time the questionnaire was distributed. There was also some change in how the students felt about others' behaviour, as four percent less of the students felt acknowledged by others and five percent less felt respected by others. Concerning mastery and participation, there is an increase of five percent who agree that they master exercises, and an increase of eight percent who agree that they get to participate in decision-making.

Table 1: Difference in responses concerning learning environment, n = 261

Claim	Agree t1	Agree t2	Variance
I listen to others	93 %	93 %	0 %
I feel that others see me and listen to me	72 %	68 %	-4 %
I trust others	76 %	77 %	1 %
I receive trust from others	79 %	79 %	0
I show respect to others	79 %	97 %	18 %
I feel respected by others	81 %	76 %	-5 %
I master exercises I receive	62 %	67 %	5 %
I get to participate in decision-making in school	42 %	50 %	8 %

Discussion

As the results reveal, the students work sincerely with creating an inclusive learning environment. They identify what they succeed with, and at the same time they are conscious about the challenges of including everyone in a class. They also come up with good strategies to include others. When evaluating the measures, it is reported that some of the students 'want to be left alone', but the student representatives did not say much about how they know this. The conclusion that not everyone wants to be social may be a misperception. The students might not understand that their peers are shy or introverted, or even worse - depressed or anxious. One cannot take for granted that students in upper secondary school understand others' behaviour, facial expression, or body language. As youth surveys show, there has been an increasing number of youths who feel alone and excluded since the pandemic started (Haugseth & Smestad, 2021). Therefore, it is important to problematize and focus on the fact that it is not always easy to know whether others really want to be left alone.

Perhaps they just do not know how to build relations or how to deal with shyness or loneliness.

Another issue that is often discussed in relation to inclusion is the importance of respecting each other. The results from the questionnaire show that at the second time of data collection, more students reported respecting others, but fewer students felt respected. This seems somewhat contradicting, as one would assume that when more students show respect, more students would feel respected. What it means to show respect and to be respected may also need to be problematized and discussed, so that the students have a common understanding when they report on how they experience the learning environment and their own behaviour.

When applying a method as the five-step approach described in this study, it might be difficult to find the right balance between student autonomy and teacher interference. For example, there may be situations where the teachers have a clear idea about what the students need to work on, but the students may perhaps not be conscious about it. In the intervention described above, the students were told to work on inclusion in the second round. This interferes somewhat with student autonomy, which is essential to facilitate health promotion (Helmersen & Stiberg-Jamt, 2019). However, even though the focus area for the student council work was predetermined, the students were given the possibility to decide how to work with inclusion, and the action plans were made by the students themselves. In this way, autonomy was ensured within a certain framework. Steering the process of working with the learning environment in specific directions could also be defined as giving autonomy-support, providing the students with the necessary conditions for them to fulfil the psychological need of autonomy (Ryan & Deci, 2017).

Another challenge when applying this type of approach is to follow up the process that is started in the student council. Time could be one challenge and succeeding making teachers involved is another challenge. Sometimes the teachers could be unwilling to prioritize student council work due to time pressure in the subjects. For development activities in school to succeed, it is crucial that leaders are involved in the process (Fullan, 2016), making plans to implement the change, building capacity through facilitating practice, guidance, and leadership, and ensuring structures that sustain the change. Related to the current study, schools where leaders are engaged in student council work and creating a health promoting environment will have a greater chance of success than schools where the leaders do not take charge of the implementation process.

Conclusion

This study shows that when students are being engaged in creating an inclusive learning environment, they act and make a change. The students' reflections provide important knowledge about the students' thoughts and perceptions, and how one can facilitate for further work on subjects like inclusion. The intervention described also illustrates a way of facilitating participation and learning about democracy, which are central topics in the renewal of the Knowledge Promotion, the curricula for Norwegian schools (Ministry of Education and Research, 2017). The approach promotes student agency, which is also emphasized in the OECD-report *The future of education and skills: Education 2030* (2018). According to this report, one of the most important aims of education is to support students to participate in activities and influence their surroundings in a positive way.

The results from the questionnaire show that the students perceive that they give and receive acknowledgement, trust, and respect. However, fewer students experience mastery and participation in decision-making. Both mastery and participation are crucial elements for motivation (Ryan & Deci, 2017), inclusion (Meld. St. 6, 2019-2020; UNESCO, 2005) and health promotion (Antonovsky, 2012). The results of the questionnaire show an increase in the number of students who agree that they master exercises and participate in decision-making from the first to the second test-time, that is during and after round two of the intervention. This shows a possible potential of the approach applied in the current study. However, more extensive and longitudinal studies are needed to investigate this potential further.

There may be challenges with the reliability of the findings in this study. The students may not understand what is meant by the concept of 'participation,' and perhaps they do not remember different situations where they have been given the opportunity to influence decisions, so that their answers may not reflect the truth. The sample of the study is also limited to one school, and the sample is not randomly selected. Hence, there are challenges with the validity of the study as well, and the results may not be generalisable. Even though there are threats to the reliability and validity of the findings of the current study, results from youth surveys (Bakken 2019, 2022) confirm that there is a need for a change in schools as more and more young people experience loneliness and dread going to school. To create a health promoting learning environment, teachers must take students' voices seriously, so that the students can experience that they have resources to influence and master their situation, which again may lead to a sense of coherence and improved ability to handle stress (Antonovsky, 2012). There is a need to investigate further how to facilitate a health promoting learning environment where students experience not only good relations, but also that they master everyday exercises, and get to participate and engage in decision making, so that they experience motivation and meaning in school.

Acknowledgements

We want to thank our SAMM-collaborators in Norway for inspiring collaboration. This project has been financed by the Norwegian Directorate of Health, the Agder County through the programme Health-promoting Kindergartens and Schools and the Agder County Governor.

References

- Antonovsky, A. (2012). *Helsens mysterium: Den salutogene modellen*. Gyldendal.
- Bakken, A. (2019). *Ungdata 2019. Nasjonale resultater*, NOVA Rapport 9/19. NOVA, OsloMet.
- Bakken, A. (2022). *Ungdata 2022. Nasjonale resultater*. NOVA Rapport 5/22. NOVA, OsloMet.
- Bang, L., Hartz, I., Furu, K., Odsbu, I., Handal, M. & Torgersen, L. (2023). *Psykiske plager og lidelser hos barn og unge*. Folkehelse rapporten. FHI.
<https://www.fhi.no/nettpub/hin/psykisk-helse/psykisk-helse-hos-barn-og-unge/>
- Borge, A. I. H. (2018). *Resiliens. Risiko og sunn utvikling*. Gyldendal Akademisk.
- Bratholmen, N. V. L. (2022). *Flere elever fullfører videregående opplæring på normert tid*. Statistisk sentralbyrå. <https://www.ssb.no/utdanning/videregaende-utdanning/statistikk/gjennomforing-i-videregaende-opplaering/artikler/flere-elever-fullforer-videregaende-opplaering-pa-normert-tid>
- Fullan, M. (2016). *The New Meaning of Educational Change* (5. Ed.). Routledge.
- Haugseth, J. F. & Smestad, E. (2021). *Ungomdstid med smitteverntiltak: En sammenligning av unges egenrapporterte livskvalitet og tillit i Norge og Sverige 2020/2021*. BULKIS-RAPPORT 2/21, NTNU.
- Hellang, Ø. & Helmersen, M. (2022). *“På felles vei” – Helsefremmende barnehager og skoler Evaluering og følgeforskning*. NORCE.
- Helmersen, M. & Stiberg-Jamt, R. (2019). *HBS Agder: Førevaluering av tiltak for helsefremmende barnehager og skoler*. NORCE Samfunnsforskning og Oxford Research.
- Horverak, M. O. & Aanensen, M. (2019). Decreased motivation and increased mental illness among young people – a need for teaching life mastery skills in school. *The 7th European Conference on Education, Independence & Interdependence, official conference proceedings*, (pp. 239-251). <https://papers.iafor.org/submission52464/>
- Horverak, M. O. (2020). Developing resilience and life mastery skills in the classroom – a multiple case study comparing a Norwegian and Peruvian context. *The 5th IAFOR International Conference on Education – Hawaii2020 Official conference proceedings*, (pp. 31-44). <https://papers.iafor.org/submission53632/>
- Horverak, M. O. & Langeland, G. M. (2022). SAMM – A systematic approach to mastering life – the fivestep motivation method. *The European Conference on Education 2022: Official Conference Proceedings*, 21-31. <https://doi.org/10.22492/issn.2188-1162.2022.3> <https://papers.iafor.org/submission61986/>

- Langeland, G. M. & Horverak, M. O. (2021). *Hvordan legge til rette for mestring, medvirkning og motivasjon i ungdomsskole og videregående skole*. Cappelen Damm Akademisk.
- Meld. St. 6 (2019-2020). *Tett på – tidlig innsats og inkluderende fellesskap i barnehage, skole og SFO*. Kunnskapsdepartementet.
<https://www.regjeringen.no/no/dokumenter/meld.-st.-6-20192020/id2677025/>
- Ministry of Education and Research. (2017). *The renewal of the Knowledge Promotion; General part – values and principles for education*.
<https://www.udir.no/lk20/overordnet-del/?lang=nob>
- OECD. (2018). *The future of education and skills: Education 2030*.
[https://www.oecd.org/education/2030-project/contact/E2030_Position_Paper_\(05.04.2018\).pdf](https://www.oecd.org/education/2030-project/contact/E2030_Position_Paper_(05.04.2018).pdf)
- Olsen, M. I. & Traavik, K. M. (2010). *Resiliens i skolen: Om hvordan skolen kan bidra til livsmestring for sårbare barn og unge. Teori og tiltak*. Fagbokforlaget.
- Reneflot, A., Aarø, L. E., Aase, H., Reichborn-Kjennerud, T., Tambs, K. Øverland, S. (2018). *Psykisk helse i Norge*. Folkehelseinstituttet.
https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2018/psykisk_helse_i_norge2018.pdf
- Ryan, R. M. & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. The Guilford Press.
- UNESCO (2005). *Guidelines for inclusion: Ensuring access to education for all*.
<https://unesdoc.unesco.org/ark:/48223/pf0000140224>

Contact email: may.olau.horverak@birkenes.kommune.no

***Citizens of the English Language:
Sociolinguistic Perspectives on Indian Subjectivity***

Prateek Shankar, Rhode Island School of Design, United States

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This paper presents what I call extralingual citizenship which theorizes an expansion of translingualism to include the ethnoracial logic of the nation-state and demonstrate the entanglement of language, governance, and education in the policing of knowledge infrastructures and discursive practices. I build on the work of Kachru on World Englishes, Tupas on unequal Englishes and extralinguistic value, Rosa and Flores on raciolinguistic ideologies, and translingual scholars such as Trimbur, Cannagararah, and Gilyard to frame extralingualism as a kind of citizenship, attempting to shift the focus of English pedagogy and practice away from the syntactical and etymological concerns of language use to the agentive potential of the language user. I center this study in India, framing the English language as an archive of the memory and afterlife of colonialism, exploring the idea of extralingualism through (i) Gauri Vishwanathan's Gramscian exploration of English literary study in colonial India, (ii) autobiographical fictions written by Ahmed Ali, Ramabai Ranade, and Shevantibai M. Nikambe, (iii) a juxtaposition of the formative language debates of the Constituent Assembly of India with the recently updated National Education Policy of 2020, and lastly (iv) a comparison of the Spoken English coaching industry in India with Writing Centers in India's emerging private liberal arts schools to speak to the English-markets reified by extralingually differentiated Englishes. My aim, across the full scope of this project, is to reframe English as a contested linguistic field where multiple Englishes become analogous to the respective forms of capitalism, sociality, and subjectivity constructed through them.

Keywords: Extralingual Citizenship, World Englishes, Translingualism, Extralinguistic Value, linguistic Imperialism, Decolonial Language Pedagogy, Nation-State/Colonial Governmentality

iafor

The International Academic Forum
www.iafor.org

Introduction: Whose English Is It Anyway?

It begins with a closeup. We see the skewed shadow of a man against a glossy white wall, its volumetric silence broken only by his energetic voice. He says:

Hey, bro, let me tell you what had went down. I was two bands away from getting, bro, whole barber shop, bro. Come on, mama. Bro. Peanut gonna call my phone talking about. I just got paid. I looked at the phone. You just got paid? What?! Man, where the dice at? I'm ready to shoot. We can roll. Last time I shot with it, 1300 in my pocket. Easy. Off top.

The shot widens as he speaks, revealing a Black man leaning against the railing of a balcony. To his left sits another Black man—the multiple Grammy and Pulitzer Prize-winning rapper Kendrick Lamar—who asks, “What happened?”:

What happened? Man? Peanut is what happened. Had me hot on my mama. Hot. Seven, seven, seven. Back to back to back to back. Bro, I was mad. He was all in my bag, in my pockets and my whole Duffy. I was ready to get out.

The camera continues to zoom out. We now see an elderly white man sitting to the left of Lamar—the billionaire Ray Dalio. Three men sitting on a black wrought iron balcony, framed against the pristine white walls of an apartment building. Lamar turns to Dalio and says:

Actually, what he's saying is, he saved up money to get a local barber shop. He then made a friendly business wager with Peanut and hoped to secure more money for his business, eventually losing it all with one roll of the dice. Ray, what do you think?

“I think his problem is volatility,” Ray replies, using a slew of high-handed financial jargon to encourage the man to diversify his investments. Lamar promptly translates. “Basically, bro, what he's saying is, slow money wins the race.”

In reviewing this exchange, consider: what compels Lamar to interpret on both men's behalf? One would assume they are speaking the same language. Yet, Kendrick chooses to translate the Black man's African American vernacular (AAVE) to a version of English that his white companion can understand. There's relative ease in the way he conducts this translation: this role is clearly not new to him. In fact, one could argue that his translation isn't even linguistic: it's sociocultural and heteroglossic, telling of the epistemic imaginations that both men inhabit. One man's “wager” becomes another's “dice,” meaning transferred across signs even as its *extra-linguistic value*¹ is not, demonstrating a hybridity and internalized hierarchy within the English language and an unequal demand for translation amongst its variegated users. Put simply, all Englishes are not made equal; their social implications are marked by distinct ethnoracial histories, haunted by vestiges of colonialism, feudal stratification, and slavery, which pervade the contemporary moment to inform a divergent constellation of subjectivities and material realities. Referencing Kachru, this “colonial present” informs the

¹Ruanni Tupas frames ‘*extra-linguistic value*’ as being “[...] attached to [White] English (and other contextually dominant languages/varieties) as a means of explaining the hegemony it enjoys, as well as to understand as (hidden) resistance the plethora of persistent ‘errors’ and ‘deviations’ that characterize non-elite use.” (2015: xi)

appropriation and pluricentrification² of the English language into multiple World Englishes (WE), fractured across an unequal exchange of linguistic centers and peripheries. Despite its seminality, Kachru's framing has been criticized for assuming a center-periphery binary in the evolution of English, overlooking the transcultural flows that contribute to the co-development of hybrid forms of local Englishes across geographic boundaries. While subsequent scholarly attention³ has attempted to address these critiques, the same cannot be said for public consciousness which attempts to resolve this using one of two strategies. First, in the disproportionate celebration of English as a global language: the multiplicity of Englishes is reframed as one single English expressed multiply. Secondly, by framing WE as deviating from a so-called Standard English (SE), resulting in the differentiation and hierarchization of colloquial sociolects and postcolonial English variants as peripheral. This is enacted through the institutional demand for English proficiency (IELTS, TOEFL, et. al.) and the formulation of TESOL as a distinct pedagogical code. While there are ongoing efforts to include WE within TESOL programs⁴, these attempts remain mostly peripheral with their biggest achievements limited to North America. Consequently, Lu & Horner have advocated for a translingual approach that situates language practices within a "temporal-spatial frame" where they are always "emergent, in process (a state of becoming), and their relations as mutually constitutive" (p. 587). However, Gilyard points out a "tendency to flatten language differences" in translingual theorizing, neglecting the fact that—while we all differ as language users—not everyone differs in the same way (2016, p. 287). This flattening of differences within intersecting reifications of WEs overlooks sociocultural variance, creating a "linguistic everyone."

Framing Extralingual Citizenship

My work emerges from this peculiar juncture: in an attempt to untangle the "everyone" into multiple "linguistic someone"s, I introduce the notion of *extralingual citizenship*. By virtue of its inherent social value, language functions as a sort of passport that reflexively informs societal access and individual subjectivity. This value is mediated by ideologies of the nation-state, the native speaker, racial and casteist supremacy, the ethnocentric myth of the monolithic nature of English, its hegemonic status over other languages, and the commodification of language—attitudes that were manufactured during the colonial era and remain largely undisputed in public consciousness, policy, and technology (Tupas, 2015, p. 6). Performed language has material force, as Gilyard (2016, p. 287) puts it, as demonstrated in the advertisement that opens this paper. Developed for CashApp in 2022, the advertisement raises Kendrick's translation of AAVE into a performance of the inequality of WEs. The implication of these imbalanced extralingual citizenships is obvious: consider Ebonics where the use of AAVE is institutionally penalized despite its commercial exploitation. In effect, while WEs as cultural commodities are grossly fetishized for capitalist consumption, their users continue to be delegitimized. In effect, by framing extralingualism as a form of citizenship, I aim to shift the focus of English pedagogy/practice from the syntactical concerns of language *use* to the agency of the language *user*, while highlighting

²Writing in *Other Tongues: English across cultures*, Kachru orders this pluricentrification in his "Three Circles of World Englishes" – the "Inner Circle", consisting of the sites of origin of the English language and its subsequent spread through the first diaspora, namely the UK, USA, Australia, New Zealand, Ireland & anglophone Canada; the "Outer Circle", sites created through British imperial expansion i.e. India, Nigeria, Pakistan, South Africa, Philippines, and its other erstwhile colonies; and lastly, the "Expanded Circle", that includes sites where English plays no historical or governmental role but is still used for international communication, namely China, Russia, Japan, non-Anglophone Europe, South Korea, and Egypt.

³See B. B. Kachru, E. Schneider, C. Mair, et. al.

⁴See Young, Greenfield, Flores, Rosa, et. al.

the interconnections between language, education, subjectivity, and governance in shaping knowledge economies and discursive practices. Rather than flattening, I attempt to address “the erasure of historical and unresolved struggles that are involved in meaning-making practices and knowledge production” (García and Baca, 2019, p. 29).

The interaction of these processes is not linear: they occur as a living entanglement—a melting pot I call the *churn*. Language is perhaps most surreptitious in its regulation of social contact where the centrality of misunderstanding masks the very cause of this communicational distance. Misunderstanding is the first element of intercultural encounter, with the process of translation becoming the paradoxical site of both misinterpretation and language production. This is, however, a threat to centralized state machinery especially in nationalist societies where desires for monolingual identity deny the asymmetry of language use through institutional codification, further regulating the churn. The radical vitality of language use is thus characterized as language *misuse*, discreetly converting its essence into the evidence of its guilt. By extension, this language misuse creates a language *misuser*, dictating their value as both subject and commodity within neoliberal society, a regulatory spillage that manifests as a linguistic caste system, governing access to education, work, and social opportunity. Extralingual citizenship is, thus, an umbrella term that hopes to articulate these limitations, encompassing the various aspects of citizenship (social, racial, sexual, etc.), supplemented by language (*extralingual*, as in ‘over and above’) as well as those that are deeply linguistic (*extralingual*, as in ‘especially’), and can be understood as the unstable entanglement of both these readings and their resulting asymmetry. To illustrate, the following sections evaluate India as a site of continued extralingualism.

These English Masks, Those Colonial Roots

English, often referred to as the “global language of miscommunication” by Pennycook (2006, p. 5), exemplifies the asymmetries discussed thus far. Gauri Viswanathan's *Masks of Conquest* uncovers the co-development of British political and commercial interests and English literary education in India. The propagation of English among the natives served to uphold British authority and create a stable state conducive to British mercantile and military interests (p. 20). The institutionalization of English literary education, in this context, becomes one of many imperial strategies, gaining synonymy with notions of morality, virtue, and—most prominently—truth.

Between 1817 and 1835, the growing debate on the value of native languages and literary practices “was not simply over language or literature, but the *status of knowledge* itself” (p. 101, emphasis mine). Lord Babington Macaulay famously stated that a single shelf of a good European library was worth more than the entire native literature of India and Arabia. In response, Orientalist John Tyler argued for the preservation of Indigenous knowledge, emphasizing its value in understanding the history of scientific and philosophical systems and the steps taken to arrive at truth. Here, theories of curricular policy are raised into binary evaluations of the truth claim of knowledge, with nativity constructed akin to error, falsity, and dogma, and English—with its Biblical associations and post-Enlightenment brand of intellectuality—bearing the ultimate claim to truth. By a simple leap of imagination, this logic is extended to its respective language (mis)users, mirroring the xenophobic discourse on purity, whose traces now inform the “appropriateness” of WEs and the slow cognitive rupture of their speakers.

The conclusion of the debate I outline above saw the adoption of Lord Bentinck's 1835 English Education Act decreeing that "the great object of the British Government ought to be the promotion of European literature and science among the natives of India, and that all the funds appropriated for the purpose of education would be best employed on English education alone" (p. 41). English, in this instance, becomes a proxy for European knowledge; in turn, "Englishness" becomes a metonym for Europeanness, transferring its imposed superiority over indigeneity onto the language itself. It reads as a simple formula: to know English is to gain access to Europe, to civilized intellectuality and high morality. Colonial subjectivity is haunted by the vestiges of this hegemony, forcing heteroglossic language users to tear their psyche on linguistic lines, assigning asymmetric values to the language-of-home (say, one's mother tongue) and the language-of-society (here, English). Quoting Nandy:

Such disjunctions between politics and culture became possible because it is only partly true that a colonial situation produces a theory of imperialism to justify itself. Colonialism is also a psychological state rooted in earlier forms of social consciousness in both the colonizers and the colonized. It represents a certain cultural continuity and carries a certain cultural baggage. (p. 2)

How do we make sense of the cultural baggage that comes with the English language? English has since taken on many forms in its postcolonial life, and yet the conflation of 'truth' with English continues, only now it is reserved for a specific kind of 'proper' metropolitan English, as Kachru et. al. have articulated in earlier scholarship. What that English is specifically? Nobody knows. In practice, it isn't simply *what* English is performed but *who* it is performed by that ultimately validates its claim to legitimacy.

One needn't look further than the synthetic construction of Babu English in colonial India as a separate "illegitimate" variety spoken by India's English-educated bureaucracy to understand the mapping of racial identity onto language use and vice versa. This is similar to how AAVE, Spanglish, and other BIPOC English registers are delegitimized today, astutely illustrated in Rosa and Flores' concept of raciolinguistic ideologies or "the process through which language and race are co-constructed to frame the language practices of racialized communities as inferior" (2015, p. 149-152). Here, V Sreeja on Babu English:

Dubbed as the mimic men, they [Babus] were the favourite objects of lampoon of many Indian and English fiction writers and ironically they were ridiculed for the same facts they were admired for – their knowledge/a little knowledge of English, their (almost successful) aping of other symbols of Englishness and the apparent, relative proximity to the colonial master. The evolution (or counter evolution) of the term Babu is in itself testimony to the process of denigration that the class suffered in the wake of colonisation. Although it ["Babu"] is used as a courteous term of address in many Indian languages, the raj period bestowed it with a contemptuous sense. [...] In an attempt to elevate themselves to the levels of their masters, they end up being laughing stocks. (2019, p. 13)

In her analysis of English language letters written by Bengali civil servants in late 19th century India, Sreeja defines the Babu English style as being marked by "excessive stylistic ornamentation, politeness and indirectness," "the discourse organization [...] of a South Asian language", and an inordinate "use of subservient address forms." For instance: "With deep regret and unfeigned sorrowfulness your poor slave approaches his poor tale at the footsteps of your honours throne... he may meet with forgiveness of his sins" (Arnold, 1891, p. 6).

These were, she continues, “part of linguistic forms prescribed for [English] subordinates to use in addressing their superiors during the early days of the British rule in India” (2020, p. 144). And yet, when mimicked by brown ‘Babus,’ these linguistic forms become a recipe for ridicule. Evidently, language skins meaning, even as the color of one’s skin informs what value is afforded to them.

Authored Subjectivity: An Extralingual Reading Ahmed Ali’s ‘*Twilight in Delhi*’

It was the eve of Indian independence. After fourteen years as a scholar, teacher, and novelist, the Urdu literary icon Ahmed Ali found himself at Nanjing University in China. He had just been appointed Visiting Professor and would spend two years teaching English at the behest of the British Council. Ending his tenure in 1948, Ali sought to return to his native Delhi. However, the India he had left behind no longer existed. In the time since his departure, his country had endured an unstable mitosis, splintering the subcontinent into two conjoined twins in a violent partition of land, livelihood, and language. One colony became two free nations, and yet, Ali became a new kind of prisoner. Having never stated his preference, the Ambassador of India in China K.P.S. Menon denied his return to India, arguing that as a Muslim he would have to go to Pakistan—which is where he would live until the day he died, never again returning to the streets he called home.

Eight years prior, at the height of the Progressive Writers’ Movement (PWM), Ali had written *Twilight in Delhi*, a prescient novel set in the wake of English colonialism. Taking place between 1911 and 1919 in newly-colonized New Delhi, the book explores the complex forces shaping the city—parallels that Ali would personally experience not even a decade later—through the perspectives of two protagonists: Mir Nihal, the father who longs for lost Mughal glory, and Asghar, the son who embraces English modernity. Albeit not stated explicitly, these two imaginaries capture a central tension within the novel, a loose binary negotiation of past and future, as understood and embodied by these two characters. I explore the negotiation of these subjective ideals through the metaphor of twilight (borrowed from the title of the novel), of a waning day slowly melting into the purple embers of a new evening, the slow middle between an end and a beginning. Reflecting on the novel, Sumatra Baral writes:

Twilight indicates in-betweenness and liminality – the position of Delhi between two languages – English and Urdu and two empires, the Mughal and the British. [...] Twilight, which usually hints at a transition between day and night, here posits itself between life and death, tradition and change, orthodoxy and progression. (2021)

This half-light semi-darkness speaks to the bilingual (if not plurilingual) colonial speakers’ experience of the in-between, of a sort of double consciousness engendered by their oscillation between linguistic traditions, further heightened in the case of *Twilight* by Ali’s choice to author the novel in English, despite local criticism and constant rejection from British publishers. The novel was part of an enormous body of controversial work produced by Ali and his peers in PWM. These were Urdu literary dissidents, attempting to shake the foundations of socioreligious orthodoxy through a radical retelling of North India, most notably in a collection of Urdu short stories titled *Angaaray* that would ultimately be banned (fig. 1). And yet, Ali chose to write *Twilight* in English. Could we read this as the author mirroring his younger protagonist’s English aspirations? Ali offers clarification in a 1975 interview:

I have been wondering why I write in English. [...] It was not because, as some people have said, that I wanted to curry favor with the British. That's nonsense. It was an escape for me from many things. I could not express myself in Urdu when I was young, so I had to express myself somehow and English was all right for them [his family] ~ it was the ruler's language, the baré sahib's [big officer's] language, so they couldn't take objection to that in their minds. [...] Urdu had been taken away from me because of the great resentment people had toward my writing in Urdu. (JSAL, 1975, p. 122-3)

His comments point to the position English holds as a marker of social mobility and intellectual progress in Indian society. Could this explain the motivations behind his choice to write in the language of the colonizer? Or did he claim it as his own?

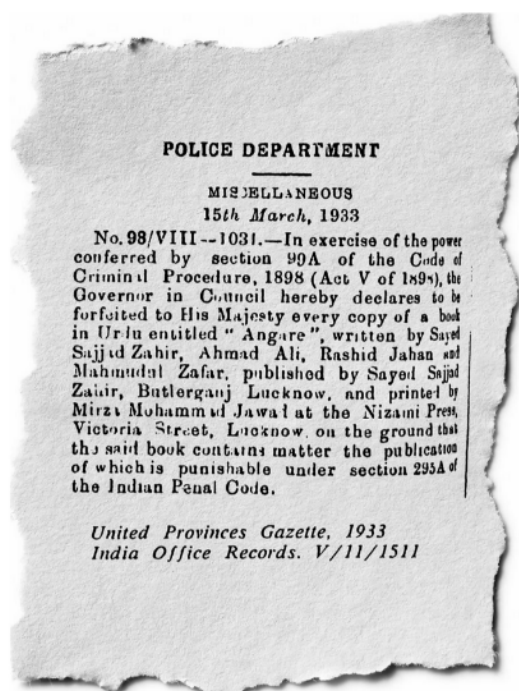


Figure 1 (left): Police notification on the ban of *Angaaray*, published in the *United Provinces Gazette* in 1933. Figure 2 (right): A portrait of Ahmed Ali smoking a pipe, circa 1955.

Within and beyond the novel, we encounter transitory subjectivities, author and character reflexively experiencing and redefining themselves within a marked discontinuity. Twilight, in this context, becomes a mode of knowledge, an in-between that resists description, a liminal (un)becoming that transgresses two imaginaries of seeming incompatibility, conjuring a discontinuum that is as generative as it is inertial. I locate my research within this linguistic twilight, investigating the transitory subjectivities that emerged and (d)evolved in response to English and the powers, specific sites—be it caste, class, or gender location—and motivations that informed this transfiguration.

Sexual Englishes: An Extralingual Reading of Ramabai Ranade's 'Himself'

In thinking about English and its emergent subjectivities, I turn to a 2012 book by Shefali Chandra titled *The Sexual Life of English: Languages of Caste and Desire in Colonial India*. Chandra's reading of the history of English education in India artfully introduces gender and caste as active agents in the articulation of new subjectivities, socialities, and forms of extralingual citizenship. Using a wealth of relatively unknown literature from the turn of the 20th century, written primarily by women authors from the subcontinent, her work captures the surreptitious ways in which British India's English-educated Indian elite secured the power of the English language within their own caste and class position (p. 5). While their register was derogatorily termed Babu English, as previously discussed, knowledge of the language ultimately afforded elite natives new ways to extend their privilege in Indian society. In turn, by extending English education only to their own wives and daughters, these men mapped the "colonial-native matrix over their marital bonds" to create a new female Indian subject (p. 5). Chandra notes:

[...] British India's English-educated subjects taught English to their own woman [...] Bringing English to their wives and daughters, British India's English-educated men successfully secured the language of power within their class and caste location. [...] This idealised female figure was key to the India elite's quest for cultural equivalence with Europe, its distinction from "other" Indians, and its ability to speak in the name of a national commodity." (p. 5)

To demonstrate, let us consider *Himself: The Autobiography of a Hindu Lady*, a 1938 autobiography of Pandita Ramabai Ranade. In *Himself*, Ramabai documents her experiences learning English from her Brahmin husband (and social reformer) M. G. Ranade and its subsequent effects not only on her own psyche but also on the social contract she shared with her husband. Ramabai, who was only eleven at the time of her marriage, is said to have lacked a compassionate bond with her much older husband. Instead, M. G. Ranade decided to teach his new bride the English language. Their nocturnal pedagogic endeavors in the privacy of his office/classroom became a proxy for domestic intimacy. Speaking to this "symbolically affective bond," Uma Chakravathi queries, "Short of brutally consummating the marriage what would one do in such a situation except begin teaching the illiterate wife in alphabet?" (p. 217). How these experiences shaped Ramabai provides a model to understand an evolving female subject in India at the turn of the twentieth century; in this case, an upper-caste Hindu wife. Chandra notes:

Ramabai's memories sheds light on the interface between English and sexual identity, between individual desire, and social power. [...] Her individuated desire to possess the cultural power of English was interwoven with her awareness that it was her male relatives who were learning the language. (p. 144)

Ranade's stepbrothers, who were around the same age as Ramabai, had also begun learning English at that time. By aligning herself with the social power of English within an unconventional marital contract, Ramabai was able to access a phallogocentric social power previously alien to Indian women. Most notably, it reconfigured her relationship with other women in the household, particularly with her widowed sister-in-law Durga, who had been denied the opportunity to pursue her education because she was married at an incredibly early age (p. 139). Chandra:

English education threatened to disrupt existing domestic hierarchies and, by the way of the “new” compassionate love [between Ramabai and her husband], to diminish the authority of other women in a female-centered household. (p. 148)

Indeed, one could argue that Ramabai’s selective education was sustained within the household through the expectation of free widowed labor. The lack of English education, in the case of the widowed Durga, produced another kind of female subject, one marked by labor, marginalization, sexual punishment, and a staging of lack. Chandra articulates the position of Durga and other women in the household when stating that “English-educated women would disdain their domestic roles and thus cease to respect domestic markers.” At the same time, Ranade’s ability to mediate Ramabai’s education elevated his own power within the household (p. 145). Chandra notes that “Durga’s complex reactions averred that ‘English’ was a mobile, linguistic sign of vast material ramifications, indicating, expressing, and actively shaping a new hetero-conjugal contract” (p. 145). Evidently, the extralingual citizenship afforded to Indian women remains regulated by their marital association with masculinity.

Here too, we engage with the centrality of twilight as the site of extralingual discontinuity and the centrality of desire as a guiding force towards English language acquisition. English language use, in this context, is a key mode of soft power that radically transforms the subjective capabilities of the language user as well as their relationship to the ruling state and their place in it. Fundamentally, I argue that an education in the English language is an introduction to the state of twilight-as-linguistic-discontinuum, to both sociolinguistic dissonance and possibility, their unstable boundaries rendering a new kind of female citizen in colonial India.

Angrezi Medium: This Language Is Kampleks

Cut to the present. In *Hindi Is My Ground, English Is My Sky*, Chaise LaDousa describes an interview with a Varanasi-based school principal on the experience of Hindi-medium students entering English-medium environments. This prompts the mention of a feeling of inferiority on the part of the Hindi-medium students (2014, p. 37) which the interviewee calls a ‘complex’ (*kampleks*). This colloquial expression captures the inability to resolve twilight, so common in its social usage so as to highlight the ubiquity of language-informed class disparities. Note, a ‘complex’ is not the same thing as a *kampleks*. Here, the sign remains the same—unlike Lamar’s translation—but its texture changes when carried across linguistic contexts. *Kampleks* (unlike complex) illustrates the very real fear of being perceived as a language misuser, and the subsequent denial of the extralinguistic values—intelligence, class, authority—associated with it. A direct outcome is the articulation of multiple streams of English education in India performed within a spectrum of class identities. The socially mobile bourgeoisie inhabits an English that is analogous to hegemonic British and American varieties while the remaining population occupies various degrees of pidginized (and inordinately delegitimized) Englishes gathered through the medium of their schooling (or lack thereof). Their interplay results in the production of different *English-markets* within the broader marketplace of languages.

To clarify: consider the English Coaching industry in India that services thousands of aspirants for jobs (in call centers, government, etc.), higher education, or civil services examinations. These centers are informal educational institutions, often set up within dense

urban residential colonies⁵, occupying the same liminal space that births the experience of the *kampleks*. Here, the concern is not the status of knowledge as much as its material possibilities, as evident in how these centers are marketed (fig 4).

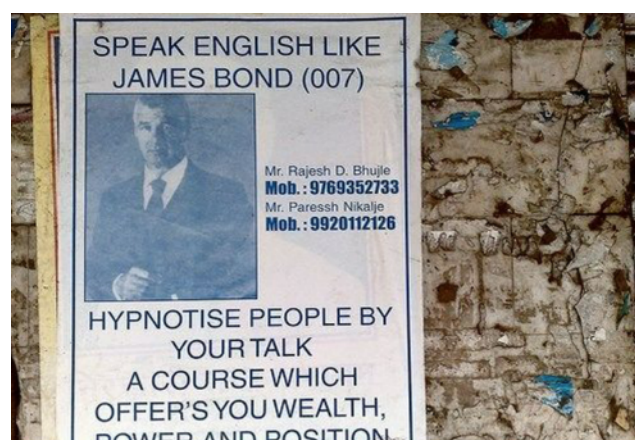


Figure 3: Public advertisements for English Coaching Centers in Ulhasnagar (left).

Figure 4: Mumbai (right); both in the state of Maharashtra in India.

In contrast, consider Writing Centers in India's upcoming liberal arts universities (Ashoka University, Jindal, Flame University, et. al) that view the Writing Center as a site for developing critical faculties, analytical skills, and research capacities, attracting a decidedly upper-class clientele. This brand of intellectualism is in stark contrast to the pragmatic "Smart English" promised by coaching centers (fig. 4). While both models are valid responses to their respective class contexts, they enforce dramatically different conceptions of the English language and their attendant markets, which have little to no overlap. Evidently, these English-markets inhabit differing positions within binary center-periphery constructions such as rural/urban, Indian/Western, professional/creative, et. al. interchangeably mapped onto a logic of appropriateness and afforded varying degrees of agency. English, in this context, is more than the language of global capitalism—it is a contested linguistic field, a discursive space occupied by multiple configurations of extralingual citizenship, each enabling the creation/differentiation of specific markets, material opportunities, and social expectations. It is worth highlighting that liberal arts education and attendant writing center pedagogies have been noted as being primarily of US origin. Here, Hotson and Bell:

As neocolonial commodities, U.S. writing courses and writing centers are also easily exported, especially as American English is the lingua franca of knowledge acquisition and publication. (2022, p. 53)

⁵Writing in a 2021 paper on UPSC coaching centers, Chaise LaDousa provides a comprehensive illustration of the inner workings of these institutions: "One of the most successful coaching teachers I met in Delhi was named Ram. He had come to rent out a three-room flat in the heart of Mukherjee Nagar's cluster of multi-story buildings devoted to coaching tutorials. One entered a waiting room that was adjacent to Ram's office. To the side of the office was a narrow hallway that led to Ram's assistant's office and a bathroom. [...] Across the way from the waiting room was a lecture hall that accommodated approximately 40 students. The room was equipped with a chalkboard mounted above a slightly raised platform from which Ram delivered his lectures. Such was the setup of all of the coaching teachers I met who had been working for anywhere between 10 and 25 years. [...] Most of the students were from smaller metros or from small towns, and explained that the prospects for work, either at home or where they had gone to university, were particularly bad." (2014, p. 114)

Further:

We observe this currently occurring in Brazil and Russia, where DOS regional English language officers (RELOs), “a kind of teacher-diplomat,” support the establishment and national organization of writing centers as U.S. cultural diplomacy initiatives to “support the achievement of U.S. foreign policy goals and objectives, advance national interests, and enhance national security by informing and influencing foreign publics.” (2022, p. 51)

This is a radical departure from “HYPNOTISE PEOPLE BY YOUR TALK. A COURSE WHICH OFFER’S YOU WEALTH, POWER AND POSITION.” Instead, we confront writing centers as a site of neocolonial soft power similar to the Anglicist ideologies that informed Lord Bentinck’s educational policy of 1890. The regulation of wealth, power, and position, in this context, is raised to geopolitical terms and continues to be defined extralingually. Subsequently, this alignment with neoliberal values affords students access to a kind of global class mobility that remains completely alien to clients of English coaching centers.

Conclusion

If you have come this far, I offer my genuine gratitude with the hope that these wavering ideas sparked new questions, or at least invigorated existing ones. I leave you now with some closing points of inquiry. First, how do we ascertain a global grammar to English without becoming overly reductive? Can we accommodate the inherent fractalization of the English language—and the various linguistic and cultural traditions it has been influenced by—in its teaching and performance? Consequently, can its teaching encompass the myriad material values the language makes possible while still addressing / countering / reorganizing the moral / social / ideological logics it extends? And, ultimately, if none of this is possible, where does this leave us, and what might still be the gift of such a line of questioning?



Figure 5: A cartoon from a national daily newspaper from New Delhi, circa the 1990s.

References

- Ahmed, A. (1940). *Twilight in Delhi*. Oxford University Press.
- Ahmed, T. (2006). *Literature and Politics in the Age of Nationalism - The Progressive Writers' Movement in South Asia, 1932-1956*. University of London.
- Akhtar, J., & Zaidi, H. Z. (2006). Progressive Writers' Movement in Urdu Literature. *Indian Literature*, 50(4), 140–162. <https://www.jstor.org/stable/23346444>
- Althusser, L. (1971). Ideology and Ideological State Apparatuses (Notes towards an Investigation). In *Lenin and Philosophy and Other Essays* (pp. 121–173).
- Anderson, D. D. (1971). Ahmed Ali and 'Twilight in Delhi.' *Mahfil*, 7(1), 81–86. <https://www.jstor.org/stable/40874415>
- Appadurai, A. (1990). Disjuncture and Difference in the Global Cultural Economy. *Theory, Culture & Society*, 7(2–3), 295–310.
- Baral, S. (2021, February 13). Narratives of Suffering and “Risk”: Looking back at Ahmed Ali’s “Twilight in Delhi.” *Café Dissensus*. <https://cafedissensus.com/2021/02/14/narratives-of-suffering-and-risk-looking-back-at-ahmed-alis-twilight-in-delhi/>
- Bhabha, H. K. (2004). Signs Taken for Wonders. In *The Location of Culture*.
- Canagarajah, S. (2009). The Plurilingual Tradition and the English Language in South Asia. *AILA Review*, 22, 5–22. <https://doi.org/10.1075/aila.22.02can>
- Chandra, S. (2012). *The Sexual Life of English: Languages of Caste and Desire in Colonial India*.
- Coppola, C. (1994). Ahmed Ali in Conversation - An Excerpt from an Interview. *The Annual of Urdu Studies*, 9. <http://digital.library.wisc.edu/1793/11839>
- Fanon, F. (1952). *Black Skin, White Mask*.
- García, R., & Baca, D. (2019). Introduction. In R. García & D. Baca (Eds.), *Rhetorics Elsewhere and Otherwise: Contested Modernities, Decolonial Visions* (pp. 1-48).
- Gilyard, K. (2016). The Rhetoric of Translingualism. *College English*, 78(3), 284–289.
- Gregory, D. (2004). *The Colonial Present: Afghanistan, Palestine, and Iraq*. Wiley-Blackwell.
- Hotson, B., & Bell, S. (2022). Writing Centers and Neocolonialism: How Writing Centers Are Being Commodified and Exported as U.S. Neocolonial Tools. *Writing Center Journal*, 40(2), Article 4, 50-69. <https://doi.org/10.7771/2832-9414.1020>

- Joshi, P. (2002). *In Another Country: Colonialism, Culture, and the English Novel in India*. Columbia University Press. <https://doi.org/10.7312/josh12584>
- Kachru, B. B. (1983). *The Other Tongue: English Across Cultures* (2nd ed.). Pergamon Press.
- LaDousa, C. (2014). *Hindi Is Our Ground, English Is Our Sky: Education, Language, Social Class in Contemporary India*. Berghahn Books.
- Lu, M.-Z. & Horner, B. (1998b). The problematic of experience: Redefining critical work in ethnography and pedagogy. *College English*, 60(3), 257. <https://doi.org/10.2307/378557>
- Nandy, A. (1989). *The Intimate Enemy: Loss and Recovery of Self under Colonialism*. Oxford University Press.
- Paul, P. (2003). The Master's Language and Its Indian Uses. In C. Mair (Ed.), *The Politics of English as a World Language: New Horizons in Postcolonial Cultural Studies*.
- Pennycook, A. (2006). *Global Englishes and Transcultural Flows*. Routledge.
- Phillipson, R. (1992). *Linguistic Imperialism*. Oxford University Press.
- Ranade, R (1938). *Himself: The Autobiography of a Hindu Lady*. Translated by Katherine Van Akin Gates. Longmans, Green and Co.
- Rasool, S. H., et al. (2019). Subverting the British Raj - Delhi as a Metaphor of Resistance in Ahmed Ali's *Twilight in Delhi* (1940). *The Discourse*, 5(2), 177–182.
- Sreeja, V (2019). Babu English: Mimicry and Subversion in Language. *IOSR Journal Of Humanities And Social Science*, vol. 24, no. 2, pp. 13–17, <https://doi.org/10.9790/0837-2402011317>
- Sreeja, V (2020). Babu English Revisited: A Sociolinguistic Study. *Journal of English as an International Language*, vol. 15, no. 1, pp. 135–47.
- Suleri, S (1992). *The Rhetoric of English India*.
- Thiong'o, N. W. (1986). *Decolonizing the Mind*. East African Educational Publishers.
- Tupas, R., & Rubdy, R. (2015). Introduction: From World Englishes to Unequal Englishes. In R. Tupas (Ed.), *Unequal Englishes: The Politics of Englishes Today* (pp. 1-19). Palgrave Macmillan UK. <https://doi.org/10.1057/9781137461223>
- Viswanathan, G. (2015). *Masks of Conquest: Literary Study and British Rule in India*.
- Wright, A (1891). *Baboo English as 'tis Writ: Being Curiosities of Indian Journalism*.

Contact emails: pshank01@risd.edu
prateek.shankar@gmail.com

Re-envisioning Web Learning and Communication Experience With WebXR

Ming Wai Christy Chung, The University of Hong Kong, Hong Kong SAR

Chi Ming Chan, The University of Hong Kong, Hong Kong SAR

The Paris Conference on Education 2023

Official Conference Proceedings

Abstract

As the digital era progresses, various information and communication technologies are adopted to enhance the language learning process and to facilitate effective communication. Over the past decades, learners have been exposed to a whole new world of knowledge learning, diffusion, and communication with augmented reality (AR) and virtual reality (VR) technology. Web-extended reality (webXR) is being used as a solution to bridge the real world and the virtual world in the realm of newly-designed, web-based learning and communication activities. The ability to adopt these kinds of technologies to diffuse disciplinary knowledge is necessary for our new generations. Aiming at re-envisioning the immersive web learning and communication experience with webXR, we initiated a project in 2022, with the intent to establish a webXR-based Virtual Chinese Language Learning Centre (VCLLC) to provide a well-structured virtual learning environment for students to deploy both the Chinese language communication skills and webXR technology ability to effectively write, display and diffuse their disciplinary knowledge in Chinese, in a manner which is best suited for modern communication. In this paper, we will discuss and share some experiences in establishing a transdisciplinary assignment mechanism that helps students learn and use Chinese language with the latest ICT technology to diffuse and communicate at new heights by promoting hands-on practices, which can help our students imagine, create, and deliver innovative XR experiences in the context of disciplinary Chinese learning.

Keywords: ICT, Language Learning, WebXR, Virtual Learning, Communication Intensive Course, RECTi Model

iafor

The International Academic Forum

www.iafor.org

Introduction

Over the past few decades, there has been an increasing emphasis on redirecting the educational focus from the acquisition of static knowledge to interactive communication. In addition to enhancing learners' comprehension of the subject matter, interactive communication stimulates critical thinking, creativity, and collaboration, which are essential skills in the 21st century (Teo 2019). As Constant Leung (2005) points out that it “signaled a shift from grammar-based pedagogy to Communicative Language Teaching,” implying the need “to reconnect with the social world if the concept of communicative competence is to mean anything more than a textbook simulacrum of Englishes in the world.” This approach acknowledges that learning is not restricted to rote memorization but also focus on developing students’ higher order thinking that encompasses active engagement with the subject matter through discussions, collaborations, presentations, and problem-solving (Vijayaratnam 2012).

Learners can be benefited through the adoption of interactive communication, including the cultivation of coveted skills such as communication, teamwork, and problem-solving, which are highly valued in modern job markets. By engaging in meaningful interactions with peers, learners can attain a deeper understanding of the subject matter and develop the competencies necessary for the practical application of their knowledge in authentic meaning-focused, task-based scenarios (Yildiz 2020).

At the same time, we have entered a realm of knowledge acquisition, dissemination, and communication through the utilization of various information and communication technologies (ICTs). Social media platforms (Siddig 2020), discussion forums (Stickler & Hampel 2015; Manegre & Gutiérrez-Colón, 2023), and other online tools (Salmons, 2023) facilitate learners' ability to connect with one another, engage in the exchange of ideas and experiences, and cultivate a more collaborative and supportive learning climate. Furthermore, by emphasizing collaboration and communication via the latest informational technology such as augmented reality (AR) and virtual reality (VR), we can create more engaging and effective learning experiences that better prepare learners for success in a rapidly changing world (Alenezi & Akour 2023).

A Shifting Focus from Static Knowledge Acquisition to Interactive Communication

Shifting the focus from static knowledge acquisition to interactive communication represents a significant shift in the way we approach education and learning.

At the University of Hong Kong (HKU), the emphasis on language learning has also shifted away from fostering native language proficiency as the prime goal. The overarching objective of language instruction is frequently viewed as the cultivation of interdisciplinary and communication-centered language skills. In 2019, HKU initiated a project that involved the implementation of a CI (Communication Intensive) badge.

Courses that have been awarded with this badge are characterized by curricula that intentionally incorporate components that foster the development of communication-related knowledge, skills, and attributes. Numerous language courses are meeting certain requirements such as providing explicit and precise documentation regarding communication-focused course learning outcomes, aligning communication-related outcomes with at least two of the four communication “literacies”/goals, and assigning a minimum of 40% of the course evaluation

to assessment tasks that are specifically related to communication-relation activities (HKU 2022).

In response to this change in learning emphasis, innovative strategies for teaching and learning that capitalize on technology and novel media to facilitate the distribution and acquisition of knowledge are being deployed. Such pioneering methods encompass online courses, virtual and augmented reality simulations, gamification, and interactive multimedia content. These techniques offer learners the opportunity to interact with the materials in more dynamic and immersive ways, resulting in more profound comprehension and increased retention (Blyth 2018).

The emergence of innovative approaches for disseminating, acquiring, and communicating knowledge like social media, chatbots, online forums etc. represents a unprecedented frontier in the realm of education and learning. Embracing these novel methods has the potential to create more engaging, inclusive, and efficacious learning experiences that enhance learners' preparedness for success in a swiftly evolving world.

Synopsis of Our Project

Our project aims to innovate the immersive web-based learning and communication experience by leveraging WebXR technology. In 2022, we successfully applied a TDLEG project with the objective of establishing a Virtual Chinese Language Learning Centre (VCLLC) that utilizes cutting-edge WebXR technology to offer students a well-structured virtual learning environment with innovative and immersive learning experience. The establishment of a WebXR learning center is particularly relevant in the post-pandemic context, where the COVID-19 pandemic has forced many educational institutions to resort to online learning (Zhang 2020).

The VCLLC is intended to enable students to not only enhance their proficiency in the Chinese language but also develop their technology skills of ICT and apply them to effectively write, display, and disseminate their disciplinary knowledge in Chinese over a WebXR environment, which is best suited for modern communication practices in the cyber world.

The WebXR learning center offers a virtual environment that enables students to access a wide range of educational materials, including courses, simulations, and interactive multimedia resources. Students could then explore more complex concepts and scenarios, thereby facilitating the development of a deeper comprehension of the subject matter. We also attempt to create a transdisciplinary assignment mechanism that facilitates students' acquisition of the Chinese language by the latest ICT technology. This mechanism aims to promote hands-on practices that will enable students to imagine, create, and deliver innovative XR experiences that are contextualized within their disciplinary fields. This represents an exciting prospect to harness cutting-edge technologies to augment the learning experience and prepare students for triumph in a fast-changing world.

By developing these skills, students will be better equipped to diffuse and communicate their disciplinary knowledge at a new level, thereby enhancing their language learning and communication abilities.

Virtual Learning in Brief

Over the past decade, there has been a surge in the application of virtual reality (VR) and augmented reality (AR) models driven by advancements in technology and the expansion of communication networks and infrastructure (Bolter & Engberg 2021). Virtual learning has emerged as an effective learning tool, particularly in language acquisition, through the use of various AR and VR technologies such as Virtual Reality Language Immersion (Dhimolea, Kaplan-Rakowski, & Lin, 2022), Augmented Reality Vocabulary Flashcard (Nursabra, Syamsinar, Nurchalis, & Nuralima, 2023), Virtual Language Exchanges (Lin, & Lan, 2015), and Gamification (Al-Dosakee, & Ozdamli, 2021) with AR and VR technologies. These technologies have the potential to create more captivating and enjoyable immersive learning experiences. For example, Wedyan, Falah, Elshawees, Alfalah, & Alazab (2022) suggested that augmented reality can improve reading comprehension, academic achievement, vocabulary items, students' motivation, engagement, collaboration, and creativity.

Virtual learning can take various forms, ranging from online courses to virtual classrooms. Online courses are typically self-paced and can be accessed from anywhere with internet connection. Virtual classrooms, on the other hand, simulate a traditional classroom setting, with real-time interaction between students and instructors. As Kuhail, ElSayary, Farooq, & Alghamdi (2022) pointed out, immersive technologies such as AR, VR or XR have become prevalent in various domains and proven to improve learning significantly.

(i) Augmented Reality

Augmented Reality (AR) is an innovative technology that supplements a real-world environment with computer-generated sensory inputs (G. Dini, M. Dalle Mura, 2015). It aims to enhance the user's perception and understanding of the real world, rather than replacing it entirely by adding digital elements to the real world. In 1992, Thomas Preston Caudell, a researcher at Boeing, first coined the term "augmented reality" (AR) when he created an AR application for industrial purposes that allowed for the viewing of assembly diagrams (Arena, Collotta, Pau, & Termine, 2022). In the preceding decade, many AR experiences relied on a trigger barcode-like image to impose an object or video on top of objects in a real-time environment that could be viewed on a mobile device. The latest AR technology also employs surface tracking to enable the placement of virtual objects within the user's physical surroundings, eliminating the need for a trigger image.

AR can be particularly effective in communication-centered learning activities, as it enables learners to practise communication skills in realistic scenarios (Parmaxi & Demetriou 2020). For example, AR can be used to simulate a workplace environment, allowing learners to practise communication and collaboration skills with virtual colleagues. In fact, AR technology has positively impact users' learning process and experience significantly (Ghobadi, Shirowzhan, Ghiai, Ebrahimzadeh, & Tahmasebinia, 2022).

(ii) Virtual Reality (VR)

In contrast to augmented reality, which can be integrated into the user's surrounding environment, virtual reality is an emerging technology that presents a unique opportunity for teaching and learning with intensive communication activities. It aims at creating a completely artificial experience that can substitute the real world, rather than enhance it, which offers a unique and powerful learning experience to polish communication skills and prepare learners

for real-world scenarios. VR is particularly effective in situations where real-world environments are difficult or impossible to replicate, such as medical procedures or hazardous environments. In communication-centered learning activities, VR can be used to simulate high-pressure communication scenarios, such as negotiations or conflict resolution.

Comparing with other technologies, VR offers a more sophisticated and immersive learning experience. The development of virtual reality (VR) applications is a complex process that requires specialized expertise, in which meant a significantly higher developing cost that involved technical personnel.

(iii) WebXR

When choosing the appropriate technology for communication-centered learning activities, it is crucial to consider the limitations of both AR and VR. AR necessitates a real-world environment, which may not be feasible or suitable for all cases. On the other hand, VR can be costly to implement and may require specialized equipment. To strike a balance between AR and VR, an emerging technology known as eXtended reality (XR) has gained attention in recent years (Meccawy, 2022).

WebXR is a developing technology that amalgamates virtual and augmented reality with HTML, CSS and Javascripts coding like WebGL, Three.js, and A-Frame (Baruah, 2021). It enables learners to engage with educational content in a more dynamic and interactive manner that can be accessed via web browsers. Instead of introducing a new display type to the XR continuum, WebXR enables the deployment of virtual worlds within a web environment (Rzeszewski & Orylski, 2021). It provides a consistent interface for accessing VR/AR hardware across different devices, making it easier for developers to create and deploy immersive experiences on the web.

WebXR provides flexible ways to make use of a virtual environment (Bao, Tran, Nguyen, Pham, Lee, & Park, 2022), and is transforming the landscape of learning activities by providing an innovative and immersive learning experience to users to engage in learning activities, provides greater flexibility, accessibility, and interactivity no matter a physical VR device is available or not. It also facilitates a more realistic and immersive interaction with educational content, enabling more profound comprehension of intricate concepts and scenarios. WebXR allows learners to navigate virtual environments, manipulate 3D objects, and partake in interactive simulations, all within the confinements of their web browser, without the need to install any native applications (Pilat, Arapi, Pappas, Omieljanowicz, Prokopiuk, & Tamre, 2022).

Furthermore, WebXR technology enhances the learning experience by providing a more interactive and collaborative environment. WEBXR has gained prominence among educators and researchers as a tool for enhancing learning activities. For example, AL-Hafidz, Sukaridhoto, Al-Rasyid, Budiarti, Mardhotillah, Amalia & Satrio (2021) have successfully developed an immersive platform that enables doctors, lecturers, and students to collaborate in a virtual environment, facilitating real-time medical simulations with WebXR technology. Other application examples include Rodríguez, Dal Peraro, & Abriata (2021), Teshima, Sakaguchi, Mitsue, Uehara & Sugimoto (2022), Wong, Bayoumy, Freke & Cabo (2022), Luigini, Fanini, Basso, & Basso (2020), and Mogra & Guo (2023).

Details of the Project

The project aims to provide an exemplary model for the teaching and learning of Chinese language. Through task-based practice, students will engage with the language in a practical and immersive manner, resulting in the development of their language skills and knowledge through hands-on experience.

It also seeks to adopt an innovative approach to interdisciplinary collaborative learning, which will establish a dynamic learning environment that encourages students to collaborate across different fields of study.

(i) Project Timeline

It will be run in two stages:

Phase One	Establish a Virtual Chinese Language Learning Center that will utilize WebXR technology, with the goal of providing students with a methodically designed virtual platform to improve their language and communication skills, as well as to develop proficiency in WebXR coding techniques.
Phase Two	Set up a transdisciplinary assignment mechanism which will enable students to acquire and apply the Chinese language using cutting-edge information and communication technology (ICT), with the goal of enhancing the diffusion and communication of the Chinese language through practical experience.

Throughout the assignment period, students from each specialization will:

- Engage in idea exchange and appreciation to jointly develop effective solutions for producing works that adhere to correct formatting requirements;
- Select appropriate quantities and qualities of information, and;
- Determine optimal methods for display.

(ii) Design of Pedagogy and Activities

The pedagogy of the curriculum design for the virtual learning environment is underpinned by the RECTi model developed by Dr. Chi Ming Chan. A fundamental aspect of this model is the design of activities that are engaging, meaningful, and relevant to the learners' needs and interests. The approach aims at promoting language proficiency and skill development in a systematic and comprehensive manner, with the integration of information and communication technology.

RECTi model contains the following elements:

Revitalize	<ul style="list-style-type: none"> • Reviewing and practicing previously learned vocabulary and grammar structures • Discussing current events and cultural topics related to the language being studied • Reading and discussing works written in the target language
Enhance	<ul style="list-style-type: none"> • Practicing listening comprehension through audio recordings and videos • Engaging in role-playing scenarios to practice using the language in real-life situations • Participating in debates or discussions on controversial topics
Create	<ul style="list-style-type: none"> • Creating works related to a specific topic in the target language • Collaborating with peers to create a group project or presentation • Writing summaries or responses to articles, news stories, or literary works in the target language
Transfer	<ul style="list-style-type: none"> • Participating in community events or activities where the target language is spoken • Engaging in independent study or research projects related to the language and culture being studied • Applying for jobs or graduate programs that requires proficiency in the target language
Integrate	<ul style="list-style-type: none"> • Engaging in debates or discussions on current issues or topics of interest, which requires them to use their language skills to express and defend their opinion • Participating in role-plays, where they act out different scenarios using appropriate language and communication skills • Working in groups to complete a project, such as creating a presentation or a video, by using their language skills to communicate effectively and collaborate with others

The key is to design activities that are engaging, meaningful, and relevant to the learners' needs and interests, whilst promoting language proficiency and skill development in a systematic and comprehensive way.

(iii) Choice of WebXR platforms

We have developed two platform versions using different coding languages to test the accessibility and usability, as well as evaluate the efficiency of development and management. One version was created using A-frame as the primary coding language for development, while another was built using framevr.io. These tools have been utilized to create an immersive and engaging virtual learning environment for students to enhance their proficiency in the Chinese language.

In order to ensure the quality of our Virtual Chinese Language Learning Centre (VCCLC), we have also established a pre-launch test server running Apache 2 on an Ubuntu platform. Although it is currently only used for test-running purposes due to technical issues, we intend to make it available to students for testing by September 2023.



Figure 1: Two Scenes in Framevr.io



Figure 2: Developing Scene with A-frame

Challenges of Developing WebXR Platform for Learning and Teaching

Several infrastructure issues have been identified that require immediate attention. These issues include the server capacity, network access, and server maintenance. Failure to address these issues in a timely and effective manner could have a significant negative impact on the development and functionality of our virtual learning platform.

The success of our project is reliant on the provision of technical support from the IT department. However, our current capacity to develop tools and equipment is insufficient to meet our needs, as demonstrated by the inadequate computer performance that hinders smooth rendering in Blender, Unity or Real Engine 5. A need to upgrade the infrastructure is deemed essential.

In addition to hardware inadequacies, the lack of familiarity among teachers with the coding of WebXR poses another obstacle to the full-scale deployment of the system. To overcome this challenge, we are considering the solution of engaging student helpers who possess the requisite computer knowledge and skills.

Another critical aspect of our project is to ensure that we address the security challenges that may arise. The primary concerns are privacy, security, and data protection of our students. We must ensure that any virtual learning environment we have created is secure and protected against unauthorized access or data breaches. The potential security challenge arises from the issue of login credentials on non-university approved web platforms. If these credentials are compromised, it could result in the unauthorized access and leakage of students' data. This critical consideration brings us to another issue: whether to develop the platform or website entirely in-house or employ a ready-made hosting service. We must carefully weigh the pros and cons of each option to ensure that we make the best decision for our project.

Aside from the aforementioned challenges, there are other issues that need to be considered to ensure the success of the project. One such issue is the lack of native support for WebXR format in some browsers and tools. This, coupled with compatibility issues faced by outdated browsers and mobile devices, creates a challenge for both the developers and students. To address this issue, the replacement of outdated machines and devices may be necessary.

An additional challenge that must be addressed is the lack of computer proficiency among teachers and students from academic disciplines with limited digital literacy. The development, deployment, and utilization of the WebXR platform require a certain level of competency, which may not be met by all users. To overcome this challenge, we propose the organization of seminars and hands-on workshops which targets at enhancing the computer proficiencies of both teachers and students.

Expected Impacts of the Project

Notwithstanding the challenges that require attention, the development of the WebXR platform is progressing according to plan. Upon completion, the project is expected to yield several significant impacts that will benefit students, educators and alike.

One key goal would be the integration of the curriculum in a meaningful way that promotes effective learning. This, in turn, has the potential to improve academic outcomes and foster a more comprehensive understanding of the target language and culture.

Another goal is the establishment of a benchmark for the development of WebXR-based platforms for transdisciplinary collaborations with other courses. Our project is at the forerunner of innovative cross-disciplinary learning, and we anticipate that it will inspire other teachers to pursue similar initiatives in the future.

Future Planning

Upon completion, the final WebXR learning centre will be opened as a knowledge hub within the Virtual Chinese Language Learning Centre. This hub will provide students with an interactive and immersive learning experience that promotes their Chinese language proficiency. By integrating the WebXR platform into the virtual learning environment, students will have access to an extensive range of resources and tools that facilitate their language learning journey.

If additional funding becomes available, we plan to make students' WebXR works accessible to the public for educational purposes. This initiative will serve as a form of knowledge exchange, where students can share their knowledge and insights with the wider community. By providing access to these resources, we hope to foster a culture of collaboration and innovation that will benefit the wider academic community.

Conclusion

WebXR offers numerous benefits for learning and teaching in communication-intensive language courses. It provides a more realistic and immersive learning experience, increased accessibility and flexibility, and opportunities for collaboration and communication among learners and instructors. As this technology continues to evolve, it presents exciting prospects for the future of language education. By adopting the latest technology of WebXR, our project aims to empower students to envision, create, and deliver innovative learning experiences within the framework of their respective academic fields. The project's emphasis on providing a meaningful and relevant context for language development is intended to equip students with the tools and skills necessary to succeed in an increasingly interconnected and globalized world. With the creation of an immersive and engaging virtual learning environment, the

platform established by our project will offer students the opportunity to develop their Chinese language proficiency in a practical and relevant context.

References

- Al Hafidz, I. A., Sukaridhoto, S., Al Rasyid, M. U. H., Budiarti, R. P. N., Mardhotillah, R. R., Amalia, R. & Satrio, N. A. (2021). Design of collaborative WebXR for medical learning platform. In *2021 International Electronics Symposium (IES)* (pp. 499-504). IEEE, <https://ieeexplore.ieee.org/abstract/document/9593951>
- Al-Dosakee, K., & Ozdamli, F. (2021). Gamification in teaching and learning languages: A systematic literature review. *Revista Romaneasca Pentru Educatie Multidimensionala*, 13(2), 559-577.
- Alenezi, M., & Akour, M. (2023). Digital Transformation Blueprint in Higher Education: A Case Study of PSU. *Sustainability*, 15(10), <https://www.mdpi.com/2071-1050/15/10/8204>
- Arena, F., Collotta, M., Pau, G., & Termine, F. (2022). An overview of augmented reality. *Computers*, 11(2), 28.
- Bao, L., Tran, S. V. T., Nguyen, T. L., Pham, H. C., Lee, D., & Park, C. (2022). Cross-platform virtual reality for real-time construction safety training using immersive web and industry foundation classes. *Automation in Construction*, 143, <https://www.sciencedirect.com/science/article/abs/pii/S0926580522004356>
- Baruah, R. (2021). *AR and VR using the WebXR API: learn to create immersive content with WebGL, Three.js, and A-Frame*. Apress.
- Blyth, C. (2018). Immersive technologies and language learning. *Foreign Language Annals*, 51(1), 225-232.
- Bolter, J. D., Engberg, M., & MacIntyre, B. (2021). *Reality media: Augmented and virtual reality*. MIT Press.
- Ghobadi, M., Shirowzhan, S., Ghiai, M. M., Mohammad Ebrahimzadeh, F., & Tahmasebinia, F. (2022). Augmented Reality Applications in Education and Examining Key Factors Affecting the Users' Behaviors. *Education Sciences*, 13(1), <https://www.mdpi.com/2227-7102/13/1/10>
- HKU (2022). Communicatio-Intesive Courses. <https://cics.hku.hk/>
- Kuhail, M. A., ElSayary, A., Farooq, S., & Alghamdi, A. (2022, September). Exploring immersive learning experiences: A survey. In *Informatics* (Vol. 9, No. 4, p. 75). MDPI.
- Leung, C. (2005). Convivial communication: recontextualizing communicative competence. *International Journal of Applied Linguistics*, 15(2) (pp.119-144).
- Lin, T. J., & Lan, Y. J. (2015). Language learning in virtual reality environments: Past, present, and future. *Journal of Educational Technology & Society*, 18(4) (pp.486-497).

- Liontas, J. I. (2021). Teaching and learning English in AR-infused worlds. *TESOL Connections*, (pp.1-8).
- Littewood, William (2011). Communicative Language Teaching: An Expanding Concept for a Changing World, In Eli Hinkel (ed.) *Handbook of Research in Second*, vol.ii (pp. 541-557). New York & London, Routledge.
- Luigini, A., Fanini, B., Basso, A., & Basso, D. (2020). Heritage education through serious games. A web-based proposal for primary schools to cope with distance learning. *VITRUVIO-International Journal of Architectural Technology and Sustainability*, 5(2), 73-85.
- Manegre, M., & Gutiérrez-Colón, M. (2023). Foreign language learning through collaborative writing in knowledge building forums. *Interactive Learning Environments*, 31(3), 1364-1376.
- Matahari, T. (2022). WebXR Asset Management in Developing Virtual Reality Learning Media. *Indonesian Journal of Computing, Engineering and Design (IJoCED)*, 4(1), 38-46.
- Meccawy, M. (2022). Creating an immersive xr learning experience: A roadmap for educators. *Electronics*, 11(21), <https://www.mdpi.com/2079-9292/11/21/3547>
- Mogra, I., & Guo, X. (2023, January). Using Web 3D and WebXR Game to Enhance Engagement in Primary School Learning. In *2022 IEEE International Symposium on Multimedia (ISM)*.
- Nursabra, N., Syamsinar, S., Nurchalis, N. F., & Nuralima, R. (2023). The Use of Augmented Reality Flashcard in Enriching Students' vocabulary. *Cokroaminoto Journal of Primary Education*, 6(1), (pp.73-81), <https://e-journal.my.id/cjpe/article/view/2493>
- Parmaxi, Antigoni, and Demetriou, Alan A.. (2020). Augmented reality in language learning: A state - of - the - art review of 2014–2019. *Journal of Computer Assisted Learning*, 36(6), (pp.861-875), <https://onlinelibrary.wiley.com/doi/full/10.1111/jcal.12486>
- Pilat, Z., Arapi, P., Pappas, N., Omieljanowicz, M., Prokopiuk, N., & Tamre, M. (2022, June). Advanced ICT solutions in a distance vocational education and training in the field of robotics. In *IOP Conference Series: Materials Science and Engineering* (Vol. 1239, No. 1, p. 012001). IOP Publishing, <https://iopscience.iop.org/article/10.1088/1757-899X/1239/1/012001/meta>
- Rodríguez, F. C., Dal Peraro, M., & Abriata, L. A. (2021). Democratizing interactive, immersive experiences for science education with WebXR. *Nature Computational Science*, 1(10), 631-632.
- Rzeszewski, M., & Orylski, M. (2021). Usability of WebXR visualizations in urban planning. *ISPRS International Journal of Geo-Information*, 10(11), 721.
- Salmons, J. (2023). *Learning to collaborate, collaborating to learn: Engaging students in the classroom and online.*

- Siddig, B. (2020). Social media in teaching of languages. *International Journal of Emerging Technologies in Learning (iJET)*, 15(12), 72-80.
- Stickler, U., & Hampel, R. (2015). Transforming teaching: New skills for online language learning spaces. In *Developing online language teaching: Research-based pedagogies and reflective practices* (pp. 63-77). London: Palgrave Macmillan UK.
- Taylor & Francis. Dhimolea, T. K., Kaplan-Rakowski, R., & Lin, L. (2022). A systematic review of research on high-immersion virtual reality for language learning. *TechTrends*, 66(5) (pp.810-824).
- Teo Peter (2019). Teaching for the 21st century: A case for dialogic pedagogy. *Learning, Culture and Social Interaction* 21 (pp.170-178), <https://www.sciencedirect.com/science/article/abs/pii/S2210656119300030>
- Teshima, Y., Sakaguchi, A., Mitsue, Y., Uehara, N., & Sugimoto, K. (2022, October). Development of WebXR-based Environment for Engineering Experiments. In *2022 IEEE Frontiers in Education Conference (FIE)* (pp. 1-5). IEEE.
- Vijayaratnam. Phawani (2012). Developing Higher Order Thinking Skills and Team Commitment via Group Problem Solving: A Bridge to the Real World. *Procedia - Social and Behavioral Sciences*, 66 (pp.53-63), <https://www.sciencedirect.com/science/article/pii/S1877042812052329>
- Wedyan, M., Falah, J., Elshaweesh, O., Alfalah, S. F., & Alazab, M. (2022). Augmented reality-based English language learning: importance and state of the art. *Electronics*, 11(17), <https://www.mdpi.com/2079-9292/11/17/2692>
- Wong, J., Bayoumy, S., Freke, A., & Cabo, A. (2022). Augmented reality for learning mathematics: A pilot study with webxr as an accessible tool. In *Towards a new future in engineering education, new scenarios that european alliances of tech universities open up* (pp. 1805-1814). Universitat Politècnica de Catalunya.
- Yildiz Yunus (2020). Task-based Language Teaching: An Approach in Spotlight to Propel Language Learning Forward. *International Journal of Social Sciences & Educational Studies* (online), 7(1) (pp72-77), <https://ijsses.tiu.edu.iq/index.php/volume-7-issue-1-march-2020/>
- Zhang, Chun (2020). From Face-to-Face to Screen-to-Screen: CFL Teachers' Beliefs about Digital Teaching Competence during the Pandemic. *International Journal of Chinese Language Teaching*, 1:1, 35-52, <https://doi.org/10.46451/ijcl>

Contact email: mwchung@hku.hk

Educational Partnerships That Can Drive the Activation of Renewable Knowledge Process, Using the Public Libraries Infrastructure

Ioana Cornelia Cristina Crihană, The National Association of Public Librarians and Libraries in Romania, Romania

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The library environment in Romania is very fragmented, having neither the habit nor the culture of cooperation and partnerships. Driven by divergent interests, the library environment rarely interacts with other stakeholders for common goals, does not engage outside the narrow goals of micro-groups and does not actively participate in the development of the knowledge society. No matter how successful they are individually, libraries do not have enough vision and they lack the overall picture of how they can contribute to a better use of knowledge and to build a more efficient and impactful information literacy structure. The cultivation of information skills is one of the libraries major objectives, while representing the guarantee of sustainable and resilient efforts in terms of personal and professional development of individuals. Objectives: Our goal is to stimulate libraries as individual entities, but also the various consortia of public-private entities in the culture field to get involved as partnership brokers in information literacy to generate resilience skills that contribute to activating latent knowledge. Considered as actionable assets, renewable knowledge acts like a common base of intellectual acquisitions that are in the interest of heterogeneous library users' communities. This article aims to bring public libraries to the forefront as partners for renewable knowledge. After analyzing the partnership broker concept and the renewable knowledge significance, we will clarify how libraries can be encouraged to engage in cultivating educational partnerships with various public or private entities to contribute to activating renewable knowledge in libraries.

Keywords: Renewable Knowledge, Partnership Brokering, Library Ecosystems, Socio-Technical Theory, Qualitative Transformation of Communities

iafor

The International Academic Forum
www.iafor.org

Introduction

This paper presents a new perspective on the civilizing function of libraries in partnership brokering (Crihană, 2014), arguing for an exploratory study to transform librarians into engaged and responsible curators of knowledge assets. Taking into account the socio-intellectual and professional profile of librarians, they are able to transform themselves into curators of knowledge and facilitators of proactive and responsible partnerships, libraries can effectively contribute to the sustainable development and education of communities.

According to the global trends and societal demands driven by technology, libraries have evolved into spaces of collective and shared knowledge, responding to the information and continuous development needs of users while facilitating the qualitative transformation of communities. In response to evolving global trends and the specific demands of a technology-based society, libraries have long been recognized as essential institutions in promoting the dissemination of knowledge and societal development. Starting from this premise, this article analyzes the role of libraries in partnership brokerage activities, underlining the essential importance of renewable knowledge in increasing the impact of libraries in the process of reconfiguration and valorization of pre-existing elements of knowledge, with the support of technology.

Literature review has demonstrated that libraries have undergone a significant transformation, expanding their role beyond traditional information repositories. In contemporary society, libraries are recognized as hubs of collective knowledge, addressing diverse user needs while actively contributing to the qualitative progress of communities. This shift in perception underscores the importance of fostering collaborative partnerships to maximize the potential of libraries as key agents of change.

Libraries have traditionally been seen as promoters of education, culture and the dissemination of knowledge. However, with the advancement of technology and its empowerment with the digital age, libraries have transcended their conventional roles and become dynamic centers of learning and continuous development. By embracing the civilizing function, libraries aim more than ever to empower individuals, promote a culture of sustainability and drive positive societal transformations.

Partnerships in Library Ecosystems

Libraries incorporate complex bases of knowledge, skills, access to the heterogeneous resources, etc. and allow users to explore new areas of knowledge in a collaborative, interaction-based manner. As a defining added value, libraries offer users the opportunity to practice and validate their own creative ideas, becoming part of the process of co-creating value.

Recognizing the ever-growing complexity of societal challenges, libraries are increasingly embracing the power of partnerships. Collaborative endeavors with various stakeholders, including governmental bodies, non-profit organizations, educational institutions, and community groups, enable libraries to broaden their reach and impact. These partnerships provide valuable resources, expertise, and collaboration networks that enhance the effectiveness and sustainability of library initiatives.

To fully leverage the potential of partnerships, librarians play a critical role as sustainable partnership brokers. Librarians must adopt an engaged and responsible approach in curating knowledge assets, ensuring continuous renewal, and fostering collaboration with diverse stakeholders. Equipped with the necessary skills and expertise, librarians act as facilitators, connecting different actors, and orchestrating joint initiatives for the benefit of sustainable and educated communities.

The introduction into the collective mind of the concept of Partnership Broker and the multiple roles it plays, depending on the stage a partnership goes through, is intended to lead to the creation of a coalition of partners for community cohesion, which will help both libraries, NGOs and business entities active at the community level to realize their role as a socio-economic catalyst because they will become centers of influence, learning and development of public-private partnerships.

This paper aims to demonstrate, based on the case study of the project **SHIFT: MetamorphoSiS of cultural Heritage Into augmented hypermedia assets For enhanced accessibiliTy and inclusion** - a European research and innovation initiative funded under the Horizon 2021-2027 program that aims to bring the values of cultural heritage closer to the public - that supporting multifunctional partnerships is essential for the sustainable development of the ecosystem of library services and implicitly of the community through partnerships of knowledge, to support users of library services to evolve by activating renewable knowledge resources.

Renewable Knowledge (RK) defines knowledge assets as a renewable resource (Baarbé, et al., Myronenko, 2016); (Baarbé & de Beer, 2017). A renewable resource is that type of resource that, although it supports the influence of environmental interactions, can be used, recombined and reused with new meanings and in different applying manners. Therefore, as a renewable collective asset. (Brown and Duguid, 1998), knowledge has a hierarchical structure consisting of: data, information, knowledge and wisdom. (Matei and Matei, 2011).

This paper initiates a preliminary analysis on the dynamics of creating and storing Renewable Knowledge in libraries. The main focus is on understanding, recombining, reinterpreting and operationalizing private Renewable Knowledge as a universal public good that generates transformative creativity, co-creation and transformative learning. The current research represents a first attempt to probe the way in which basic knowledge becomes Renewable Knowledge and the manner in which public libraries can play an essential role in this process.

SHIFT – A Case Study for Actioning RK in Libraries

The main defining factor for Renewable Knowledge is the reusable nature of knowledge in general which, by reshaping or putting in a new learning paradigm, generates new cognitive content, enriched both as information and as interpretation. This paper intends to refine the research by developing a set of particular tools for defining and putting into practice the concept of Renewable Knowledge in the current work of cultural operators, using SHIFT project as a relevant case study on the dynamics of Renewable Knowledge in libraries.

Renewable Knowledge is generally perceived as the sum of all collections, information, and knowledge developed and managed by libraries and ensuring easy community access to them, either face to face or through technology and communication channels, based on technology. In the SHIFT project case, libraries are invited to contribute their own knowledge

resources (photo collections, books, short movies, digital stories, art objects, etc.) to train AI algorithms for the optimization of these cultural resources in terms of content appealing, accessibility, inclusion and monetary opportunities.

A New Paradigm for Supporting Renewable Knowledge

According to the current trends and the specific requirements of society based on technology, libraries today are spaces designed to meet the information and continuous development needs of users and contribute to the qualitative transformation of society. As alternative spaces for lifelong learning, libraries provide an organized framework for study and experimentation for quality personal and professional training, critically contributing to increasing the quality of life.

The unprecedented expansion of web-based knowledge and the the exponential expansion of data volumes, combined with solid techniques of investigation and statistical analysis of data, have led to a huge potential for change in all aspects of life, leading to appearance of new categories of library services. Amid of the successive financial crises, the emergence of modern technologies, internationalization and globalization, libraries have become increasingly aware that it is necessary to identify innovative ways to survive and achieve strategic goals and their community, educational and civilizing mission.

Libraries offer to their users a large series of technology-based services (in the aim of exploration, testing & validation). Libraries are able to become trend setters for ordinary users by promoting the benefits of technology on a large scale. Libraries are spaces for collaborative learning, where users are encouraged to innovate, co-create and become more responsible in terms of resilience skills and actionable knowledge.

Libraries – Oriented Towards Cultivating Multi-Stakeholder Partnerships

Cultivating multi-stakeholder partnerships is essential for the sustainable development of the library service ecosystem, the emancipation of the community through knowledge partnerships and, implicitly, for the sustainable and resilient evolution of library services by activating Renewable Knowledge resources.

- Libraries – innovation-oriented institutions
- Librarians - involved and responsible curators of knowledge assets, aggregators of renewable knowledge and brokers of sustainable partnerships for educated communities
- Libraries – actors of a common reform process in supporting the user community to have optimal access to modern services
- Libraries are able to have a huge contribution to the sustainable progress of society
- Libraries are capable to integrate modern, technology-based services in order to encourage the innovation and co-creation
- Libraries could manage a complex process of developing collective knowledge, by creating new levers to support and cultivate renewable knowledge partnerships

This paper shares the ongoing research within the SHIFT project, with the aim of providing solutions for the creation and consolidation of knowledge partnerships in supporting technological progress in the field of Cultural Heritage (CH).

The development of SHIFT tools is based on the collaboration between the communities of stakeholders represented in the project, mobilized by libraries and museums, CH institutions and professionals in the field of heritage conservation and leading software developers in their fields, involved in the design of advanced technological solutions.

The SHIFT project proposes modern ways of making CH elements accessible through reinterpretation, updating translations, animation, other multi-sensory techniques, through which users will become part of the process of understanding and interpreting CH assets.

SHIFT – A Partnership Including a Mix of Entities

Public libraries are increasingly assimilated with institutions of knowledge that connect communities, especially through the nature of the relationships they cultivate with their users. The SHIFT project brings together in a powerful consortium the most diverse institutions of knowledge, namely libraries, museums, associations and foundations in the field of heritage and ethics, universities, SMEs, software integrators, etc.

The SHIFT project aims to enrich the experience of interacting with cultural assets through visual, auditory, and sensory modalities, such as using haptics. It will develop tools and methodologies to enable contemporary description of cultural assets through language evolution models. It will leverage on the advances of Artificial Intelligence (AI) and Machine Learning (ML) technologies to improve CH access to European citizens experiencing sensory impairment.

The SHIFT project aims to apply in libraries and museums the latest innovations in fields such as: artificial intelligence, machine learning, multimodal data processing, digital content transformation methodologies, semantic representation, linguistic analysis of historical records and the use of haptic interfaces to communicate effectively the new experiences of all citizens (including people with disabilities).

SHIFT – The Bet With Technology

SHIFT partners aim to stimulate libraries as individual entities, but also the various consortia of public-private entities in the culture field to get involved as partnership brokers in introducing technology in cultural environment to generate resilience skills that contribute to activating latent and pre-existing knowledge. They intend to bring public libraries to the forefront as partners for renewable knowledge. As native partnership brokers at the community level, libraries are able to engage in cultivating educational partnerships with various public or private entities.

The need to renew the knowledge commons aligns perfectly with the socio-technical perspective and agenda. The socio-technical theory (Mumford, 2020) recognizes the interconnectedness of technical and social components in any workplace, emphasizing that both subsystems must be considered equally for optimal system performance. With the rise of the digital revolution, the integration of the socio-technical approach becomes even more critical in navigating uncertain transitions and addressing problematic interfaces with the system's environment.

Integrating socio-technical principles into the development of knowledge commons enables a better understanding of how human, social, and organizational factors influence the technical

systems and working methods employed. This humanization of processes leads to more fluid and reliable work systems, where the technical subsystem involves tools and processes for creating products and services, while the social subsystem relates people to the technical system and to each other.

The commons theory, with its focus on shared governance of resources and knowledge, provides a valuable framework for the permanent renewal of knowledge in a rapidly changing digital age. Elinor Ostrom's work on commons governance demonstrates that communities can successfully manage resource systems without relying solely on the state or market institutions. In the context of knowledge, this approach becomes essential for ensuring democratic access to information and respecting property rights policies.

However, the age of digitalization also brings its challenges, particularly in balancing common knowledge and knowledge shared within specific groups. The critical imperative lies in formalizing and regulating protocols for using common goods and sharing knowledge in communication systems, ensuring that heritage of knowledge is preserved while enabling widespread access.

Organizations, recognizing the importance of knowledge development for maintaining a competitive advantage, have designed open and innovative organizational structures. Nonetheless, the ever-changing nature of knowledge requires constant updates and renewal. By combining material, human, and symbolic resources, organizations can enhance the renewal of knowledge between product and process developments, ensuring they stay relevant and adaptive in the face of evolving technologies and societal needs.

Renewing the knowledge commons aligns seamlessly with the socio-technical perspective and agenda. The integration of socio-technical principles into the management and development of shared knowledge ensures a holistic approach, where both technical and social components are considered, leading to more robust and adaptable systems. By adopting the principles of commons governance, organizations can foster a democratic and inclusive approach to knowledge sharing while respecting property rights and fostering innovation. In the digital age, where knowledge is rapidly evolving, the need for continuous renewal becomes even more critical, and the socio-technical perspective offers valuable insights and strategies to achieve this goal effectively.

Conclusion

As libraries continue to evolve and adapt to the changing needs of society, their civilizing function becomes increasingly relevant. By embracing innovative partnerships and empowering librarians as sustainable partnership brokers, libraries can effectively address the demands of the digital age, nurture knowledge assets, and contribute significantly to the qualitative transformation of communities. This article calls for further exploratory research to delve into the transformative potential of partnerships in enhancing the civilizing function of libraries for a sustainable and educated future.

As the main partnership broker at the community level, the library is responsible for initiating and cultivating partnerships that connect people, ideas and innovation. The library's mission is to demonstrate that its role is no longer just to offer books or IT services, but to fully contribute to the emancipation and fundamental civilization of communities. The cultivation of digital skills, the introduction of modern technology in current activities and the

valorisation of pre-existing and renewed cultural portfolios represent major objectives of libraries, at the same time offering the guarantee of sustainable personal and professional development of individuals and organizations.

To meet the need for continuous knowledge renewal, organizations have embraced innovative and open organizational structures. However, some structures may still be inadequate or ineffective. Recognizing the importance of maintaining a competitive advantage, organizations have realized the effectiveness of investing in a cohesive knowledge development process. This involves establishing a harmonious relationship between process design, product development and the skills, values and knowledge base of human actors. As knowledge is not universally available asset and requires periodic updating, the combination of material, human and symbolic resources has been shown to enhance knowledge renewal between product and process development.

In conclusion, the renewal of common knowledge is closely related to the socio-technical perspective and agenda. The integration of socio-technical principles in the management and development of shared knowledge ensures a holistic approach where technical and social components are considered equally. This results in more resilient and adaptable systems. By embracing the principles of shared governance, organizations can encourage the democratic and inclusive sharing of knowledge while respecting property rights and encouraging innovation. In the digital era, characterized by a rapid evolution of knowledge, the need for continuous renewal is paramount, and the socio-technical perspective offers valuable insights and strategies to achieve this effectively.

References

- Baarbé, J., de Beer, J. (2017). A data commons for food security. Proceedings of the 2017 IASC Conference Open AIR, Working Paper No.7/17, pg. 38, 2017.
- Crihană, I. (2014). <https://partnershipbrokers.org/w/journal/brokering-long-term-partnerships-a-cross-border-approach-based-on-a-romanian-experience/>
- Matei, A. I., Matei, L. (2011). Knowledge marketing and development in the new knowledge-based economy. In 10th International Congress of the International Association on Public and Nonprofit Marketing, 2011, April.
- Mumford, E. (2000). A Socio-Technical Approach to Systems Design, <https://link.springer.com/article/10.1007/PL00010345>
- Myronenko, V. Premises and features of building elements of artificial intellect in systems of on-line control over agrarian and industrial complex. UDC 681.785.55:681.3.07, 2016.
- Ostrom, E. (1990). Governing the Commons The evolution of institutions for collective action, published by The Press Syndicate of The University of Cambridge, The Pitt Building, Trumpington Street, Cambridge, United Kingdom.

Understanding the Current Context of Leadership Development Through Dietetic Education in Canada

Billie Jane Hermosura, University of Ottawa, Canada

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Background: Leadership education includes individual development and learning from effective leaders. Evidence in the literature suggest education leaders and curriculum designers should revise health professions education to include a more explicit focus on leadership. In Canada there is a new competency domain related to dietetic leadership, however little is known about Canadian dietitians' leadership development.

Method: To develop a foundational understanding of how leadership skills are currently taught in dietetic education in Canada, a documentary analysis of 13 Canadian dietetic programs and a focus group interview with dietetic educators was conducted as one phase of a doctoral study. The interview was recorded and transcribed verbatim. A data extraction tool was used to analyze the program documents and thematic analysis was conducted on the interview transcript.

Results: Findings demonstrate that leadership development may not be explicit in dietetic education, but transferrable skills aligned with leadership emerged. The notion of self-leadership and participating in extracurricular activities were also emphasized in the focus group interview. The role of the educator is important in informing, designing, and delivering the program. In addition to their teaching roles, educators play a critical role in shaping learners' professional identity and career path.

Conclusion: Leadership is important in dietetics and can be cultivated through dietetic education and further developed throughout dietetic practice. To best understand the context of leadership in dietetic education and practice, it is important to understand how it is currently taught in different programs as well as practicing dietitians' perspectives.

Keywords: Leadership Development, Health Professions Education, Competencies, Dietetics

iafor

The International Academic Forum
www.iafor.org

Introduction

Competency standards are needed in health professions to ensure practitioners have the abilities required to meet the needs of the people they serve (Royal College of Physicians and Surgeons of Canada [Royal College], n.d.). For example, CanMEDS is a framework that groups physician abilities under seven roles, whereby a competent physician integrates the competencies of all seven roles into their practice (Royal College, n.d.). In Canada, the Integrated Competencies of Dietetic Education and Practice (ICDEP) was recently revised to include leadership as part of a new competency domain. The ICDEP has *Practice Competencies* embedded throughout seven interrelated *Domains of Competence*. The ICDEP is useful for education programs to guide curriculum and assessment of candidate learning outcomes, creating specifications for the Canadian Dietetic Registration Exam, and evaluating compliance with dietetic education programs' accreditation standard. Perhaps more importantly, however, is that the ICDEP provides a common understanding of entry-level dietetic practice.

Despite the need for competency standards, professional education has not kept pace with healthcare challenges, largely because of fragmented, outdated, and static curricula that produce ill-equipped graduates (Frenk et al., 2010). One area that some suggest needs greater development is leadership skills (Brewer et al., 2016; Frank, Snell, et al., 2015). Leadership in the health sector continues to be recognized as a key factor in improving healthcare (Marchildon & Fletcher, 2016). Leadership skills can help health professionals work effectively in a dynamic environment, promote collaborative practice, and minimize siloed work.

Leadership education includes individual development and learning from effective leaders (Buschlen & Guthrie, 2014). Evidence in the literature suggest education leaders and curriculum designers should revise health professions education to include a more explicit focus on leadership (Beacham et al., 2017; Bradd et al., 2019; Frenk et al., 2010). Literature related to leadership and dietetics stems from traditional areas of dietetic practice in clinical nutrition and foodservice management, where leadership tends to relate to positional authority a dietitian might have (Arensberg, et al., 2019; Morris & Matthews, 2014; Patten et al., 2021). Limited research that investigates leadership and dietetics from the perspective of competency-based education (Boyce, 2014; Tweedie et al., 2021).

Dietitians continue to find their place within the health care hierarchy and explore how they recognized as leaders in the healthcare system (Partnership for Dietetic Education and Practice, 2020). As part of a doctoral study which aims to understand the ways in which dietitians develop leadership and use leadership skills in practice, the objective of this paper is to discuss the ways leadership skills are currently taught in dietetic education in Canada.

Methods

The doctoral study had a three-phase qualitative design which involved a diverse array of data collection techniques and methods (Hermosura, 2022). This paper focuses on Phase I of the study, which addresses the research question, “in what ways are leadership skills currently taught in dietetic education in Canada?” Although there were three distinct phases, the phases were interconnected and results in one phase influenced work in another. Triangulation was achieved by employing multiple methods for collecting and analyzing data, redundancy in

data collection, and the inclusion of multiple perspectives to clarify meaning (Farmer et al., 2006; Stake, 2006).

Phase I included a documentary analysis of a selection of program documents, and then a focus group with dietetic educators. To develop a foundational understanding of 13 dietetic programs in Canada, publicly available program documents were gathered through an online search of program website; the process started mid-January 2020. Additional program documents were sent from eight programs. Curriculum document analysis was conducted using a standardized extraction tool. Then, the preliminary findings from the documentary analysis were presented to the focus group. A 90-minute focus group discussion with four dietetic educators occurred in March 2020. Additional focus groups were planned, however participant attrition occurred due to the beginning of the COVID-19 pandemic. The purpose of the focus group interview was to obtain insights from dietetic educators about their programs by providing educators with the opportunity to validate and/or elaborate on the findings from the document analysis. A thematic analysis of interview transcript was conducted.

Findings

The documentary analysis in Phase I included a review of publicly available information on websites (i.e., admission requirements such as portfolios, resources for prospective students, promotional materials, survey results, and technical reports) and course documents (i.e., course outlines, schedules or syllabi, course assignment details, performance assessments or rubrics, and internship education program manuals). The documents were analyzed against pre-identified ICDEP 2013 competencies related to leadership. In addition, other ways leadership might be taught in their respective courses beyond the minimum practice competency were considered. Based on the documents reviewed, limited information on the details of the various activities, how students are evaluated, and innovative strategies that programs integrate into courses were available.

Preliminary findings of the website review and documentary analysis provided a sense of how skills related to leadership were reflected in dietetic education, considering leadership was not a core competency at the time of the data collection and analysis. Based on the website review, many programs identified that at the time of application to a dietetics program, which may include an integrated internship, students are expected to possess personal characteristics related to communication skills and self-direction. Programs offer a range of in-class activities that develop students' dietetic professional practice, communication, and management skills, which also contribute to developing leadership skills.

The most common activities across all programs were working on group assignments, creating, and delivering presentations, reading special topics articles, and listening to guest speakers. Other activities that some programs integrated into their courses were writing blogs and creating podcasts or infographics. Students regularly contribute to the learning of others through group discussions, presentations, writing blogs, and creating other media. Students also participate in practice-based research which develops their professional practice. They conduct literature reviews, contribute to Practice-Evidence-based Nutrition pathways, and complete research projects. To develop their ability to manage projects and achieve results, they learn to develop business or new product plans, as well as develop and monitor nutrition care plans. While it was evident that programs planned and supported some skills

development (e.g., critical self-reflection, communication with a variety of audiences) through their courses, it was less evident how they are taught or evaluated. Based on these preliminary findings, I developed questions I wanted to ask the focus group participants.

The focus group interview provided an opportunity for me to gather additional insights from dietetic educators, whose perspectives elaborated on the findings from my documentary analysis. The focus group participants elaborated on the preliminary document analysis findings by providing detailed descriptions of their dietetics programs and what they believed to be the ways in which they taught leadership. This phase aligned with the macro-level of my conceptual framework and sought to better understand the connection of system structures including education requirements. Thus, taken together, the documentary analysis and focus group interview situated the current context of dietetic education by drawing a more fulsome picture of the connection between program curricula and the ICDEP.

The four dietetic educators who participated in the focus group reacted to the preliminary document analysis findings and reflected on their own experiences with their respective programs. First, there appears to be consensus that aspects of leadership can be taught, in particular skills related to self-leadership. They concurred with the document analysis, and provided more context of the ways in which students learn leadership skills. Second, in addition to the experiences offered by the program, many students further develop their skills from extracurricular activities, resulting in some students advancing into leadership roles in student organizations. In class, students contribute to several group assignments whereby they strengthen their communication skills and teamwork abilities. The educators also said students take on extracurricular activities to further develop their skills and enhance their resume. Lastly, educators have a role to play in shaping the curricula. While many dietetic educators are quite passionate about the work they teach, they are often faced with systemic barriers which can prevent them from fully contributing to the program. They are often faced with workplace discrimination, horizontal violence, and microaggressions.

Discussion

Upon review of the wide variety of documents, it was evident that the ICDEP informs what dietetic programs in Canada must develop through curricula. Up until the present time, leadership has not been a competency area required in dietetic education programs, and the documents alone do not provide the whole picture. The documentary analysis highlighted transferrable skills that are often associated with leadership, which were elaborated on by dietetic educators.

Developing Self-Leadership in Programs

Educators talked about developing self-leadership in students through critical reflection and collaborative activities in a variety of courses, rather than through one specific course. These activities help students not only become self-aware of personal strengths and challenges, but also develop strategies to improve oneself or have a growth mindset. This is consistent with Thompson and Miller (2018) who write that self-leadership aligns two personal attributes: self-awareness and developmental motivation, whereby self-awareness is the ability to understand one's personal strengths and challenges combined with an eagerness to grow.

While self-leadership skills appeared to be taught in professional practice and communication type classes, these skills were also taught in clinical and management courses. This is a

prudent strategy for dietetic programs because students have a variety of opportunities and settings where they can learn and apply these skills. Interestingly, it has been argued that self-leading individuals are more productive regardless of their role (Birdi et al., 2008; Manz & Sims, 1991). The development of self-leading skills begins in the first year and this can be seen in the dietetic courses, where they introduce students to some of these skills in their first year, then gradually develop their capacity over the subsequent years. In addition, more recently, Dickson and Tholl (2014) advanced notions of leading outside of one's official title by "leading from where you are" (p. 283) or self-leadership, collaboration, and leading in a complex environment. As seen in the syllabi and focus group discussion, the data showed that students can learn and practice self-leadership skills in a variety of contexts, rather just associating these skills with one specific course or role (e.g., clinical).

Further Leadership Development Through Extracurricular Activities

Research suggests that the situation for students pursuing dietetics is especially competitive to secure a dietetic internship (Siswanto et al., 2015). To address this issue, the dietetic educators said some programs have integrated the internship into their curricula. Despite the shift to integrating internship into dietetic programs, students may still find applying to enter dietetic programs competitive. Students may use non-job-related experiences, such as participation in extracurricular activities during their studies to demonstrate knowledge, skills, abilities, and other personal characteristics (Roulin & Bangerter, 2013). In the focus group, the educators discussed different ways students gained leadership outside of the learning experiences offered by the dietetic programs. Extracurricular activities, whether directly related to nutrition and food or not, may give students additional opportunities to practice many of the transferrable skills such as communication. Some students may also pursue leadership roles in these activities, such as holding a co-chair position.

Roulin and Bangerter (2013) found in their study with 197 students that students mainly engage in extracurricular activities for internal motives (e.g., passion). As students became closer to entering the labour market, students became more active in professionally related associations or volunteering activities and sought more leadership positions. Marinescu et al. (2017) also found that students acquired leadership skills through extracurricular activities, throughout the academic environment. Although participating in extracurricular activities has advantages to improve job prospects, it has been researched that students in highly competitive health science programs are also at risk for burnout when taking on these activities (Almalki et al., 2017).

Role of Dietetic Educators - "Dietetic Educators Matter"

An emergent theme was the role of the educator is important in informing, designing, and delivering the program. In dietetics, many dietetic educators are dietitians themselves, some of whom have taken advanced training in adult education. Like nursing education, dietetic education encompasses a variety of teaching roles such as clinical oversight, clinical practice, simulated, on-line, and didactic instruction, and doctoral projects/dissertations that all impact workload (Thompson & Miller, 2018). In addition to their teaching roles, educators play a critical role in shaping learners' professional identity and career path. Chen and colleagues (2017) write that educators have a role in nurturing learners' early passions teaching and focusing on identity formation and career development to provide a vision and path for them in the profession. "Dietetic educators matter" (Chloe, Associate Professor) yet despite the critical role educators have in shaping dietetic education, the focus group participants

reported systemic barriers including discrimination, horizontal violence, and microaggression. Some participants talked about how they have personally experienced power imbalance in the workplace which have resulted in inequitable and at times discriminatory outcomes.

Conclusion

What appeared from the documentary analysis was evidence that some leadership-related skills associated with communication skills and professional practice are part of the curricula, although these are not explicitly linked to leadership development of trainees. To develop a better understanding of how these skills are taught and to obtain further insights, insights were gleaned from the four dietetic educators who participated in the focus group interview. Their collective responses provided much needed insight into how leadership-related skills are taught or experienced in different programs. It became apparent the role dietetic educators have in shaping how curricula is taught; however, educators are often faced with barriers that limit their ability to fully exercise their own self-leadership within the academic institutions. Taken together, the documentary analysis and focus group interview illustrate the current context of how leadership is taught in dietetic education.

Acknowledgements

Dr. Christine Suurtamm (Faculty of Education) and Dr. Ivy L. Bourgeault (Faculty of Social Sciences) at the University of Ottawa for their supervision and guidance throughout the doctoral study.

References

- Almalki, S. A., Almojali, A. I., Alothman, A. S., Masuadi, E. M., & Alaqeel, M. K. (2017). Burnout and its association with extracurricular activities among medical students in Saudi Arabia. *International Journal of Medical Education*, 8, 144–150.
- Arensberg, M. B. F., D’Andrea, C., & Khan, M. (2019). Clinical leadership and innovation help achieve malnutrition quality improvement initiative success. *Journal of the Academy of Nutrition and Dietetics*, 119(9), S49–S55.
- Beacham, A. O., Van Sickle, K. S., Khatri, P., Ali, M. K., Reimer, D., Farber, E. W., & Kaslow, N. J. (2017). Meeting evolving workforce needs: Preparing psychologists for leadership in the patient-centered medical home. *American Psychologists*, 72(1), 42–54.
- Birdi, K., Clegg, C., Patterson, M., Robinson, A., Stride, C. B., Wall, T. D., & Wood, S. J. (2008). The impact of human resource and operational management practices on company productivity: A longitudinal study. *Personnel Psychology*, 61(3), 467–501.
- Boyce, B. (2014). Learning to lead: Developing dietetics leaders. *Journal of the Academy of Nutrition and Dietetics*, 114(5), 688–692.
- Bradd, P., Travaglia, J., & Hayden, A. (2017). Leadership in allied health: A review of the literature. *Asia Pacific Journal of Health Management*, 12(1), 17–25.
- Brewer, M. L., Flavell, H. L., Trede, F., & Smith, M. (2016). A scoping review to understand “leadership” in interprofessional education and practice. *Journal of Interprofessional Care*, 30(4), 408–415.
- Buschlen, E., & Guthrie, K. L. (2014). Seamless leadership learning in curricular and cocurricular facets of university life: A pragmatic approach to praxis. *Journal of Leadership Studies*, 7(4), 58–64.
- Chen, H. C., Wamsley, M. A., Azzam, A., Julian, K., Irby, D. M., & O’Sullivan, P. S. (2017). The health professions education pathway: Preparing students, residents, and fellows to become future educators. *Teaching and Learning in Medicine*, 29(2), 216–227.
- Dickson, G., & Tholl, B. (2014). *Bringing leadership to life in health: LEADS in a caring environment*. Springer.
- Farmer, T., Robinson, K., Elliott, S. J., & Eyles, J. (2006). Developing and implementing a triangulation protocol for qualitative health research. *Qualitative Health Research*, 16(3), 377–394.
- Frank, J. R., Snell, L., Ten Cate, O., Holmboe, E. S., Carraccio, C., Swing, S. R., Harris, K. A. (2010). Competency-based medical education: Theory to practice. *Medical Teacher*, 32(8), 638–645.

- Frenk, J., Chen, L., Bhutta, Z., Cohen, J., Crisp, N., Evans, T., Zurayk, H. (2010). Health professionals for a new century: Transforming education to strengthen health systems in an interdependent world. *The Lancet*, 376, 1923–1958.
- Hermosura, B. J. (2022). *Learning to Lead: A Multi-Faceted Study of Leadership Skills Development and Use by Dietitians* (Doctoral dissertation, Université d'Ottawa/University of Ottawa).
- Manz, C. C. (1983). Improving performance through self-leadership. *Global Business and Organizational Excellence*, 2(3), 288–298.
- Marchildon, G., & Fletcher, A. (2016). Prioritizing health leadership capabilities in Canada: Testing LEADS in a Caring Environment. *Healthcare Management Forum*, 29(1), 19–22.
- Marinescu, P., Toma, S. G., & Dogaru, I. (2017, December). Acquiring leadership skills through extracurricular activities in the academic environment: The case of the Faculty of Administration and Business, University of Bucharest. In *European Conference on Management, Leadership & Governance* (pp. 306-312). Academic Conferences International Limited.
- Morris, D., & Matthews, J. (2014). Communication, respect, and leadership: Interprofessional collaboration in hospitals in rural Ontario. *Canadian Journal of Dietetic Practice and Research*, 75(4), 173–179.
- Partnership for Dietetic Education and Practice. (2020). *Integrated Competencies of Dietetic Education and Practice, Version 3.0*. [https://www.pdep.ca/library/PDEP-Policies/Integrated-Competencies-For-Dietetic Education-And.aspx](https://www.pdep.ca/library/PDEP-Policies/Integrated-Competencies-For-Dietetic-Education-And.aspx)
- Patten, E. V., Sauer, K., Osborne, S. L., & Rose, K. (2021). Clinical leadership in dietetics: Viewpoints from the front lines. *Topics in Clinical Nutrition*, 36(3), 202–212.
- Royal College of Physicians and Surgeons of Canada (n.d.). *CanMEDS Role: Leader*. <http://www.royalcollege.ca/rcsite/canmeds/framework/canmeds-role-leader-e>
- Roulin, N., & Bangerter, A. (2013). Extracurricular activities in young applicants' résumés: What are the motives behind their involvement? *International Journal of Psychology*, 48(5), 871–880.
- Siswanto, O., Brady, J., & Gingras, J. (2015). Successfully attaining a dietetic internship position in Ontario on the first attempt: A descriptive survey. *Canadian Journal of Dietetic Practice and Research*, 76(1), 27–32.
- Stake, R. (2006). Multiple case study analysis. The Guilford Press.
- Thompson, S. A., & Miller, K. L. (2018). Disruptive trends in higher education: Leadership skills for successful leaders. *Journal of Professional Nursing*, 34, 92–96.

Tweedie, J., Wright, H. H., Palermo, C., & Pelly, F. E. (2021). Key concepts for dietetic curriculum: An observational study of Australian dietitians' perceptions. *Nutrition & Dietetics*, 78(5), 544–552.

Contact email: bhermosu@uottawa.ca

The Development of Instructional Design Using Animation in the Elementary Teacher Education Program of Universitas Terbuka

Astri Dwi Jayanti Suhandoko, Universitas Terbuka, Indonesia

Della Raymena Jovanka, Universitas Terbuka, Indonesia

Monika Handayani, Universitas Terbuka, Indonesia

The Paris Conference on Education 2023

Official Conference Proceedings

Abstract

Professional Ability Consolidation (PAC/microteaching), the centerpiece of Elementary Teacher Education at the Universitas Terbuka, is a specific concern for both lecturers and students. In addition to replacing the thesis, PAC involves students making a written report on their action research and participating in action research. A lack of student knowledge regarding implementing procedures has resulted in some students failing to compile quality reports due to the long practice stages. Using the R&D method with the ADDIE model, the study develops a prototype of the PAC course to solve the subsequent problems: (1) creating a course implementation animation video, (2) creating a method for conducting Action Research, (3) creating a method for documenting report writing procedures, and (4) creating a method for an instructional video of student supervisions. Students were informed about the FGD method after reviewing the videos produced by multimedia experts. Using the results of this preliminary research, students taking PAC courses in the current semester are considered suitable to test these videos. Research improvements can be based on expert validation and student focus groups in the previous stage before implementing follow-up trials.

Keywords: Microteaching, Action Research, Instructional Design, Animation Video, ADDIE Model

iafor

The International Academic Forum

www.iafor.org

1 Introduction

Teachers play a significant and vital role in human development (Datnow, 2020; Maria João Carvalheiro, José Campos, Morais, & Rodrigues, 2022). They are behind the academic achievement and student behavior development at every learning stage. This attempts to match their pedagogical beliefs, including how they perceive themselves as teachers or the selection of pedagogical methods they consider most effective. Both tend to influence their interpretation and pedagogical practices applied in class (Brandt, Bürgener, Barth, & Redman, 2019; Marsh, 2022). Moreover, these beliefs influence the way teachers participate in their professional community, such as how teachers collaborate and take a position in curriculum development and how they draw on the expertise of other teachers in developing their jobs and schools (Lammert, Hand, Suh, & Fulmer, 2022; Mailool, Retnawati, Arifin, Kesuma, & Putranta, 2020). Therefore, teachers' professional beliefs guide their actions in dealing with pedagogical issues with students and other school community members.

Instilling pedagogical beliefs and teacher professionalism to produce educators who are dedicated and able to collaborate is a formulation in the Curriculum of the Elementary School Teacher Education Study Program at Universitas Terbuka (PGSD-UT). The curriculum formulation is then explained in more detail in several courses, one of which is Strengthening Professional Capability (PAC). This course prepares students to identify problems in the learning process and formulate solutions. In addition, this course aims to improve students' teaching skills that apply Classroom Action Research (CAR) principles. This structured and coherent research is carried out by teachers (educators/people in the learning environment) in their classes to solve problems they encounter in the learning process (Dadds, 2020; Palobo, Tembang, Pagiling, & Nur'aini, 2021). This research went through several improvement cycles aiming to improve the quality of learning and teaching (De Borja, 2018; Khalid Mohammed, Samson, Amanuel, & Demoz, 2022). Finally, the teacher makes the improvements through a series of reflections on the teaching methods they have been using. This stage allows teachers to assess their performance to arrive at the final goal, i.e., quality improvement of the interaction between teachers and students.

Previous studies show CAR's usefulness for teachers, one of which is research conducted by Aidinopoulou and Sampson (2017) discussing the implementation of flipped classrooms (FC) in social/history subjects for students in elementary schools. Researchers compared the experimental group that implemented FC and the control group that implemented traditional teaching. The findings show that the experimental group achieved better academic performance. This indicates that action research with the FC model finds potential benefits for students in elementary schools.

As a practical course carried out remotely, the implementation of PAC lectures should be easy for PGSD-UT students for some reasons. First, some of the students are in-service teachers with experience teaching for at least one year. Second, PAC implementation guidelines have been developed for students, containing the PAC practice stages. However, there are still obstacles in the technical understanding of lecture implementation, CAR implementation procedures, and preparation of reports (Suhartono & Darmayanti, 2015). This encourages researchers to develop alternative learning media to complement the technical methods for implementing PAC so that the competencies students are expected to achieve when taking this course.

2 Methodology

Research and development of this instructional design use the ADDIE model (Dick, Carey, & Carey, 2001). First, it consists of **Analysis** that researchers do with literature studies on previous articles describing similar research and interviews with media users. In addition, these PGSD-UT students have taken PAC courses in the previous semester. The second stage is **Design** which relates to setting program goals, making storyboards and scripts used in the media, and choosing media (Video Animation and Teacher Model Videos).

The next stage is **Develop**, i.e., producing every media that has been planned in the design stage, including 1) Animated Videos for Introduction to PAC Courses, 2) Animated Videos for Introduction to CAR, 3) Videos of CAR Pre-cycle, Cycle 1, 2, and 3, and 4) Writing Training Video. Then the next stage is **Implement**, where the researcher tries to use the media developed in the learning process (Online Tutorial or Webinar Tutorial). The final stage is **Evaluate**, where the researcher makes improvements in the media use after getting input from the previous stage. Therefore, this study will only describe the three stages of the ADDIE model three stages: analysis, design, and development. As support for these three stages, the researcher invited instructional design experts, material experts, and learning multimedia experts, as well as several students who use media, to provide input on the learning products that have been developed. The inputs are described in the discussion section.

3 Results

In this section, the researcher presents the research and development results with the ADDIE model in three stages: **Analysis**, **Design**, and **Develop**.

3.1 Analysis

The analysis of articles discussing similar themes shows that implementing PAC courses every semester has always been a scourge for PGSD students. Even though they are in-service teachers with experience in carrying out the learning process in class, they can still complete this course well. Several reasons could be the cause, including the students' lack of knowledge regarding the procedures for carrying out CAR (Suhartono & Darmayanti, 2015) and the students' incompetence in preparing practice reports. Thus, they affect students' grades that do not meet the minimum criteria and student failures in these courses (Budiastra, Hanafi, & Mardiana, 2019; Fatmasari, 2018; Kadarko, Novita, & Delfi, 2010). Furthermore, during the pandemic, the government implemented a home learning policy so that CAR usually carried out face-to-face switches online. This situation affects the implementation of practical courses, which are typically carried out independently, face-to-face or online tutorials, but are accompanied by supervisors (including Bw courses/demanding mandatory guidance) in person; now, all are based on webinars or online. As a result, the learning process is increasingly complex for students who are in island areas. In addition to learning facilities and infrastructure that are less supportive (inadequate type/capacity of cell phones, network instability), students find it challenging to understand the materials during online learning, as well as the lack of consultation time with supervising lecturers/tutors (supervisor I) and tutors/colleagues (supervisor II) due to the Imposition of Restrictions on Community Activities (PPKM) by the Government.

3.2 Design of Learning Media

At the design stage, the researcher tries to compile some of the problems recorded in the analysis stage. After that, it is continued by concocting solutions to develop alternative learning media. In the next step, the researcher writes a script to show the flow and content of the learning media to be made. The compiled script includes a description of each scene in the form of supporting text and pictures.

Table 1. Preparation of PAC Course Learning Designs

No	Issues	Solution	Learning Media	Supporting Document	Involved Parties
1	Student's lack of understanding of PAC lecture techniques	Make a guide regarding technical PAC lectures	Animation Videos	Script	Animator
2	Student's lack of understanding regarding the technical implementation of PAC	Make guidelines regarding the technical implementation of PAC	Animated video of PAC implementation in general	Script	Animator
			Videos of Pre-cycle, Cycle I, II, and III	Script and Storyboard	Videographer, Teacher Model, and Supervisor
3	Student's incompetence in compiling PAC reports	Make technical guidelines for preparing PAC reports	Videos of Writing Training	The script, PPT Slides about writing training	Videographer, Researcher

After the researcher compiled the design for learning media development, the researcher performed a leveling of perceptions with the parties involved, including animators, videographers, and models (teachers and instructors). This is done to discuss the contents of the script and storyboard and their relation to the video development schedule.

3.3 Development of Learning Media

The development of alternative learning media consists of 1) animated videos, 2) Classroom Action Research (CAR) videos, and 3) writing training videos. Three different parties developed the three videos with the following details:

3.3.1 *Animated Video (Introduction to PAC and CAR Courses)*

Researchers and animators held online meetings to equate perceptions about the script's contents and its relation to video development. After the animators finished the video at stage 1, the researcher conducted a review and saw the suitability of each scene with voice-over (sound production in the video). If the researcher sees any discrepancies, the video will be returned to the animator for stage 2 revision. The results of the animator's revisions were

reviewed again, and so on, until the videos developed followed the script referring to the RPS, PAC guidelines, and online master tutorials.

3.3.2 CAR Videos (*Pre-cycle, Cycle I, II, and III*)

The video that was developed as a reference in the implementation of Classroom Action Research (CAR) consists of 4 videos, including (1) Videos of Preparation for PAC Course and Student Assistance, (2) Videos of Cycle 1, (3) Videos of Cycle 2, (4) Video of Cycle 3. These four videos no longer use the services of an animator in developing every symbol, image, and artificial sound into a scene but utilize the videographer, model teachers, students, colleagues (supervisor 2), and Universitas Terbuka staff directly. Before taking the videos, the researcher develops a storyboard and script to guide each recorded scene. Manuscripts compiled sourced from PAC guidebooks, fully described as a Lesson Plan. The model teacher discussed the script and lesson plan in advance. Researchers asked for input and adjustments based on the model teacher's experience in the teaching and learning process so far. Researchers adjusted the script and lesson plans in response to questions and input from the model teacher. Making a storyboard based on the script that has been prepared, the content is the stages of each scene and a brief description. Like scripts and lesson plans, the final storyboard results can be used in taking videos after several corrections and additions have been made.

The storyboard is based on the script that has been prepared, while the content includes the stages of each scene and a brief description. Like scripts and lesson plans, the final storyboard results can be used in the shooting process after several corrections and additions have been made. The following is a storyboard from the PAC Course Preparation and Student Assistance videos, Cycle 1, 2, and 3.

3.3.3 Writing Training Video

Writing training videos were developed by researchers using PowerPoint to present material. With the help of animators, the researchers combined PowerPoint and material explanation videos so that each PPT slide was discussed in more detail. The exposure in the video is divided into four sections according to the chapters in the PAC report, including Background/introduction, literature review, methodology, findings and discussion, conclusions, and bibliography. In each section, the researcher provides examples and writing tips to make it easier for students to understand each chapter in the report.

3.4 Pre-evaluation from Media Experts and Users

After developing alternative learning media, the researcher conducted a pre-evaluation by inviting media users and students. The following are some of the results of the pre-evaluation:

3.4.1 Paying Attention to Supporting Scenes and Equipment in the Video

The expert analysis results show that the quality of video development is good. However, in terms of dialogue, it needs some changes to be more natural. Then, the expert directed the researcher to try to make the video content consisting of images and writing or captions on essential points. This is intended so that the information conveyed is more precise (for example, what will be discussed, and in which part). In addition, several small things escaped the attention of researchers, namely the need for more prepared properties, such as the pre-

cycle video when the model teacher was at the UT regional office in Ternate, then met with the administration section. The researcher needed to complete the administrative table and consulting room with the writing/name table. It is better if several places are given information. This is to be able to reach fellow students with disabilities. Those who cannot hear can read the writings.

3.4.2 Introductory Sentence as a Video Opener

The expert said that most of the videos that had been developed were able to convey messages well. However, the researcher needs to pay attention to the synchronization between what is discussed in the scene and the texts in writing; they must appear together and complement each other. In addition, it needs additional information/introduction at the beginning of the video about the people who appear and their respective roles. This aims to clarify the message conveyed. It would be even better if there were an opening sentence/introduction from the host (appointed) regarding a brief description related to the general description of the video. This is to provide an overview to the audience of what the video is about to tell and to emphasize the purpose of developing the video.

3.4.3 Paying Attention to the Current Curriculum

According to the expert, the developed storyboard needs to follow the currently implemented curriculum, i.e., the independent curriculum (Kurikulum Merdeka). The storyboard shows students' activeness (a student-centered system) but still needs to show diversity among them. This gives the impression that all students are the same. In addition, the independent curriculum also emphasizes assessment at the beginning of learning, and the storyboard only shows the teacher giving greetings to students. The evaluation shows that the teacher knows how prepared the children are for learning; for example, there are 20 children in a class, whether all or only a few are ready. Thus, it needs to add the teacher's scene where they provide an assessment to determine the child's readiness to start the learning process.

3.4.4 Writing Training Videos

The expert explained that the writing training videos were generally excellent, and it took the effort to find flaws. However, if this video is used as a reference for students to make reports, it can be said that the material is still very general. Students need a video that describes how to write each chapter in the report step by step, so it is better if the researcher completes it with various examples of writing sentences, paragraphs, chapters, even the introductory chapter, literature review, methodology, analysis and discussion, and conclusions. Experts also directed them to make additional videos regarding writing bibliography, paraphrasing, or directions not to plagiarize other people's work.

4 Conclusions

Based on the results of reflection on the opinions of experts, students, and PAC tutors, the following are some inputs for further video development: (1) It needs to provide greeting sentences from the host/researcher accompanied by moving pictures/animations to describe the video in general. So that video users get an initial picture before understanding the next video scene. (2) The evaluation carried out by supervisor two should be given at the end of each cycle. So that video users can find out the shortcomings of implementing learning methods in each cycle. Input from the supervisor at the end of the video explaining input/alternative solutions can also be a common thread for videos in the next cycle. (3) The

Writing Training Video is made more detailed. Since the PAC report consists of 5 chapters, it needs to develop videos for some chapters in the report accompanied by technical examples in each chapter.

Acknowledgements

This R&D research was supported by the Research and Community Service Institute of Universitas Terbuka (Indonesia) [Grant Number: B/358/UN31.LPPM/PT.01.03/2022].

References

- Aidinopoulou, V., & Sampson, D. G. (2017). An action research study from implementing the flipped classroom model in primary school history teaching and learning. *Journal of Educational Technology & Society*, 20(1), 237-247.
- Brandt, J.-O., Bürgener, L., Barth, M., & Redman, A. (2019). Becoming a competent teacher in education for sustainable development: Learning outcomes and processes in teacher education. *International Journal of Sustainability in Higher Education*.
- Budiastra, A. K., Hanafi, H., & Mardiana, A. (2019). ANALISIS PENYELENGGARAAN & LAYANAN MATAKULIAH PRAKTEK UNTUK DAERAH 3T. *Jurnal Pendidikan*, 20(2), 157-171.
- Dadds, M. (2020). *Passionate enquiry and school development: A story about teacher action research*: Routledge.
- Datnow, A. (2020). The role of teachers in educational reform: A 20-year perspective. *Journal of Educational Change*, 21(3), 431-441.
- De Borja, J. M. (2018). Teacher action research: Its difficulties and implications. *Humanities & Social Science Reviews*, 6(1), 29-35.
- Dick, W., Carey, L., & Carey, J. (2001). The systematic design of instruction (5th). *New York: Longmann*.
- Fatmasari, R. (2018). *Teaching Practice in Distance Education Context*. Paper presented at the SHS Web of Conferences.
- Kadarko, W., Novita, S. D., & Delfi, R. (2010). Pelaksanaan praktek mengajar bagi guru peserta pendidikan jarak jauh yang tinggal di wilayah terpencil. *Jurnal Pendidikan*, 11(2), 78-87.
- Khalid Mohammed, I., Samson, E., Amanuel, Y., & Demoz, B. (2022). Learning to teach self-study in improving data management practices of student-teachers during an action research course. *Education Inquiry*, 13(3), 304-320. doi: <https://doi.org/10.1080/20004508.2021.1892332>
- Lammert, C., Hand, B., Suh, J. K., & Fulmer, G. (2022). "It's all in the moment": a mixed-methods study of elementary science teacher adaptiveness following professional development on knowledge generation approaches. *Disciplinary and Interdisciplinary Science Education Research*, 4(1). doi: <https://doi.org/10.1186/s43031-022-00052-3>
- Mailool, J., Retnawati, H., Arifin, S., Kesuma, A. T., & Putranta, H. (2020). Lecturers' experiences in teaching soft skills in teacher profession education program (TPEP) in Indonesia. *Problems of Education in the 21st Century*, 78(2), 215.

- Maria João Carvalheiro, C., José Campos, F., Morais, M., & Rodrigues, G. (2022). Validación de la versión Portuguesa de la self-efficacy scale for physical education teacher education major toward children with disabilities (Validation of the Portuguese version of the self-efficacy scale for physical education teacher education major. *Retos*, 45, 558-565. doi: <https://doi.org/10.47197/retos.v45i0.91868>
- Marsh, B. (2022). Understanding the Professional Learning of Beginning Teachers: Maximising Learning in a Context of Systemic Constraints. *The Buckingham Journal of Education*, 3(1). doi: <https://doi.org/10.5750/tbje.v3i1.2057>
- Palobo, M., Tembang, Y., Pagiling, S. L., & Nur'aini, K. D. (2021). Identification of math teacher's capabilities in classroom action research. *Journal of Physics: Conference Series*, 1806(1). doi: <https://doi.org/10.1088/1742-6596/1806/1/012077>
- Suhartono, S., & Darmayanti, T. (2015). Pemodelan Pembimbingan Praktik Pemantapan Kemampuan Profesional (PAC) Pada Mahasiswa Pendidikan Jarak Jauh Melalui Lesson Study. *Jurnal Pendidikan Terbuka Dan Jarak Jauh*, 16(1), 10-28.

Communicating the Indonesian Dietary Recommendations: Lessons Learned From Boarding School

Nutta Taneepanichskul, Chulalongkorn University, Thailand
Syarifah Aqilah, Chulalongkorn University, Thailand
Cindy Roviqoh, Universitas Indonesia, Indonesia
Siti Sudrajat, Universitas Indonesia, Indonesia

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Monotonous meals are commonly provided at boarding schools in Indonesia with poor nutritional value and a lack of variety. As part of the Environmental Nutrition Program, this study was conducted to raise awareness of the importance of a balanced diet among female boarding high school students. We set out to improve Indonesian students' nutritional knowledge using mixed communication methods including a poster, booklet, and interactive session. A quasi-experimental study was conducted at two boarding high schools, one intervention school (IS) and one control school (CS). Nutritional education (NE) was delivered at the IS that covered the effects of food on health, nutrient sources, food groups, and dietary recommendations. NE was run over eight weeks, with two weeks for each topic. Data on nutritional knowledge were collected before and after NE using a validated questionnaire with binary response options (correct, incorrect). Student's T-test and the Mann-Whitney U-test were applied to analyze the data. A total of 57 IS and 56 CS female students were recruited. Baseline data showed no difference in students' knowledge between the schools. However, there was a significant increase in nutritional knowledge at the IS after NE compared to the CS ($M_{IS}=78$, $SD=9.3$; $M_{CS}=72$, $SD=7.2$; $P < 0.001$). Positive feedback was received on all communication methods, and the poster was found to have been the most effective, especially for communicating dietary recommendations. Our study suggested that a poster can increase school students' declarative nutritional knowledge, while two-way communication is effective at enhancing their procedural nutritional knowledge.

Keywords: Students, Boarding School, Nutritional Knowledge, Communication, Indonesia

iafor

The International Academic Forum
www.iafor.org

Introduction

Adolescence is a life stage where a good foundation of health can be constructed. Demanding autonomy, adolescents made effort to do activities as they wish including health-related ones. It is common, particularly among high school students, that peers become their priority and lead to unhealthy dietary practice (Roshita et al., 2021). Recent national health survey supported it as over one-third of highschool-aged adolescents in Indonesia consumed sugary drinks, savory and oily foods more than once every day (Ministry of Health, 2018). However, recent study argued that engaging with peer was also benefited adolescents to understand difficult information by explaining those with common term of their age (Sharif Ishak et al., 2020). Literacy on food and nutritional knowledge among adolescents was then suggested enabling adolescents to make healthier choice and yield better health outcome (Thomas et al., 2019).

Previous studies explained that student's nutritional knowledge associated with the consumption of nutrient-dense food and less consumption of unhealthy food (Oddo et al., 2022). Furthermore, female student was having higher nutritional knowledge and was applying healthier lifestyle than male as they concerned about health as well as appearance (Gaylis et al., 2020; Husain et al., 2021).

Heretofore, various activity and media use such as lecture, leaflet, poster exhibition, peer-led nutrition education as well as an internet-based was done and provided an increase on high school student's knowledge of food and nutrition in the intervention study (Oddo et al., 2022; Sharif Ishak et al., 2020). Unfortunately, in boarding schools where stricter of non-curricular activities regulation apply, the effect of an intervention aiming nutritional knowledge change remained unclear. Therefore, this study aims to explain nutrition education delivery methods with nutritional knowledge change among female students in boarding high school settings.

Methods

a) Study Design and Participant

This present study was a part of a quasi-experimental of the Environmental Nutrition Program (ENP) on female boarding high school students. ENP purposively selected two boarding highschools with 100% face-to-face learning, full-service kitchen, and willing to participate throughout the study period as intervention school and control school. Participant recruitment started at school level with inclusion criteria e.g. female student grade 10 to 11, willing to participate, and collected parent's consent by the time baseline measurement took place. Students who had dietary restriction and/or chronic disease, or failed to complete all the measurements were excluded from data analysis.

This study was approved by The Research Ethics Review Committee Chulalongkorn University (#245/2021) and Health Research Ethics Committee Fakultas Kesehatan Masyarakat Universitas Muhammadiyah Jakarta (#10.353.B/KEPK-FKMUMJ/XI/2021).

b) Intervention

ENP was a nutrition program at school wherein used an environmental approach to support balanced meal consumption of female high school students in a boarding school setting. ENP in general consisted of several activities, including (1) the use of uniform food serving tools,

(2) Nutrition Fact display, (3) food and nutrition information display, (4) body weighing awareness, and (5) photovoice activities. This paper however is aimed to explain particularly on food and nutrition information display.

Food and nutrition information (Nutrinfo) was developed based on Indonesian dietary guidelines (Ministry of Health, 2014) and covered topics related to dietary recommendation, nutrient and sources, food group, and food effect on health. Each topic of Nutrinfo was provided in the form of 1 squared meter (banner) and A4 size posters. Banners were posted on a wall in the dining hall where students were facing the wall while queuing for food, and on a wall right beside the tuck shop where students usually get their snacks. A4 posters were inserted in the acrylic stand and 6 of them were displayed on the dining table where participating students were seated during mealtime. Nutrinfo was timely posted with an interval period of 2-weeks for each topic to catch students' attention by presenting different topics with fresh design. In addition to banner and A4 poster display, an interactive session was held emphasizing on a simulation to read food label under dietary recommendation topic and timeline. Altogether, students were exposed to Nutrinfo for 8-weeks period from February to April 2022.

c) Measure

Nutritional knowledge was assessed using researcher-made general nutrition knowledge questionnaire (GNKQ) following Indonesian dietary guideline (Ministry of Health, 2014). GNKQ was validated applying inter-objective congruence (IOC) of 3 experts and pre-tested to 30 non-participant students. GNKQ featured dichotomous answer (correct/incorrect) and consisted of 45 questions with Kuder Richardson formula (KR-20) value of 0.7 by which acceptable. Nutritional knowledge score was collected as percentage of the total correct answers and total questions with 100 as the full score. Student characteristics e.g., date of birth (to calculate age in year) and major (science/social) were also obtained with a self-administered questionnaire.

d) Data Analysis

Data analysis was performed using SPSS version 28.0 (Chulalongkorn University license) and the significance was set at *p-value* <0.05 with 95%CI. Descriptive statistics were provided explaining participants' characteristics. Nutritional knowledge at baseline was tested using Mann Whitney-U test for comparability. At post intervention, intragroup differences were tested using student's paired t-test for normally distributed data and Wilcoxon test for skewed data and inter-group differences were tested using student's independent t-test for normally distributed data and Mann Whitney-U test for skewed data. Furthermore, effect of Nutrinfo was examined using linear regression model wherein coefficient value indicates nutritional knowledge change overtime in the intervention group.

Results

A total of 113 female students were enrolled in the study, 57 students in intervention school and 56 students in control school. Student's mean of age was 15.7 years old (SD=0.7) and 76.1% of them were majoring science subject. At baseline, students from both schools had the same level of nutritional knowledge (*p-value* = 0.48, Table 1). Students in the intervention school showed an increase in nutritional knowledge after intervention compared with baseline (mean difference = 6.45, *p-value* < 0.01) and had a higher nutritional knowledge than those in control school after intervention (mean = 78.1, *p-value* < 0.01).

	Baseline	After intervention	Mean difference (95% CI)	P-value
	Mean (SD)	Mean (SD)		
Intervention	71.6 (7.6)	78.1 (9.3)	6.45 (3.7; 9.2)	< 0.01 ‡
Control	70.9 (7.5)	72.4 (7.2)	1.47 (0.7; 3.6)	< 0.01 †
P-value	0.48 ^a	< 0.01 ^a		

a: Mann-Whitney U test. ‡: paired Student's t-test. †: Wilcoxon test

Table 1: Student's nutritional knowledge before and after intervention

Lessons Learned

A study aiming to increase nutritional knowledge among female high school students is beneficial to help them having consideration on health and applying it in daily life. Female adolescent not only is prone to nutrient deficiencies but also has to prepare their nutritional status for conception. However, boarding schools with tight schedule were hardly making time for session outside school curriculum. Internet and gadget access was also restricted in most boarding school in Indonesia, including the school where the present study was conducted. These aforementioned situations demanded an effective nutrition education in which less burden on educators' and students' time.

This present study suggested that banner size and multiple posters could be the alternative on delivering a vast and hassle-free food and nutrition information to the students in a boarding school setting. A recent study at the same boarding school setting was supporting our finding (Rimbawan et al., 2023). Even so, as emphasizing on environmental approach, location and design became pinpoints for our study. The students were aware of something new within school premises. They were open to a new knowledge and showed enthusiasm only when it packaged with simple design and wording as they found it was near to their daily life.

As the matter of fact, current dietary guideline of Indonesian has been promoted quite some time with insufficient understanding (Octaria et al., 2020). In this present study, students possessed higher retained knowledge on dietary recommendation after presenting Isi Piringku (as MyPlate) with pictures of common food among adolescent including in school food, following food group and portion. Besides, recommendation to hydrate and limit on additive were also included in pictures. Students were then simply grasping the guideline as the whole picture as they kept seeing it every mealtime.

This present study, however, run in a rather short period. Future research is encouraged to expand the time or method addressing procedural knowledge. Its practical could be potential to bring descriptive knowledge on food and nutrition into dietary behavior (Morren et al., 2021). Nevertheless, this study attempted the procedural knowledge on how to read food label with interactive session. The session did attract students by involving on case studies. It was then contributed to the increased knowledge on dietary recommendation topic.

Another limitation of this study was regarding the generalizability. Media use and its content in this study was tailor-made for boarding high school setting and female students. Future research may consider those characteristics when applying Nutrinfo activities in general school.

Acknowledgements

This research was funded by the 90th Anniversary of Chulalongkorn University Fund.

References

- Gaylis, J. B., Levy, S. S., & Hong, M. Y. (2020). Relationships between body weight perception, body mass index, physical activity, and food choices in Southern California male and female adolescents. *International Journal of Adolescence and Youth*, 25(1), 264-275. <https://doi.org/10.1080/02673843.2019.1614465>
- Husain, W., Ashkanani, F., & Al Dwairji, M. A. (2021). Nutrition Knowledge among College of Basic Education Students in Kuwait: A Cross-Sectional Study. *Journal of Nutrition and Metabolism*, 2021, 5560714. <https://doi.org/10.1155/2021/5560714>
- Ministry of Health. (2014). *Peraturan Menteri Kesehatan Republik Indonesia Nomor 41 Tahun 2014 Tentang Pedoman Gizi Seimbang*. Ministry of Health.
- Ministry of Health. (2018). *Laporan Nasional RISKESDAS 2018 [Report of National Health Survey 2018]*. Badan Penelitian dan Pengembangan Masyarakat, Kementerian Kesehatan RI.
- Morren, M., Mol, J. M., Blasch, J. E., & Malek, Ž. (2021). Changing diets - Testing the impact of knowledge and information nudges on sustainable dietary choices. *Journal of Environmental Psychology*, 75, 101610. <https://doi.org/https://doi.org/10.1016/j.jenvp.2021.101610>
- Octaria, Y., Apriningsih, A., Dwiriani, C. M., & Februhartanty, J. (2020). School readiness to adopt a school-based adolescent nutrition intervention in urban Indonesia. *Public Health Nutrition*, 1-12. <https://doi.org/10.1017/S1368980020001299>
- Oddo, V. M., Roshita, A., Khan, M. T., Ariawan, I., Wiradnyani, L. A. A., Chakrabarti, S., Izwardy, D., & Rah, J. H. (2022). Evidence-Based Nutrition Interventions Improved Adolescents' Knowledge and Behaviors in Indonesia. *Nutrients*, 14(9). <https://doi.org/10.3390/nu14091717>
- Rimbawan, R., Nurdiani, R., Rachman, P. H., Kawamata, Y., & Nozawa, Y. (2023). School Lunch Programs and Nutritional Education Improve Knowledge, Attitudes, and Practices and Reduce the Prevalence of Anemia: A Pre-Post Intervention Study in an Indonesian Islamic Boarding School. *Nutrients*, 15(4), 1055. <https://www.mdpi.com/2072-6643/15/4/1055>
- Roshita, A., Riddell-Carre, P., Sjahrial, R., Jupp, D., Torlesse, H., Izwardy, D., & Rah, J. H. (2021). A Qualitative Inquiry into the Eating Behavior and Physical Activity of Adolescent Girls and Boys in Indonesia. *Food and Nutrition Bulletin*, 42(1_suppl), S122-S131. <https://doi.org/10.1177/0379572121990948>
- Sharif Ishak, S. I. Z., Chin, Y. S., Mohd. Taib, M. N., Chan, Y. M., & Mohd. Shariff, Z. (2020). Effectiveness of a school-based intervention on knowledge, attitude and practice on healthy lifestyle and body composition in Malaysian adolescents. *BMC Pediatrics*, 20(1), 122. <https://doi.org/10.1186/s12887-020-02023-x>

Thomas, H., Azevedo Perry, E., Slack, J., Samra, H. R., Manowiec, E., Petermann, L., Manafò, E., & Kirkpatrick, S. I. (2019). Complexities in Conceptualizing and Measuring Food Literacy. *J Acad Nutr Diet*, 119(4), 563-573.
<https://doi.org/10.1016/j.jand.2018.10.015>

Contact email: Nutta.T@chula.ac.th

***Growing Stronger Together:
Are Students' Positive Resources Correlated to Teachers' Features?
How Could They Be Incremented?***

Tania Di Giuseppe, Fondazione Patrizio Paoletti, Italy
Giulia Perasso, Fondazione Patrizio Paoletti, Italy
Grazia Serantoni, Fondazione Patrizio Paoletti, Italy
Carmela Lillo, Fondazione Patrizio Paoletti, Italy
Alessandro Maculan, University of Padua, Italy
Francesca Vianello, University of Padua, Italy
Patrizio Paoletti, Fondazione Patrizio Paoletti, Italy

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

According to scientific literature, teachers' positive characteristics foster students' well-being. Plus, numerous studies show that specific educational trainings increase students' positive resources. The present research aims at exploring: (i) the association between teachers' and adolescent students' resources; (ii) the impact of a neuropsychopedagogical training on adolescents (i.e., Envisioning the Future, EF). The sample includes N=113 adolescents (mean age=13.94 years) whose responses were combined with their teachers' data (N=12, mean age=48.5 years). Participants completed self-report measures (e.g., on self-compassion, self-efficacy in the management of positive and negative emotions, resilience, and self-determination) and ad-hoc items about bullying frequency. To respond to aim (i), correlational analyses were conducted. Analyses of variance (ANOVA) were conducted to respond to aim (ii). The results show that teachers' positive attitude and perceived social support correlate positively with students' self-efficacy in managing positive emotions ($p < .05$). Furthermore, teachers' common humanity correlates positively with the frequency with which adolescents report bullying among peers ($p < .05$). A negative correlation emerged between teachers' self-efficacy in managing positive emotions and students' self-judgment ($p < .05$). ANOVAs highlight that EF increases adolescents' self-efficacy in managing negative emotions [$F(1,112)=4.56$ ($p < .05$)], common humanity [$F(1,112)=11.28$, $p < .01$], self-determination [$F(1,112)=45.05$, $p < .001$], frequency of reporting bullying [$F(1,112)=14.85$, $p < .001$]. The research lays the ground for future studies on trainings that enhance students' positive resources, conceptualizing well-being as a socio-contextual and not only personal variable.

Keywords: Students, Teacher, Neuropsychopedagogy

iafor

The International Academic Forum
www.iafor.org

Introduction

Adolescence is a critical period for the formation of personal and social identity, as stated by Erikson (1958), Marcia (1966), and Sadowski (2021). During this phase, young individuals prepare for adulthood, which entails actively participating in their community of reference. The development of adaptive cognitive, social, and emotional resources balances the investment in social relationships (Tarrant et al., 2001; Tanti et al., 2011). While the family is no longer the sole source of support and socio-emotional nourishment, the peer group, and other adult figures (e.g., teachers, and educators) gain importance in constructing personal identity in educational, playful, and relational contexts. As adolescents' social horizons expand, growth challenges increase, enriching internal and interpersonal connections (Armsdeen & Greenberg, 1987; Tarrant, 2002; Nickerson & Nagle, 2005; Albarello et al., 2017). According to this premise, the school is the primary context for socialization during adolescence: here students spend most of their time learning concepts, interacting with peers, developing interests in extracurricular activities, and preparing for the future (Eccles & Roeser, 2011). School, therefore, significantly influences every aspect of adolescent development and well-being (e.g., cognitive, psychological, social) (Wigfield et al., 2006; Sadowski, 2021). The school context contributes substantially to the development of a resilient individual, which could be furtherly supported through specific educational training (Koni et al., 2019).

Do Teachers' Characteristics Influence Students?

Beyond the literature that has investigated how the relationship between teachers and students (positively or negatively connoted) can influence the well-being of younger students and be a resource for them (Wang et al., 2013; Hagenauer et al., 2015; Summers et al., 2017; Uslu & Gizir, 2017; Harding et al., 2019; García-Moya et al., 2020; Ansari et al., 2020; Ye et al., 2022), it is also useful to ask how much and in what ways precise teacher characteristics can influence precise characteristics of the adolescent student.

According to various theoretical frameworks such as Social Learning Theory (Bandura, 1969), life-skills education (WHO, 1994) (Lumpkin, 2008), and Pedagogy for the Third Millennium (Paoletti et al., 2008), teachers act as role models for behaviour and moral reasoning and their well-being is closely linked to that of the younger generation. These aspects are in line with what neuroscience has shown: mirror neurons in fact (Rizzolatti et al., 2004), activated by observing the other in the performance of an action, describe how individuals can influence each other through their characteristics (Paoletti, 2008; Paoletti & Selvaggio, 2013). The discovery has influenced educational practices, as there is an influence between the educating figure and the students, which can shape the latter's well-being (Godwin, & Trubridge, 2021).

Indeed, research shows that teachers' emotions can influence adolescent students (Becker et al., 2014; Frenzel et al., 2021) in terms of socio-emotional competence and motivation (Rodrigo-Ruiz, 2016). Keller and Becker (2021) suggest that three main emotional experiences, namely anger, pleasure, and anxiety, are directly related between students and teachers, and it is crucial for students' well-being that they perceive emotional authenticity in their interactions with teachers.

Teachers with positive characteristics, therefore, could provide positive examples to their students, including the ability to emerge strengthened from adversity (resilience, Luthar et al.,

2000), the ability to identify and achieve goals (self-efficacy, Bandura et al., 1995) and the ability to maximize joy and appreciation in daily life (self-efficacy in managing positive emotions, Caprara et al., 2008). Similarly, negative characteristics of teachers may have a negative impact on adolescent students. For example, exposure to the example of an adult figure who tends to run away from stressors by using avoidance as a coping strategy (Carver et al., 1989), could generate confusion in young students in dealing with adversity. At the same time, self-critical adult figures could lead adolescents to greater self-judgement, potentially associated with depression and rumination (Rimes & Watkins, 2005).

As argued by White & Kern (2018), within educational contexts, positive education is an increasingly relevant theoretical and empirical strand for pedagogical practice, as it allows for in-depth exploration and evaluation of the best teaching and learning techniques in a relational context. In line with this assumption, the present study aims to detect correlations between teachers and students concerning psychological variables related to well-being and the impact of the neuro-psycho-pedagogical intervention "Envisioning the Future" (EF) on the psychological, social, emotional, and behavioural dimensions of adolescents' lives.

Envisioning the Future: A Neuropsychopedagogical Training

Envisioning the Future is a neuropsychopedagogical training developed by the Patrizio Paoletti Foundation and implemented in Italy with educators in the juvenile penal circuit (Paoletti et al., 2022a; , Paoletti et al., 2023a), inmates (Di Giuseppe et al., 2022), earthquake survivor communities (Di Giuseppe et al., in press) and Ukrainian refugee parents (Paoletti et al., 2023b). The 2022 edition of the EF project, which was conducted from March to May 2022, for a total duration of 8 weeks, offered adolescents and their teachers a training course aimed at fostering individual and school community well-being, especially after the discontinuity caused by the Covid-19 pandemic. Born on the theoretical basis of the Sphere Model of Consciousness (Paoletti & Ben-Soussan, 2019; Pintimalli et al., 2020) and the Pedagogy for the Third Millennium (Paoletti, 2008), Envisioning the Future offers a pathway that integrates theoretical notions on the functioning of the resilient brain and techniques to manage stress, face adversity, cultivate self-determination, by promoting individual well-being and a sense of belonging to humanity in the broadest sense. The project included participation in live webinars with Patrizio Paoletti Foundation trainers and access to a free digital platform.

The training course entitled "The Ten Keys for Resilience" provided interdisciplinary theoretical-practical content. Each key included a training session focusing on a specific theme, accompanied by guided exercises to train resilience in teachers and adolescents, including: (1) Start with what you can control and make small decisions; (2) Identify an attainable, exciting, measurable goal; (3) Several times a day become aware of your posture; (4) Be inspired by stories; (5) Ask yourself what is really important; (6) Cultivate gratitude; (7) Experience the other as a resource, cultivate and expand your social network; (8) Cultivate curiosity; (9) Practice a few minutes of silence; (10) Embrace and transform: before going to sleep generate your own tomorrow today (Paoletti et al., 2022b). The training sessions were accompanied by guided exercises and techniques: relaxation and meditation techniques, mind-training, guided visualisations. All these techniques were presented to foster self-programming, training in proactive and non-self-judging storytelling, and the enhancement of pro-social behaviour, to experience a common, positive, and generative resilience matrix.

Study Aim

The present study has two aims: (i) to explore the correlations between students and teachers in terms of positive resources and negative characteristics; (ii) to investigate the impact of a neuro-psycho-pedagogical training on multiple areas of adolescents' emotional, social and psychological functioning (e.g., emotion regulation, self-compassion dimensions, self-determination dimensions and the frequency with which bullying incidents are reported by the peer group).

Method

Participants

A sample of N=113 adolescents experienced EF and took part in the research. They had an average age of 13.94 years (aged between 12 and 18 years, 52% female) and came from different Italian cities (Assisi N=10; Acerra N=22; San Benedetto del Tronto N=3; Oristano N=2; Rome N=76); N=12 teachers with an average age of 48.5 years (100% female) who taught in the classes attended by the adolescents also participated in the research.

Measures

In this study, multiple psychological variables related to well-being were assessed in adolescents and their teachers. The Self-Compassion Scale (Neff, 2003; Veneziani et al., 2017) was used to evaluate six dimensions of self-compassion, which include self-kindness versus self-judgment, common humanity versus isolation, and mindfulness versus over-identification. This scale consisted of 26 items, and participants responded on a Likert scale ranging from 1 (almost never) to 5 (almost always).

Adolescents completed the APEN/A - APEP/A scales (Scales of Personal Self-Efficacy in Managing Negative and Positive Emotions) (Caprara, ed., 2001) to assess their personal self-efficacy in managing negative and positive emotions. This scale consisted of 15 items, and participants responded on a 5-point Likert scale ranging from "Not at all capable = 1" to "Completely capable = 5."

Students were also given an ad-hoc scale on bullying that assessed the frequency of bullying incidents in their school. Participants could respond using a time-frequency scale ranging from 0 (never) to 4 (every day).

Additionally, some dimensions of Soresi et al.'s (2004) Self-Determination Questionnaire were administered to assess how secure the adolescents felt about their choices. Specifically, items relating to the young person's sense of security regarding future decisions and their own abilities were examined. Participants responded on a 7-step Likert scale.

Finally, the teachers' coping strategies were assessed through the administration of the COPE-NVI questionnaire (Coping Orientation to the Problems Experienced-New Italian Version) (Sica et al., 2008), which consisted of 60 items. Participants responded on a 4-step Likert scale ranging from "I usually don't do it = 1" to "I almost always do it = 4." This questionnaire measures five basic dimensions related to coping, including social support, avoidance strategies, positive attitude, and transcendent orientation.

Procedure

The research project was developed by the Research Institute for Neuroscience Education and Didactics (RINED) of the Patrizio Paoletti Foundation, in collaboration with the University of Padua, whose ethics committee approved the study (protocol: 2020-III/13.41.10). A convenience sampling was carried out, involving in the project schools whose teachers and school principals had participated in online events of the Patrizio Paoletti Foundation, accredited by MIUR, between April 2021 and February 2022. The students took part in the Envisioning the Future (2022 edition) training between March and May 2022, with informed consent from their families. The research required the compilation of the battery of tests in two stages (e.g., t1, March 2022; t2, May 2022): in order to associate the data of the subjects from t1 to t2, an identification pseudonym was requested (e.g., first two letters of the municipality of birth and last four digits of the mobile phone number).

Analytic Plan

To answer the first research objective (i), correlation analyses (Pearson's r) were carried out to understand statistically significant associations between students' and teachers' scores on the mentioned scales. To investigate the second (ii) research aim, analyses of variance (ANOVA) were carried out to compare negative emotion regulation, self-determination, perception of a sense of common humanity, and perception of bullying in a group of adolescents before and after EF neuropsychopedagogical training.

Results

Correlations

The Pearson correlation analyses show that two teachers' coping modalities, namely positive attitude ($r=.190$, $p<.05$) and perceived social support ($r=.193$, $p<.05$), correlate positively with students' self-efficacy in managing positive emotions. Furthermore, teachers' common humanity correlates positively with the frequency with which adolescents report bullying among peers ($r=.304$, $p<.05$). A negative correlation emerged between teachers' self-efficacy in managing positive emotions and students' self-judgment ($r=-.127$, $p<.05$).

ANOVA

The pre-post analyses of variance (ANOVA) show the effects of the neuropsychopedagogical training on the students (Table 1). From pre- to post-training (e.g., T1 to T2), the regulation of negative emotions in the students $F(1,112)=4.56$, $p=.03$, the sense of common humanity $F(1,112)=11.28$, $p=.001$, self-determination for future decisions $F(1,112)=45.05$, $p=.000$, the frequency with which bullying is reported $F(1,112)=14.85$, $p=.000$, increase in a statistically significant way.

Table 1. ANOVAs pre-training EF (T1) and post-training EF (T2)

	Mean (T1)	Mean (T2)	<i>F</i>	<i>p</i>
Self-efficacy in managing negative emotions	23,58	24,81	4.56	.035
Common Humanity	2,63	2,97	11.28	.001
Self-determination for future decisions	24,38	28,12	45.05	.000
Frequency of reporting bullying	0,85	1,315227	14.85	.000

Discussion

Correlations Between Students' and Teachers' Characteristics

The study found that positive teachers' attitudes and perceived social support correlate with higher student self-efficacy in managing positive emotions. Teachers' common humanity was positively correlated with the frequency of reported bullying among peers, while teachers' self-efficacy in managing positive emotions was negatively correlated with student self-judgment. The results emphasize the importance for adolescents of the relationship with adults who are external to the family (Nickerson & Nagle, 2005; Sadowski, 2021) in the context of socialization and cognitive, psychological, and social development of school (Eccles & Roeser, 2011; Wigfield et al., 2006; Uslu & Gizir, 2017). During adolescence teachers can influence adolescents' psychological functioning and well-being because they constitute behavioural models to imitate (Bandura, 1969; WHO, 1994) and their emotional, social, and cognitive resources impact their students as attested by previous studies (Ansari, 2020; Becker et al., 2014; Frenzel et al., 2021; Rodrigo-Ruiz, 2016).

The results of the present research allow to focus on the correlation between teachers' coping styles and adolescents' self-efficacy in managing positive emotions. The construct of coping (Cramer, 1998) encompasses the specific strategies individuals use to face stressors: the exposure to a teacher who can face problems with a positive attitude (Richards, 2012) and cultivating relationships able to offer social support (Zimet et al., 1988) vehicles to adolescents the importance of optimism and belonging to a social network of human bonds. The higher these teachers' characteristics are, the more the students are prone to be self-efficacious in maximizing joy and appreciation in everyday life (Caprara et al., 2008; Perasso & Velotti, 2020), positive emotions that can trigger emotional well-being (Fredrickson & Joiner, 2002).

Moreover, the correlation that emerged between teachers' common humanity and adolescents' frequency for reporting bullying furtherly highlights the importance of imitative

learning during socioemotional and moral development (Bandura, 1996; WHO, 1994). According to Neff (2003) common humanity is the perception of belonging to the human species, as a group, as a wide family. This aspect in teachers could foster prosocial behaviours (Gini et al., 2007; Jenkins & Fredrick, 2017; García-Vázquez et al., 2020; Zábavá, 2020; Gonçalves et al., 2021) in their students, who result more prone to see and report with higher frequency incidents of bullying between peers.

Finally, in this study, the capacity to amplify positive emotion (Caprara et al., 2008) by the teacher negatively correlates with student's self-judgement. It is possible to speculate that the exposure to an adult role-model who can appreciate the positive aspects of daily life, beyond difficulties and personal limits, encourages the adolescent to embrace self-compassion (Neff, 2003), counteracting negative outcomes (e.g., depression, rumination) that may relate to self-judgement (Rimes & Watkins, 2005).

The Impact of Envisioning the Future on Adolescents

The EF program emerged to positively impact adolescents. After the training, students had an increase in self-efficacy in managing negative emotions, in the sense of common humanity, in self-determination regarding future decisions, and in the frequency with which they reported bullying.

Perceiving self-efficacious in managing emotions refers to two constructs: self-efficacy, as the perception of being able to achieve specific goals (Bandura, 1995), and emotional regulation, such as the ability to regulate the intensity and frequency of emotional states (Caprara et al. 2008; Perasso & Velotti, 2020). Becoming more capable of managing negative emotions implies, for adolescents who have participated in EF, a greater ability to avoid being overwhelmed by anger, irritation, discomfort, and discouragement. This capacity is crucial in adolescence, a phase linked to the development of identity, as theorized by Erikson (1958). Since adolescence is permeated by the polarization between the definition of personal identity and role confusion, not being overwhelmed by negative emotions is fundamental for facing complex crises and life transitions, not only in the strictly academic field but also in the socio-relational one (Tarrant et al., 2001; Koni et al., 2019).

EF also seems to encourage adolescents' sense of self-determination regarding future choices, defined by Soresi et al. (2004) as the process through which people actively engage and control the direction of their own lives. It is an active and continuous process that involves making decisions and taking actions that reflect one's values, beliefs, and goals, taking responsibility for one's own actions. This variable is a key factor in promoting overall well-being and quality of life (Soresi et al., 2004). By stimulating self-determination through neuropsychopedagogical training, boys and girls can positively channel their commitment, resources, and motivations toward future choices that promote healthy identity development (Marcia, 1966). The two constructs (i.e., self-efficacy in managing negative emotions and self-determination regarding future choices), increased by EF, refer to an individual emotional and cognitive dimension; however, the program also positively affects adolescent boys and girls in the socio-relational capacities.

There is an increase in the perception of common humanity and in the frequency with which bullying is reported to the frequency questionnaire by adolescents after participation in EF. Common humanity, as a dimension of self-compassion (Neff, 2003), implies the perception of belonging to one's community and, in a broader sense, to the human species. Bullying, on

the other hand, includes in its definition a broad constellation of verbal, physical and psychological, recursive, and deliberate behaviours towards subjects perceived as more fragile, enacted by an individual or group (Guarino et al., 2011; Armitage, 2021). The spread of the phenomenon among adolescents is increasingly widespread (Armitage, 2021; Forsberg & Thorvaldsen, 2022) and represents a psychological emergency for new generations, also thanks to social networks (Perasso et al., 2021). Additionally, the phenomenon has not been halted by the COVID-19 pandemic (Zwicker et al., 2021; Wachs & Hébert, 2021). Since it promotes common humanity and the frequency with which bullying among peers is reported, EF indirectly incentivizes prosociality, investigated by a wide body of studies (Gini et al., 2007; Jenkins & Fredrick, 2017; García-Vázquez et al., 2020; Zăbavă, 2020; Gonçalves et al., 2021), that positively influences decision-making, moral choice, compassion and understanding of the other, improving the sociorelational climate in the school context.

Limits and Future Directions

The research presents some limitations, such as the possibility of bias in self-report questionnaires (Dicken, 1963). Future studies should integrate qualitative and quantitative measures to overcome the issue. Plus, the study lacks of longitudinal data on teachers: this prevented the use of regression models to investigate interactions between variables (Hayes, 2013). Future studies could collect teacher data and implement follow-up data collection (e.g., at least 3 months after the second data collection) to investigate the long-term effects of the neuropsychopedagogical program (EF) on adolescents' well-being (Kazdin, 2008). However, despite these limitations, the study provides valuable insights into the teacher-student relationship and the positive impact of the EF program on students' multidimensional well-being, including emotional regulation, self-determination, and social relationships.

Conclusion

This study provides insight into the relationship between teachers and students during adolescence, showing that teachers' positive characteristics (e.g., coping styles, common humanity, self-efficacy in managing positive emotion) correlate with specific aspects of adolescents' psychological wellbeing and functioning (e.g., emotion regulation, sensitivity towards bullying, self-judgement). The study also measured the impact of a neuropsychopedagogical program (EF) on adolescents, finding positive effects of the training in terms of increased self-efficacy in managing negative emotions, perception of common humanity, self-determination regarding future choices, and frequency of reported bullying among peers. These results draw attention to the importance of pedagogical practices, knowledge, and techniques that promote and enhance the well-being of adolescents, emphasizing how a positive educational relationship with support and exchange with the teacher can improve the quality of life during adolescence.

References

- Albarello, F., Crocetti, E., & Rubini, M. (2018). I and us: A longitudinal study on the interplay of personal and social identity in adolescence. *Journal Of Youth and Adolescence*, 47, 689-702. <https://doi.org/10.1007/s10964-017-0791-4>
- Ansari, A., Hofkens, T. L., & Pianta, R. C. (2020). Teacher-student relationships across the first seven years of education and adolescent outcomes. *Journal of Applied Developmental Psychology*, 71, 101200. <https://doi.org/10.1016/j.appdev.2020.101200>
- Armitage, J. (2021). *Bullying and cyberbullying in adolescence*. Cambridge University Press.
- Armsden, G. C., & Greenberg, M. T. (1987). The inventory of parent and peer attachment: Individual differences and their relationship to psychological well-being in adolescence. *Journal of youth and adolescence*, 16(5), 427-454. <https://doi.org/10.1007/BF02202939>
- Bandura, A. (1969). Social-learning theory of identificatory processes. *Handbook of socialization theory and research*, 213, 262.
- Bandura, A. (1995). *Self-efficacy in changing societies*. Cambridge University Press.
- Becker, E. S., Goetz, T., Morger, V., & Ranellucci, J. (2014). The importance of teachers' emotions and instructional behavior for their students' emotions—An experience sampling analysis. *Teaching and Teacher Education*, 43, 15-26. <https://doi.org/10.1016/j.tate.2014.05.002>
- Caprara, G. V. (Ed.). (2001). *La valutazione dell'autoefficacia. Costrutti e strumenti*. Edizioni Erickson.
- Caprara, G. V., Barbaranelli, C., Borgogni, L., & Steca, P. (2008). Measuring emotional self-regulation and its relation to well-being. *Journal of Happiness Studies*, 9(4), 571-594.
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, 56(2), 267–283. <https://doi.org/10.1037/0022-3514.56.2.267>
- Cramer, P. (1998). Coping and defense mechanisms: What's the difference?. *Journal of Personality*, 66(6), 919-946.
- Di Giuseppe, T., Perasso, G., Mazzeo, C., Maculan, A., Vianello, F., & Paoletti, P. (2022). Envisioning the future: A neuropsychopedagogical intervention on resilience predictors among inmates during the pandemic. *Ricerche di Psicologia-Open Access*. <https://doi.org/10.3280/rip2022oa14724>
- Di Giuseppe, T., Serantoni, G., Paoletti, P., Perasso, G. (in press). Un sondaggio a quattro anni da Prefigurare il Futuro, un intervento neuropsicopedagogico postsisma [A survey four years after Envisioning the Future, a post-earthquake neuropsychopedagogic intervention]. *Orientamenti Pedagogici*, Ed. Erikson.

- Dicken, C. (1963). Good impression, social desirability, and acquiescence as suppressor variables. *Educational and Psychological Measurement*, 23(4), 699-720.
<https://doi.org/10.1177%2F001316446302300406>
- Eccles, J. S., & Roeser, R. W. (2011). Schools as developmental contexts during adolescence. *Journal of Research on Adolescence*, 21(1), 225-241. <https://doi.org/10.1111/j.1532-7795.2010.00725.x>
- Erikson, E. H. (1958). Identity and the life cycle. *Psychological issues*, 1(1), 1-171.
- Forsberg, J. T., & Thorvaldsen, S. (2022). The severe impact of the COVID-19 pandemic on bullying victimization, mental health indicators and quality of life. *Scientific reports*, 12(1), 22634. <https://doi.org/10.1038/s41598-022-27274-9>
- Frenzel, A. C., Daniels, L., & Burić, I. (2021). Teacher emotions in the classroom and their implications for students. *Educational Psychologist*, 56(4), 250-264.
<https://doi.org/10.1080/00461520.2021.1985501>
- Fredrickson, B. L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science*, 13(2), 172-175.
- García-Moya, I., Brooks, F., & Moreno, C. (2020). Humanizing and conducive to learning: An adolescent students' perspective on the central attributes of positive relationships with teachers. *European journal of psychology of education*, 35, 1-20.
<https://doi.org/10.1007/s10212-019-00413-z>
- García-Vázquez, F. I., Valdés-Cuervo, A. A., Martínez-Ferrer, B., & Parra-Pérez, L. G. (2020). Forgiveness, Gratitude, Happiness, and Prosocial Bystander Behavior in Bullying. *Frontiers in psychology*, 10, 2827.
<https://doi.org/10.3389/fpsyg.2019.02827>
- Gini, G., Albiero, P., Benelli, B., & Altoè, G. (2007). Does empathy predict adolescents' bullying and defending behavior?. *Aggressive behavior*, 33(5), 467-476.
<https://doi.org/10.1002/ab.20204>
- Guarino, A., Lancellotti, R., & Serantoni, G. (2011). *Il bullismo: aspetti giuridici, teorie psicologiche, tecniche di intervento*. Milano: Franco Angeli.
- Hagenauer, G., Hascher, T., & Volet, S. E. (2015). Teacher emotions in the classroom: associations with students' engagement, classroom discipline and the interpersonal teacher-student relationship. *European Journal of Psychology of Education*, 30(4), 385-403. <https://doi.org/10.1007/s10212-015-0250-0>
- Harding, S., Morris, R., Gunnell, D., Ford, T., Hollingworth, W., Tilling, K., ... & Kidger, J. (2019). Is teachers' mental health and wellbeing associated with students' mental health and wellbeing?. *Journal of Affective Disorders*, 242, 180-187.
<https://doi.org/10.1016/j.jad.2018.08.080>
- Hayes, A.F. (2013). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. Guilford Press.

- Jenkins, L. N., & Fredrick, S. S. (2017). Social Capital and Bystander Behavior in Bullying: Internalizing Problems as a Barrier to Prosocial Intervention. *Journal of youth and adolescence*, 46(4), 757–771. <https://doi.org/10.1007/s10964-017-0637-0>
- Kazdin, A. E. (2008). *Statistical power analysis for the behavioral sciences* (2nd ed.). Routledge.
- Keller, M. M., & Becker, E. S. (2021). Teachers' emotions and emotional authenticity: do they matter to students' emotional responses in the classroom?. *Teachers and Teaching*, 27(5), 404-422. <https://doi.org/10.1080/13540602.2020.1834380>
- Koni, E., Moradi, S., Arahanga-Doyle, H., Neha, T., Hayhurst, J. G., Boyes, M., ... & Scarf, D. (2019). Promoting resilience in adolescents: A new social identity benefits those who need it most. *PloS one*, 14(1), e0210521. <https://doi.org/10.1371/journal.pone.0210521>
- Lumpkin, A. (2008). Teachers as role models teaching character and moral virtues. *Journal of Physical Education, Recreation & Dance*, 79(2), 45-50. <https://doi.org/10.1080/07303084.2008.10598134>
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). Research on resilience: Response to commentaries. *Child Development*, 71(3), 573-575. <https://doi.org/10.1111/1467-8624.00168>
- Marcia, J. E. (1966). Development and validation of ego-identity status. *Journal of Personality and Social Psychology*, 3(5), 551. <https://psycnet.apa.org/doi/10.1037/h0023281>
- Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity*, 2(3), 223-250. <https://doi.org/10.1080/15298860309027>
- Nickerson, A. B., & Nagle, R. J. (2005). Parent and peer attachment in late childhood and early adolescence. *The Journal of Early Adolescence*, 25(2), 223-249. <https://doi.org/10.1177/0272431604274174>
- Paoletti, P. (2008). *Crescere nell'eccellenza*. Roma: Armando editore.
- Paoletti, P., & Ben Soussan, T. D. (2019). The sphere model of consciousness: from geometrical to neuro-psycho-educational perspectives. *Logica Universalis*, 13(3), 395-415. <https://doi.org/10.1007/s11787-019-00226-0>
- Paoletti, P., Di Giuseppe, T., Lillo, C., Serantoni, G., Perasso, G., Maculan, A., & Vianello, F. (2022a). La resilienza nel circuito penale minorile in tempi di pandemia: un'esperienza di studio e formazione basata sul modello sferico della coscienza su un gruppo di educatori. *Narrare i gruppi*, pagine-01.
- Paoletti, P., Di Giuseppe, T., Lillo, C., Anella, S., Santinelli, A. (2022b). *Le Dieci Chiavi della Resilienza*. <https://fondazionepatriziopaoletti.org/10-chiavi-resilienza/>

- Paoletti, P., Di Giuseppe, T., Lillo, C., Serantoni, G., Perasso, G., Maculan, A., & Vianello, F. (2023a). Training spherical resilience in educators of the juvenile justice system during pandemic. *World Futures*, 1-18. <https://doi.org/10.1080/02604027.2023.2169569>
- Paoletti, P., Perasso, G. F., Lillo, C., Serantoni, G., Maculan, A., Vianello, F., & Di Giuseppe, T. (2023b). Envisioning the Future for Families running away from War: challenges and resources of Ukrainian parents in Italy. *Frontiers in Psychology*, 14, 793. DOI: <https://doi.org/10.3389/fpsyg.2023.1122264>
- Perasso, G., & Velotti, P. (2020). Difficulties in emotion regulation scale. *Encyclopedia of personality and individual differences*, 1132-1134. https://doi.org/10.1007/978-3-319-24612-3_810
- Perasso, G., Carone, N., Lombardy Group 2014, H. B. I. S. A. C., & Barone, L. (2021). Written and visual cyberbullying victimization in adolescence: Shared and unique associated factors. *European Journal of Developmental Psychology*, 18(5), 658-677. <https://doi.org/10.1080/17405629.2020.1810661>
- Pintimalli, A., Di Giuseppe, T., Serantoni, G., Glicksohn, J., & Ben-Soussan, T. D. (2020). Dynamics of the Sphere Model of Consciousness: Silence, space, and self. *Frontiers in Psychology*, 11, 2327. <https://doi.org/10.3389/fpsyg.2020.548813>
- Richards, J. (2012, July). Teacher stress and coping strategies: A national snapshot. In *The educational forum* (Vol. 76, No. 3, pp. 299-316). Taylor & Francis Group.
- Rimes, K. A., & Watkins, E. (2005). The effects of self-focused rumination on global negative self-judgements in depression. *Behaviour Research and Therapy*, 43(12), 1673-1681. <https://doi.org/10.1016/j.brat.2004.12.002>
- Rodrigo-Ruiz, D. (2016). Effect of teachers' emotions on their students: Some evidence. *Journal of Education & Social Policy*, 3(4), 73-79.
- Sadowski, M. (Ed.). (2021). *Adolescents at school: Perspectives on youth, identity, and education*. Harvard Education Press.
- Sica, C., Magni, C., Ghisi, M., Altoè, G., Sighinolfi, C., Chiri, L. R., & Franceschini, S. (2008). Coping Orientation to Problems Experienced-Nuova Versione Italiana (COPE-NVI): uno strumento per la misura degli stili di coping. *Psicoterapia cognitiva e comportamentale*, 14(1), 27.
- Soresi, S., Nota, L., & Ferrari, L. (2004). Self-determination and school career choices: an instrument for the assessment. *Giornale Italiano di Psicologia dell'Orientamento*, 5, 26-42.
- Summers, J. J., Davis, H. A., & Hoy, A. W. (2017). The effects of teachers' efficacy beliefs on students' perceptions of teacher relationship quality. *Learning and Individual Differences*, 53, 17-25. <https://psycnet.apa.org/doi/10.1016/j.lindif.2016.10.004>

- Tanti, C., Stukas, A. A., Halloran, M. J., & Foddy, M. (2011). Social identity change: Shifts in social identity during adolescence. *Journal of Adolescence*, 34(3), 555-567. <https://psycnet.apa.org/doi/10.1016/j.adolescence.2010.05.012>
- Tarrant, M. (2002). Adolescent peer groups and social identity. *Social Development*, 11(1), 110-123. <https://doi.org/10.1111/1467-9507.00189>
- Tarrant, M., North, A. C., Edridge, M. D., Kirk, L. E., Smith, E. A., & Turner, R. E. (2001). Social identity in adolescence. *Journal of Adolescence*, 24(5), 597-609. <https://doi.org/10.1006/jado.2000.0392>
- Uslu, F., & Gizir, S. (2017). School belonging of adolescents: The role of teacher–student relationships, peer relationships and family involvement. *Kuram ve Uygulamada Eğitim Bilimleri/Educational Sciences: Theory & Practice*, 17(1), 63–82. <http://doi.org/10.12738/estp.2017.1.0104>
- Veneziani, C. A., Fuochi, G., & Voci, A. (2017). Self-compassion as a healthy attitude toward the self: Factorial and construct validity in an Italian sample. *Personality and Individual Differences*, 119, 60-68. <https://doi.org/10.1016/j.paid.2017.06.028>
- Wachs, S., & Hébert, M. (2021). The impact of the COVID-19 pandemic on bullying and cyberbullying among adolescents. *Child Abuse & Neglect*, 115, 104701. <https://doi.org/10.1016/j.chiabu.2021.104701>
- Wang, M. T., Brinkworth, M., & Eccles, J. (2013). Moderating effects of teacher–student relationship in adolescent trajectories of emotional and behavioral adjustment. *Developmental psychology*, 49(4), 690. <https://psycnet.apa.org/buy/2012-12788-001>
- White, M., & Kern, M. (2018). Positive education: Learning and teaching for wellbeing and academic mastery. <https://www.internationaljournalofwellbeing.org/index.php/ijow/article/view/588>
- Wigfield, A., Eccles, J. S., Schiefele, U., Roeser, R., & Davis-Kean, P. (2006). Motivation. In N. Eisenberg (Ed.), *Handbook of child psychology* (Vol. 3, 6th ed., pp. 933– 1002). New York, NY: Wiley.
- World Health Organization. (1994). Life skills education for children and adolescents in schools. Pt. 1, Introduction to life skills for psychosocial competence. Pt. 2, Guidelines to facilitate the development and implementation of life skills programmes (No. WHO/MNH/PSF/93.7 A. Rev. 2). World Health Organization.
- Ye, Y., Wang, C., Zhu, Q., He, M., Havawala, M., Bai, X., & Wang, T. (2022). Parenting and teacher–student relationship as protective factors for Chinese adolescent adjustment during COVID-19. *School Psychology Review*, 51(2), 187-205. <https://doi.org/10.1080/2372966X.2021.1897478>
- Zăbavă, T. (2020). The Compassion Dimension in Bullying in High School Students. *Journal of Experiential Psychotherapy/Revista de PSIHOterapie Experientiala*, 23(3).

Zaki, J., & Ochsner, K. N. (2012). The neuroscience of empathy: Progress, pitfalls and promise. *Nature Neuroscience*, 15(5), 675–680. <https://doi.org/10.1038/nn.3085>

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52(1), 30-41.

Zwicker, J. G., Meneses, C., Barter, T. P., & Card, N. A. (2021). Bullying in schools during the COVID-19 pandemic. *Journal of School Violence*, 20(2), 187-205. <https://doi.org/10.1080/15388220.2021.1896638>

Contact email: g.perasso@fondazionepatriziopaoletti.org

Simulation-Oriented Training: Analysis and Modeling of Trainer Activity During Post-simulation Debriefing (D-STAM)

Valérie Duvivier, Université de Mons, Belgium
Emilie Carosin, Université de Mons, Belgium
Antoine Derobertmeasure, Université de Mons, Belgium
Marc Demeuse, Université de Mons, Belgium

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

In post-simulation debriefing, the role of the trainer is increasingly recognised as an important asset for effective professional training. However, there are no specific models that focus on the trainer's activity during this fundamental phase of learning. Existing work often provides prescriptive insights and lacks a comprehensive theoretical framework from the trainer's perspective. To fill this gap, the paper presents the D-STAM (Debriefing Simulation Trainer Activity Model), an integrative model designed to understand and improve trainer activity during post-simulation debriefing. The D-STAM aims to answer the research question about the trainer's role in post-simulation debriefing and to identify the characteristics of the trainer's activity. It was developed on the basis of an integrative literature searches in nine French and English databases (Google Scholar, ERIC, ERUDIT, CAIRN, Pascal & Francis, OpenEdition, Springer, SCOPUS and Sudoc). The 33 articles selected were subjected to thematic analysis (according to Braun and Clark, 2006), supplemented by n-vivo 12 software. The D-STAM highlights the role of the trainer as a facilitator, guiding the learners' reflections and supporting the development of operational models. It emphasises the dual regulation of the trainer's activity, both by himself/herself and by the dynamic conditions of the debriefing. The model includes three levels of variables (input, process and effect) and provides a holistic understanding of the trainer's activity, including the use of technology. The model is applicable to the fields of medicine, risk management and education.

Keywords: Post-simulation Debriefing, Trainer, Facilitator, Professional Training, Dual Regulation, D-STAM

iafor

The International Academic Forum
www.iafor.org

1. Introduction, Issue and Research Issue

Simulation for vocational training purposes is considered one of the “dominant models in education” (Horcik, 2014, p.1). It aims to reproduce the reality of a professional event or situation by reducing it to a simplified model (Duvivier & Demeuse, 2023). In this way, the learner interacts proactively with a real or virtual object, device or person and can modify the flow of decisions and actions throughout the interaction (Halamek et al., 2019).

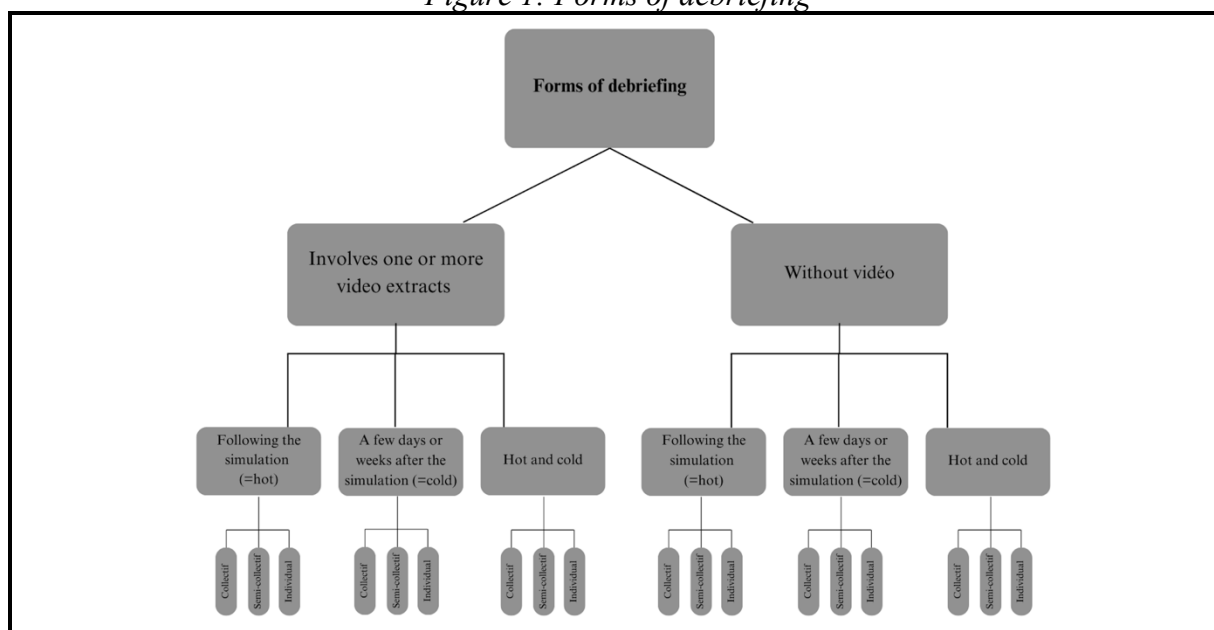
Simulation for training purposes is generally organised into three successive interactive phases: the briefing phase, the simulation session and the debriefing phase (Fanning & Gaba, 2007; Samurçay, 2009; Vidal-Gomel, 2020). Each phase has a specific function (Dubois, 2017). Briefing allows each learner to mentally prepare for the simulated situation they are about to experience (Fanning & Gaba, 2007). The simulation session focuses on the simulated situation itself, where learners experience an environment that replicates real professional practice (Duvivier & Demeuse, 2023). Debriefing aims to explore mistakes, challenges and successes, identify key learning points (Oriot & Alinier, 2018) and encourage critical reflection on the skills developed (Duvivier & Demeuse, 2023). Often facilitated by a trainer (Sawyer, Eppich, et al., 2016), debriefing encourages learners to articulate actions and reflections on actions (Chinara & Pellerin, 2014; C. Pastré, 2006).

Considered to be one of the main pedagogical challenges of simulation (Oriot & Alinier, 2018; Savoldelli, 2011), debriefing is very regularly the subject of work in the military, civil security and education sectors, and especially in the health and medical sector. Some of this work (e.g. Oriot & Alinier, 2018; Bauchat & Seropian, 2020; Sawyer & al. 2016) has addressed debriefing methods and techniques, strategies for engaging learners during debriefing, the impact of this phase on learning, critical reflection and the importance of debriefing in skills development.

However, few have taken an interest in the trainers and even fewer in the way in which the trainer takes hold of the simulation object and uses it to train the learners, on the one hand, and the way in which the trainer supports the reflective activity of the learners during the debriefing, on the other, remains little studied. When it is, the elements reported are prescriptive in nature. Questions remain as to their generalisation or operationalisation. The way in which post-simulation contributes to the development of reflexivity has been less explored.

Yet a growing body of work suggests that debriefing cannot be considered without a skilled and trained professional trainer (Bauchat & Seropian, 2020; Oriot & Alinier, 2018; Sawyer et al., 2016). This interest can be explained for several reasons.

Firstly, there is also a wide variety of debriefing formats in figure 1 (see Sawyer & al. 2016 for a summary). This variety of formats highlights the richness and complexity of the pedagogical approach to debriefing as well as the multiple factors that come into play when choosing and conducting a debrief (Sawyer, Fleegler, et al., 2016). These factors may concern the level of the learner, the pedagogical objectives, the context (Eppich & Cheng, 2015; Sawyer & al., 2016; Oriot & Alinier, 2018; Bauchat & Seropian, 2020) and the content (Secheresse, 2020).

Figure 1: Forms of debriefing

This situation is made more complex by the abundance of methodologies (24 models identified by Duvivier & al. 2023) and debriefing strategies, which forces trainers to skilfully combine different approaches, as a single method is often insufficient (Bauchat & Seropian, 2020). As Krogh et al., (2016) points, “although the literature describes different methods and approaches to debriefing that constitute effective debriefing, there are discrepancies in what is actually practised and how experts or experienced debriefers perceive and approach debriefing” (p.1).

However, trainers' pedagogical knowledge (Dubois, 2017) and their ability to improve their practices are limited by the lack of evaluation (Delmas & Delmas, 2021) and training opportunities (Cheng et al., 2016, 2017, 2020). Indeed, simulation training has historically focused on "basic" content (Cheng et al. 2020) and short formats (sessions of 3 to 5 days or up to 3 weeks) (Policard, 2018). According to Cheng et al. (2020), this limited access to basic debriefing skills hinders the development of a comprehensive conceptual framework and the progression of trainers' skills development.

Secondly, the trainer's activity in post-simulation debriefing is not theorised by a model unlike the simulated exercise phase (cfr Vidal and Gomel, 2011 or Policard, 2018). This lack of theorization is particularly regrettable in the complex and dynamic context of debriefing, which can make the effects of the trainer's actions unpredictable or not immediately observable by the trainer.

Thirdly, the profiles of post-simulation debriefing trainers often involve individuals from operational departments or with dual roles between operational tasks and training (Dubois, 2017). These transitional positions may lead them back to their original functions or to new assignments (Dubois, 2017). Furthermore, while operational experience can be advantageous because it adds legitimacy in the eyes of the learners (Dubois, 2017), it seems to put a strain on the trainer's posture. The latter then oscillates between the posture of professional expert rather than trainer (Bastiani, 2017; Policard, 2018). This can create a challenge for trainers who have to strike a balance between maintaining cognitive control and allowing learners autonomy to explore and construct their understanding (Policard, 2018). Furthermore, trainers may downplay their educational role in relation to their fieldwork (Policard, 2018).

Fourthly, observing and integrating relevant data during the debriefing process is laborious and very demanding for trainers. Indeed, it requires them to constantly update and establish links between the pedagogical objectives of the simulation, those of the debriefing as well as the elements that arrived in simulation and (Bastiani et al., 2017; Oriot & Alinier, 2018; Secheresse, 2020) and that arrive in debriefing. This situation is reinforced by the lack of tools enabling the trainer to analyse the learner's activity during the simulation or when the trainer is also involved in the simulated situation, as this can impair their overall perception and objective observation during the debriefing. Thus, it is not uncommon to read that conducting a post-simulation debriefing can lead to mental overload among trainers (Oriot & Alinier, 2018).

Given these challenges, the aim of this paper is 1) to clarify the trainer's role in post-simulation debriefing and 2) to list and then model a set of components specific to the trainer's activity, while preserving the uniqueness of situations in a model. In light of the above challenges, this paper aims to answer two research questions:

- 1) What is the specific role of the trainer in post-simulation debriefing and how can this role be fully elucidated to improve understanding of its influence on learners' reflective processes?
- 2) How can we systematically identify and model the unique components of trainer activity during post-simulation debriefing, while ensuring the preservation of situational specificity within an overall model?

In order to answer these questions, this article presents our research methodology based on an integrative investigation. The results of the study are divided into two parts: first, we examine the role of the trainer during post-simulation debriefing. Second, we present the D-STAM model, which models the concrete manifestations of the trainer's activity during debriefing, based on Leplat and Cuny's (1974) five-box model adapted to simulation-based training systems. The D-STAM model articulates three levels of process (input conditions, activity performed and effect) and seven categories of factors (personal, contextual, technological, instrumental, regulatory, internal to the trainer and internal to the learner). We also explore the links between trainer determinants and feedback using a dual regulation perspective. Finally, we summarise the findings and discuss practical implications and future directions for research in this area.

2. Methodology and Selection of Sources

2.1. General Procedures

To answer these research questions, an integrative literature review was conducted. An integrative literature review "is a particular form of research that generates new knowledge about the subject under examination" (Torraco, 2005). The integrative approach involves synthesising and integrating knowledge from different research sources (Snyder, 2019; Torraco, 2005, 2016). Thus, unlike a traditional literature review which lists and describes previous work, the integrative literature review aims to go beyond simply describing previous work by identifying common themes, patterns or trends across the different studies included (Snyder, 2019; Torraco, 2016). It is built on comparative analysis and the search for links between different sources of research. For Snyder (2019), this method plays "an essential role in the construction of theoretical frameworks and the formulation of conceptual models" (p.133).

Our integrative review was based on 9 databases and 33 articles, both French- and English-speaking, in the fields of professional medical training, crisis management and teaching (see table 1).

Table 1: Data from the integrative review

Database	1st phase	Retained for 2nd phase	Retained for 3rd phase
Open Edition	18	3	1
PubMed	86	10	5
ERUDIT	23	6	1
CAIRN	475	7	3
Pascal & Francis	34	6	0
Google Scholar	371	12	6
Springer	861	2	2
ERIC	156	14	1
SCOPUS	765	22	4
Addition to the margin			9
TOTAL	3439	87	33

The equations combined the keywords "Simulation" AND "Debriefing" AND "formateur/facilitateur/faculty/educator/teacher" AND "education" OR "Crisis NOT Interprofessional. We used titles, keywords and abstracts, and limited the query to the period 2012- 2022. Our review was conducted in three methodological steps: first, relevant references were identified by systematic searches of one or more databases. Second, the references were selected by evaluating the titles and abstracts of the articles, eliminating duplicates from multiple sources. The third step was to assess the eligibility of the articles by analysing their full text. In addition, we considered work on debriefing trainers with the use of video, in line with Levett-Jones & Lapkin (2014), who consider this debriefing format to be a 'reference standard'. The integration of video during debriefing leads to significant implications for the trainer's professional practices (Krogh et al., 2016) all of which are not necessary in debriefings that do not include videos. Furthermore, documents relating to virtual debriefings were not included, nor were interprofessional debriefings, which involve hierarchical teams and most often a co-debriefing of trainers.

2.2. Data Processing

To answer the research questions, we proceeded to define the manifestations of the trainer's activity on the basis of a coding carried out according to a pre-established general plan (Saubesty, 2006). This coding method is based on categories that serve as a guide for developing codes (Saubesty, 2006). Some authors suggest that the coding plan can be structured around the actors involved, the activities carried out and the elements of the context (Grenier & Josserand, 2014) or around context, content and process (Pettigrew, 1990). We opted for a coding approach guided by a pre-established general plan for two main reasons. Firstly, and like Saubesty (2006), our research is exploratory in nature, which means that we are seeking to explore and understand a relatively new field. By using a pre-established coding scheme, we were able to structure our analysis and focus our research in a more targeted way. In addition, given that our study focuses on activity, its role, its obstacles, and its levers, we were able to adapt the code categories to specifically reflect these 4 components of our research.

Once the general plan had been established around these four central themes, a thematic analysis was carried out following the six stages of Braun and Clark (2006) as recommended by Braun et al., (2019). In the first stage, we carefully read selected articles to gain an overall understanding of the content and identify key concepts related to the trainer's role in debriefing. Then, we assigned labels or categories to organize the information in the data (code generation). The third stage involved researching themes to group related codes, leading to exploratory connections and different perspectives. In the fourth stage, we conducted an in-depth analysis of the themes to highlight variations and similarities. For the fifth stage, we assigned descriptive names to each theme, considering their nuances. Finally, in the sixth stage, we synthesized the results into a model to better understand the different components of the trainer's activity in post-simulation debriefing.

Data analysis was facilitated with Nvivo 12 software, providing advanced functionalities for managing, organizing, and exploring qualitative data (Plard & Martineau, 2019). We imported, organized, and coded data, visualizing connections between codes and exploring relationships between themes to extract significant insights (Plard & Martineau, 2019). To ensure reliability, the data underwent double coding. The researcher initially coded the data based on the stabilized code grid. Two weeks later, the same researcher conducted a second coding to check consistency and reliability. According to Huberman and Miles' recommendations (1991) (cited by Pourtois, 1993), a concordance rate of 80% is considered satisfactory for reliability. Our analysis achieved a concordance rate of 87.1%, indicating high reliability.

3. Results: Role and Activity of the Trainer During a Post-simulation Debriefing

3.1. Trainer-Facilitator Perspective

In simulation-based vocational training, the term 'trainer' provokes debate and coexists with thirteen other terms such as 'teacher', 'mediator', 'instructor', 'mentor', 'professor' and 'facilitator' (Jones et al. 2014 cited by Policard, 2018; Simoneau et al., 2014). Although the term 'facilitator' is the most frequently used (in 15 out of 33 papers - table 2), it is used generically to describe the overall activity of the trainer during the three phases of a simulation-based training device, namely briefing, simulated exercise and debriefing.

Table 2: Works describing the role of facilitator

Themes	Sub-themes	Authors
Role of the Trainer	Trainer-Facilitator	<ul style="list-style-type: none"> - Savoldelli, G., & Boet, S. (2013). - Secheresse, T., Mampe-Armstrong, H., Usseglio, P., et al. (2016). - Dury, C. (2017). - Secheresse, T., Pansu, P., & Lima, L. (2021). - Oriot, D., & Alinier, G. (2019). - Amor, B., Hentati, J., Gargouri (2018). - Galland, J., Jaffrelot, M., Sanges, S., Fournier, J. P., Jouquan, J., Chiniara, G., & Rivière, É. (2020). - Roulin, V. (2014). - Tutticci, N., Ryan, M., Coyer, F., and Lewis, A. (2018). - Jones, A. L., Reese, C. E., & Shelton, D. P. (2014). - Bastiani, B., Calmettes, B., Minville, V., & Marhar, F. (2017). - Dubrous, V., Eymard, C. (2022). - Cheng, et al. (2020). - Dubois, L-A. (2017). - Sondag, (2018).

In debriefing, the concept of facilitator corresponds more to "a pedagogical attitude related to a way of promoting learning in the general context of active pedagogy" (Policard, 2018; p.12). Specifically, the trainer-facilitator plays the role of mediator between the learners, the knowledge to be acquired (Simoneau & Pilote, 2017), the pedagogical objectives and the trainer himself/herself (Duvivier et al., 2023). This mediation, reminiscent of Houssaye's pedagogical triangle (1988 cited by Houssaye, 2000), gives the trainer a pedagogical intention at the time of the debriefing.

The aim is to improve their future performance by developing operational models that can be transferred to similar real-life situations (Rudolph et al., 2008; Secheresse, 2020; Pastré, 2011). To achieve this goal, the trainer-facilitator will encourage learners to develop reflective thinking by encouraging them to critically examine the actions and decisions taken during the simulated exercise and during the debriefing. This reflection allows learners to become aware of their skills, strengths and areas for improvement (Oriot & Alinier, 2018). To do this, the facilitator encourages the group to speak and discuss (Policard, 2018). He or she asks questions and guides the exchange (Simoneau & Pilote, 2017) to explore everyone's different perspectives on the simulated situations. To encourage the active participation of the learners, the trainer-facilitator adopts the position of a co-learner rather than that of an authority or expert (Horczik, 2014; Fanning & Gaba, 2007). In this way, the facilitator differs from a more transmissive approach by creating a more collaborative and open learning environment.

In conclusion, the trainer-facilitator plays an essential role in debriefing as a pedagogical mediator, encouraging reflection, active participation, speaking out and adopting a co-learner stance. This facilitative approach contributes to the exploration, learning and development of learners' skills and reflexivity in the context of simulation-based training.

3.2. Activity Modeling of the Trainer in Post-Simulation Debriefing: D-STAM

Understanding and capturing the activity of trainers in simulation and debriefing is a complex task (Bastiani, 2018). To achieve this we have opted for an approach based on activity analysis, like Bastiani (2017, 2018) and Dubois (2017). This analysis of activity is based on various theories, including the course of action (Clot, 2004), the clinic of activity (Clot, 1999), the professional didactics (Mayen, 2012; Pastré, 2006; Pastré et al., 2006) which pays particular attention to the debriefing of real-life situations, especially in dynamic environments (Bastiani, 2018) with dual regulation (Rogalski & Colin, 2018).

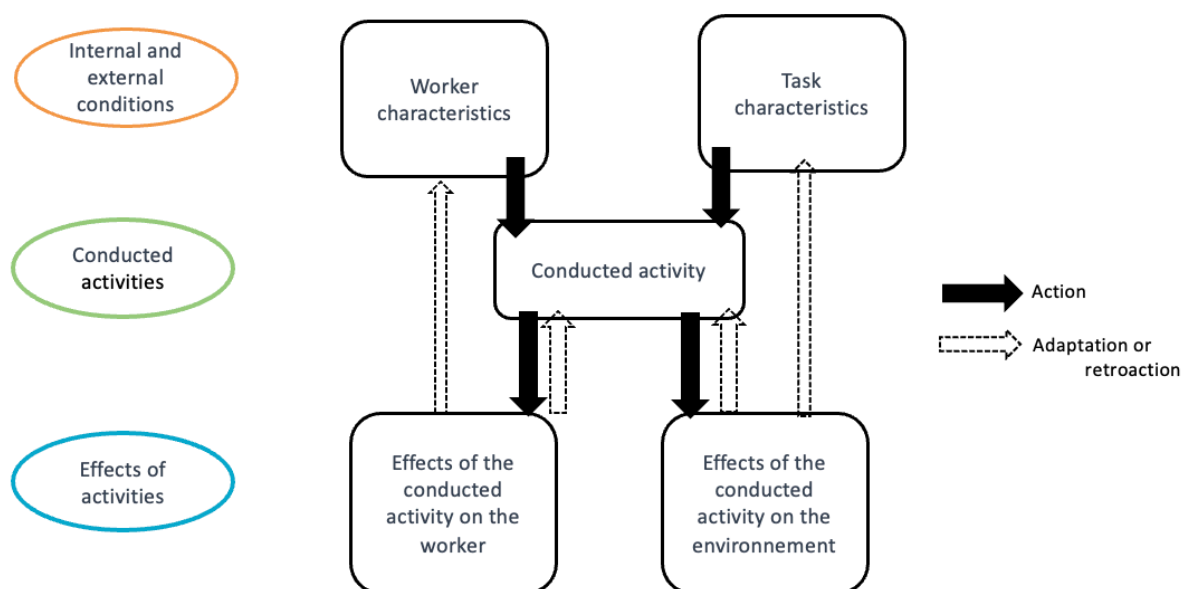
Dynamic environment refers to the debriefing contexts that draw from situations, interactions and reactions of the learners that evolve in real time, and thus require continuous adaptation on the part of the trainer. Double regulation of activity refers to the dynamic process by which an individual adjusts and regulates his or her activity according to both the external constraints of the work situation and his or her own internal characteristics (Saubesty, 2006). As a result, the trainer's activity is influenced by external contextual factors such as task requirements, tools and resources available, as well as internal factors such as skills, knowledge, motivations and emotions. In post-simulation debriefing, the trainer performs a double regulation of his activity due to the complex and dynamic nature of his role. Firstly, the trainer must regulate his activity according to the external conditions of the simulation, such as the pedagogical objectives, the simulation scenarios, the resources available and the expectations of the learners. He must adapt and adjust his approach to create an environment conducive to learning and facilitate learners' critical reflection on their actions and performance during the simulation. Secondly, the trainer must also regulate his activity according to his internal characteristics, such as his specialist knowledge, his professional experience, his teaching skills, and his ability to facilitate learners' learning. He must consider his own emotional reactions, judgements and beliefs in order to guide learners effectively through the debriefing process. The trainer must be able to adapt to learners' needs and reactions, while maintaining a balance between facilitating learning and regulating the reflection process. By ensuring this dual management, the trainer aims a) to modify the relationship between the learner and the content taught (Samurçay & Rogalski, 1998) and b) to maintain the learner in a zone of proximal development (Vidal-Gomel et al., 2011).

Moreover, trainers' activities are closely linked to their motivation and interest in practice. Indeed, it should be noted that trainers do not necessarily engage in the debriefing activity for the same reasons (Policard, 2018). The manifestations of their engagement may vary and correspond to different profiles (Policard, 2018), with an intensity and strength of involvement that lie on a continuum from low investment (mere consent) to a high degree of involvement Klein et al. (2012). A trainer's engagement profile can influence their pedagogical posture, in particular their propensity to adopt a controlling posture rather than a letting go attitude (Policard, 2018). Furthermore, the trainer's commitment is closely linked to his or her motivation. Trainers are not motivated solely by the desire to pass on knowledge, but above all perceive this activity as a professional opportunity (Bastiani, 2017). It is therefore possible, according to Bastiani (2017), that some trainers underestimate the importance of their teaching role in relation to their previous experience in the field, for which they provide training.

To better understand the dynamic and doubly regulated activity of the trainer in post-simulation debriefing, we have adapted Leplat and Cuny's five-square model (1974). The model is derived from the double regulation model of activity and has been widely discussed within the French study group RESACT. It serves as a conceptual framework for understanding the different

components and interactions involved in professional activity, without providing a specific analysis process. This framework allows us to explore complex relationships between conditions, activity, and consequences, as well as question the analysis of the trainer's concrete activity in the specific context of post-simulation debriefing.

*Figure 2: Leplat and Cuny model (1974)
(free translation from French into English)*



The five-square model (Leplat and Cuny, 1974) represents different aspects of occupational activity. The first two squares (at the top) encompass the internal and external conditions of the worker that influence his or her activity. These include individual characteristics and environmental factors such as the physical environment, tools and resources available. The middle box represents the activity itself, which includes the actions and processes used by the worker, including different stages and strategies. The last two boxes (at the bottom) focus on the consequences of the activity. The fourth box looks at the impact on organisational objectives, overall performance and productivity. The fifth box looks at individual outcomes such as job satisfaction, cognitive costs and personal development.

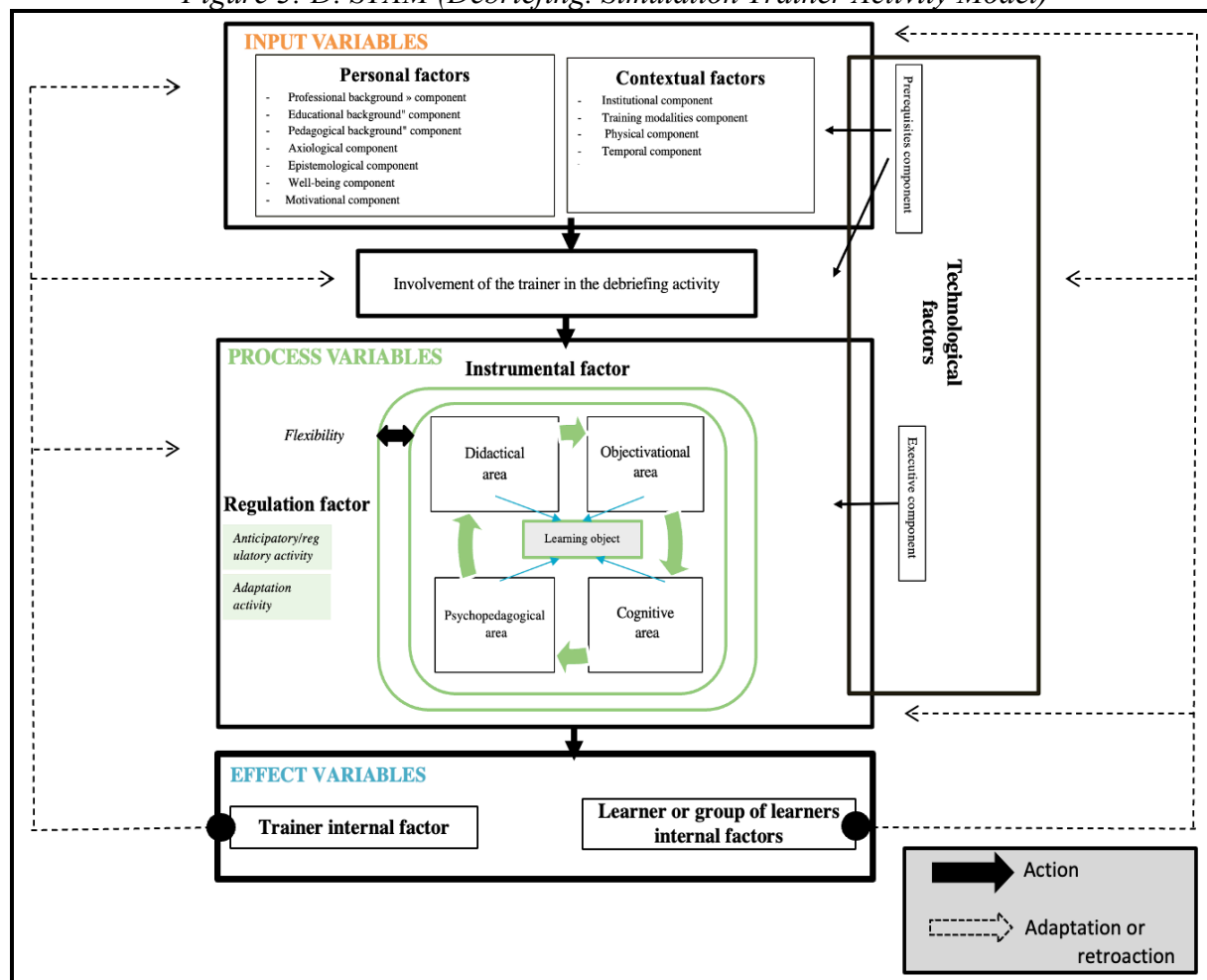
In the context of a debriefing after a simulation, Leplat and Cuny 's model (1974) provides us with a relevant conceptual framework for understanding and analysing the trainer's role and interactions in the context of training and post-simulation debriefing. It serves to support the analysis of professional situations by identifying the characteristics of a concrete activity, in our case the trainer's activity in post-simulation debriefing. This framework was mobilised on the basis of the work of our literature review and the presence of elements related to the 3 levels of variables of the Leplat and Cuny (1974) model (Table 3 - X : Variable covered in the work; - Variable not covered in the paper).

Table 3: Elements related to the 3 levels of variables and included in the D-STAM model

Research	Internal and external conditions	Conducted activities	Effects on activities
Savoldelli, G. & Boet, S. (2013)	-	X	X
Secheresse, T., Mampe-Armstrong, H., Usseglio, P. et al. (2016)	X	-	-
Dury, C. (2017)	X	X	-
Secheresse, T., Pansu, P., & Lima, L. (2021)	-	X	X
Oriot, D., & Alinier, G. (2018)	X	X	-
Amor, B., Hentati, j., Gargouri, (2018)	X	X	-
Galland, J., Jaffrelot, M., Sanges, S., Fournier, J. P., Jouquan, J., Chiniara, G., & Rivière, É. (2020)	X	X	X
Roulin, V. (2014)	-	X	X
Jones, A. L., Reese, C. E., & Shelton, D. P. (2014)	X	X	-
White, M. (2017)	-	X	X
Hallmark, BF, Thomas, CM, & Gantt, L. (2014)	X	X	-
Poinçon, B. (2015)		X	X
Secheresse, T. (2020)	X	X	X
Lilot, M. (2019)	X	-	
Bastiani, B. (2017)	X	X	X
Renou, J. (2012)	X	X	-
Bastiani et al. (2021)	X	X	X
Tutticci, N., Ryan, M., Coyer, F., and Lewis, A. (2018)	X	X	-
Dubois, L., Bocquillon, M., Romanus, C. & Derobertmasure, A. (2019)	X	-	X
Dubrous, V., Eymard, C., (2022)	X	X	X
Heng, A., Eppich, W., Kolbe, M., Meguerdichian, M., Bajaj, K., & Grant, V. (2020)	X	X	X
Dubois, L. A. (2017)	X	-	X
Dubois, L-A., & Van Daele. (2018)	X	-	-
Sondag (2018)	X	X	X
Cheng, A., Kolbe, Grant, V., et al. (2020)		X	X

Figure 3, and his legend, gives an overview of the D. STAM (Debriefing Simulation Trainer Activity Model). The first level relates to the internal and external conditions, i.e. the input variables. The variables concern the trainer's personal factors on the one hand, and the contextual factors specific to the environment in which the trainer operates on the other (figure 3). Each level of variable is described below.

Figure 3: D. STAM (Debriefing. Simulation Trainer Activity Model)



3.3. Description of the D-STAM Model by Levels

3.3.1. Level 1: Input Variables

a) Personal Factors

In terms of personal factors, six components are listed. These components are interconnected and mutually reinforcing.

- The "trainer's professional experience" components refers to the trainer's practical and concrete experience in the field of activity concerned by the debriefing. This is their experience in the field, and their in-depth knowledge of the realities and professional issues facing the learners.
- The trainer's pedagogical skills include both their general pedagogical background and their specific knowledge of post-simulation debriefing. This includes the trainer's training in the field of education and training, as well as their experience as a trainer.
- Axiological components (Bastiani et al., 2021) pertain to conflicting values and logics between learner training and professional reality. Trainers may encounter ethical dilemmas or divergent perspectives between training objectives and industry requirements. These conflicts can raise concerns, leading trainers to prioritize knowledge transmission over learner support.

- Epistemological components (Bastiani et al., 2017) involve scientific knowledge used by trainers. This theoretical and conceptual foundation guides learners' reflection.
- Trainer well-being components encompass fatigue, stress, and emotional involvement, heightened compared to other teaching formats (Policard, 2018).
- Trainers' motivation and related behaviors vary from professional development interest to personal satisfaction in contributing to learner's progress.

b) Contextual Factors

Four components are listed in terms of contextual factors.

- The "institutional" components include legal norms, standards, and policies governing training. They determine specific skills to be developed based on legal requirements and professional expectations, structuring training content and objectives.
- The "training methods" components consider the training context, whether initial or ongoing, and learners' experience levels—novices, upgrading, advanced, or practicing.
- The "physical" components involve the debriefing environment, including space layout, available equipment, and technological tools. This impacts trainer-learner interactions and ease of implementing debriefing activities.
- The "time" components address training and debriefing session duration, considering distribution across simulation phases and accommodating time constraints and contingencies.

c) Commitment

The combination of personal and contextual factors influences the trainer's commitment to his activity. This box therefore refers to the way in which the trainer engages in his or her guiding activity in relation to the commitment profiles (see theoretical framework).

3.3.2. Level 2: Activity Conducted or Process Variables

a) Instrumental Factors

The activity carried out by the trainer is divided into several areas which form a set of instrumental factors. Each area is activated with the aim of achieving the learning objective targeted by the debriefing. In the same way as (Dehon & Derobertmeasure, 2012), the D-STAM is made up of 4 areas.

- The didactic area concerns “all the elements relating to the content and the way in which it is prepared, transposed, transmitted and presented” (Derobertmeasure, 2012, p.232). This includes the selection and organisation of information, the teaching methods used, the course materials, the teaching resources and everything else that helps learners learn. The didactic area aims to ensure the clarity, relevance and accessibility of the training content, promoting the understanding and assimilation of knowledge.
- The objectification area refers to the way in which the trainer puts the results of the simulation (behaviours observed) and the debriefing discussions (comments, reflections) into perspective with the learning environment. This involves analysing the learners' actions during the simulation, identifying strengths and areas for improvement, encouraging critical reflection and establishing links with the learning objectives. The

objectivation area aims to facilitate learners' awareness, promote the integration of knowledge and encourage metacognitive reflection.

- The cognitive area refers to the way in which the trainer explores the reasons behind the learners' behaviour during the simulation. This involves analysing the cognitive processes, decision-making, strategies used and mental representations of the learners. The cognitive area aims to understand the factors that influence learners' actions, to encourage problem solving, to foster critical thinking and to promote reflective learning.
- The psycho-pedagogical area concerns the relationship between the trainer and the learner, in particular the way in which the exchange takes place and the verbal interactions that occur. This involves the level of facilitation, the degree of involvement of the trainer (Dismukes & Smith, 2017; Oriot & Alinier, 2018; Savoldelli, 2011), the way in which the trainer supports understanding during exchanges and the way in which he or she fosters a climate of trust and mutual respect. This area aims to create an environment conducive to learning, to encourage the active participation of learners and to support their professional and personal development during debriefing).

b) Regulation Factors

For Bastiani (2018), "the way in which trainers conduct and accompany post-simulation debriefings requires flexibility in order to adapt to the audience" (p.88). Indeed, regulatory factors play an important role in enabling the trainer to navigate effectively in the dynamic debriefing environment. These factors can be divided into two categories: anticipatory adjustment and the search for equilibrium, both of which contribute to adaptive activity. Anticipatory adjustment involves proactive actions where the trainer prepares teaching strategies, resources and methods adapted to the learners' characteristics, objectives and context. By anticipating learners' needs and encouraging their commitment, the teacher facilitates the achievement of learning objectives. On the other hand, the search for balance comes into play when disruptions or unforeseen events occur during the debriefing. In such situations, the trainer quickly adjusts his or her posture, teaching strategies and communication in order to maintain a productive dynamic. This adaptability and flexibility allows the trainer to respond effectively to learners' needs and maintain an appropriate level of activity throughout the debriefing process, effectively managing the dynamic debriefing environment.

3.3.3. Level 3: Effect Variables

Effect variables in D-STAM represent the consequences of the trainer's debriefing activity, impacting both the trainer and the learners. The debriefing activity can influence the trainer's psychology, experience, and practice, leading to conscious or unconscious modifications in their approach (Pastré, 2006). As for the learners, the trainer's debriefing activity influences their skill development, reflective abilities regarding simulation actions, and the formation of operational models applicable to real-life situations (Cheng et al., 2016; Cheng et al., 2020; Bastiani, 2017; Policard, 2018). Assessing these effect variables allows us to evaluate the debriefing's impact and fine-tune pedagogical strategies to optimize learning outcomes. It's crucial to study the impact beyond formal competence measurements, as limited research on trainers addresses the effects of their practices on learners' development.

3.3.4. Technological Factors

Technological factors refer to the trainer's use of technology in debriefing. This may include audiovisual recording (Krogh, 2015; Horczik, 2014; Oriot & Alinier, 2018; Sawyer et al. 2016), digital or case management tools or debriefing. In D-STAM, this includes their prior knowledge and skills related to technology, such as familiarity with tools and platforms, understanding their functionalities, and effective use in the debriefing context. At level 2, technological factors involve how the trainer utilizes technology during debriefing, utilizing tools like simulators, video recordings, data capture systems, and online platforms. This may involve recording and reviewing learners' performances, facilitating group discussions, sharing resources, providing real-time feedback, and promoting reflection and learning.

3.3.5. Links Between Trainer-Related Factors and Feedback

The repercussions of the effects generated by the debriefing activity are felt both in the short term and in the long term, both for the trainer and for the learners, and at all levels of the G-STAM model. These impacts are symbolised by the grey dashed arrows.

For the trainer, the effects are psychological, affecting confidence, motivation and commitment to practice. Positive feedback from learners increases their confidence in their skills and encourages them to persevere to improve. Debriefing also contributes to the overall improvement of the trainer's practice by enabling him or her to reflect on the different situations experienced during the sessions and to make appropriate adjustments.

On the learners' side, the effects of debriefing are also significant. It gives them the opportunity to reflect on their actions during the simulation, to analyse the results obtained and to become aware of their strengths and weaknesses. Constructive feedback enables them to identify their mistakes, understand the reasons for them and explore alternative strategies to improve their future performance. In addition, debriefing encourages learners to be reflective and to analyse their thoughts, feelings and behaviours in order to make informed decisions. This reflexivity enhances their professional development and their ability to transfer their learning to real-life situations.

4. Conclusions

The lack of a specific model for post-simulation debriefing of trainers poses a challenge in understanding their role and how they perform this role and for what impact on the learners. To fill this gap, we propose to clarify the role of the trainer in post-simulation debriefing and to identify the unique components of their activity in a model (D-STAM).

For this purpose, two parallel integrative reviews of the literature were carried out, including 33 papers. The results aimed to answer two questions: 1) "What is the unique role of the trainer in postsimulation debriefing and how can this role be comprehensively elucidated in order to improve understanding of its influence on learners' reflective processes?" and 2) "How can we systematically identify and model the unique components of the trainer's activity in post-simulation debriefing while ensuring the preservation of situational specificity in an overall model?"

Following a qualitative analysis according to Braun and al. (2019) and supported by the N-vivo12 software, the results highlight that the debriefing trainer is first and foremost a

facilitator. Although this concept has not yet been stabilised (Policard, 2018), it seems that the trainer-facilitator a) encourages and helps the learner to take action to identify and solve problems related to his or her professional field, and b) guides the learner in an in-depth reflection on this action in order to enable him or her to develop operational models that can be transferred to similar real-life situations in the future. Being a facilitator therefore corresponds to a pedagogical attitude that aims to promote learning within the framework of active teaching methods and that includes, but goes beyond, coaching.

Secondly, debriefing takes place in a dynamic, double-regulated context where situations, interactions and learners' reactions change in real time, requiring the trainer to adapt continuously. The trainer must therefore regulate his or her activity on the basis of several components, which are detailed in the Debriefing Simulation Trainer Activity Model (D-STAM). This model provides a synthetic conceptual framework for understanding and improving debriefing in different domains. Based on Leplat and Cuny's (1974) model and adopting a multi-component perspective, the DSTAM highlights three levels of variables (input, process and effect) from which the trainer's activity can be described. Level 1 examines the internal conditions associated with the trainer's personal and environmental factors. The combination of these factors influences the way the trainer engages in the debriefing activity. Level 2 focuses on the trainer's activity, approached from cognitive, didactic, psychopedagogical and objectification points of view. This activity is flexible and adapts to the dynamic context of debriefing, which is both anticipatory and restorative. In addition, we also examine the trainer's use of technology, taking into account both the prerequisites (level 1) and the way in which he or she implements the technological support. Level 3 is devoted to the effects of the trainer's activity, both on him/herself and on the learners. These effects can be felt in the short or long term, thus consciously or unconsciously reactivating the results produced by the activity.

5. Discussion

The D-STAM model, developed through an integrative literature review, provides valuable insights into the debriefing activity of trainers. It comprehensively considers the various components at play, including internal and external conditions, the activity conducted and its impact. This holistic approach enhances our understanding of the complex interactions that influence the trainer's role. In addition, the model emphasises the concept of dual regulation, whereby trainers adapt their activity based on both personal inclinations and external constraints, in line with pedagogical objectives.

In practical terms, the D-STAM model emphasises the importance of adequate training for trainers, particularly in the specific pedagogical skills required for debriefing. Equipping trainers with the necessary tools and knowledge promotes effective regulation of their activities and supports learners' learning. In addition, recognising the impact of internal and external conditions highlights the need for adequate resources and a conducive working environment to enhance trainers' commitment and effectiveness. Evaluating and reflecting on trainers' debriefing practice also emerges as a crucial aspect, requiring the development of assessment tools to identify strengths and weaknesses, thereby promoting continuous improvement.

Future research could explore a model tailored to trainers acting as facilitators or guides, with a focus on accompanying gestures during debriefing. Precise and operational process variables should be developed to explore the unique dynamics of these roles. Understanding professional guiding gestures and their influence on learner reflection and learning could shed light on their

effectiveness in promoting critical thinking and identify areas for improvement. Furthermore, exploring the match between trainers' actual practice and their stated approaches may reveal factors influencing the use of guidance. Finally, consideration should be given to training trainers in effective debriefing guidance, including appropriate teaching methods and resources to enhance their skills.

6. Acknowledgement

We have no conflicts of interests to disclose. The study was carried out as part of the ARC Sim Pro funding of the Fédération Wallonie- Bruxelles.

References

- Bastiani, B. (2017). La simulation pleine échelle et le débriefing des compétences non-techniques en anesthésie-réanimation : Contribution à la construction d'un référentiel de formation de formateurs. [These de doctorat, Toulouse 2]. <https://www.theses.fr/2017TOU20020>
- Bastiani, B., Calmettes, B., Minville, V., & Marhar, F. (2017). Accompagner la professionnalisation des formateurs en simulation médicale. *Éducation et didactique*, 11-1, 63-79. <https://doi.org/10.4000/educationdidactique.2659>
- Bastiani, B. (2018). De l'expertise professionnelle à l'accompagnement réflexif des formés. *Revue Education, Santé, Sociétés*, vol. 4, n° 2, p. 85-97.
- Bastiani, B., Houzé-Cerfon, C.-H., & Geeraerts, T. (2021). Professionnalisation des formateurs: TransFormations - *Recherches en Education et Formation des Adultes*, 2(22), Article 22.
- Bauchat, J., & Seropian, M. (2020). Essentials of Debriefing in Simulation-Based Education. In B. Mahoney, R. D. Minehart, & M. C. M. Pian-Smith (Éds.), *Comprehensive Healthcare Simulation : Anesthesiology* (p. 37-46). Springer International Publishing. https://doi.org/10.1007/978-3-030-26849-7_4
- Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic Analysis. In P. Liamputtong (Éd.), *Handbook of Research Methods in Health Social Sciences* (p. 843-860). Springer. https://doi.org/10.1007/978-981-10-5251-4_103
- Cheng, A., Eppich, W., Kolbe, M., Meguerdichian, M., Bajaj, K., & Grant, V. (2020). A Conceptual Framework for the Development of Debriefing Skills : A Journey of Discovery, Growth, and Maturity. *The Journal of the Society for Simulation in Healthcare*, 15(1), 55-60. <https://doi.org/10.1097/SIH.0000000000000398>
- Cheng, A., Eppich, W., Sawyer, T., & Grant, V. (2017). Debriefing : The state of the art and science in healthcare simulation. In D. Nestel, M. Kelly, B. Jolly, & M. Watson (Éds.), *Healthcare Simulation Education* (p. 158-164). John Wiley & Sons, Ltd. <https://doi.org/10.1002/9781119061656.ch21>
- Cheng, A., Morse, K., Rudolph, J., Arab, A., Runnacles, J., & Eppich, W. (2016). Learner-Centered Debriefing for Health Care Simulation Education : Lessons for Faculty Development. *Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare*, 11(1), 32-40. <https://doi.org/10.1097/SIH.0000000000000136>
- Chinara, G., & Pellerin, H. (2014). Simulation et gestion d'une situation de crise. In O. Fourcade, T. Geeraerts, V. Minville & K. Samii (Eds). *Traité d'anesthésie et de réanimation* (4ème édition, p. 374-385). Lavoisier.
- Clot, Y. (1999). Le geste est-il transmissible. *Apprendre autrement aujourd'hui*, p.10.
- Clot, Y. (2004). Le travail entre fonctionnement et développement. *Bulletin de psychologie*, 57(469), 5-12.

- Derobertmeasure, A. (2012). La formation initiale des enseignants et le développement de la réflexivité ? Objectivation du concept et analyse des productions orales et écrites des futurs enseignants [Phdthesis, Université de Mons-Hainaut]. <https://theses.hal.science/tel-00726944>
- Derobertmeasure, A. & Dehon, A. (2012). Double lecture de l'action : des gestes professionnels à la rétroaction. *Revue Phronesis*, 2012, 1 (2), <http://www.erudit.org/revue/phro/2012/v1/n2/index.html>. (hal-00730969)
- Dismukes, R., & Smith, G. (2017). *Facilitation and Debriefing in Aviation Training and Operations*. Routledge.
- Dubois, L.-A. (2017). Apport de l'ergonomie à la formation professionnelle par la simulation : De l'analyse croisée de l'activité de formateurs, de mentors et d'aspirants-policiers à l'amélioration d'un dispositif de formation initiale [Phdthesis, Université de Mons (UMONS)]. <https://hal.science/tel-01714061>
- Dubois, L.-A., Bocquillon, M., Romanus, C., & Derobertmeasure, A. (2019). Usage d'un modèle commun de la réflexivité pour l'analyse de débriefings post-simulation organisés dans la formation initiale de futurs policiers, sages-femmes et enseignants. *Le travail humain*, 82(3), 213-251. <https://doi.org/10.3917/th.823.0213>
- Duvivier, V., & Demeuse, M. (2023). Formation des enseignants et simulation. Les élèves ne sont pas des cobayes. Les élèves ne sont pas des cobayes. *Enseignement et Apprentissage*, 8, 3-21. https://web.umons.ac.be/app/uploads/sites/103/2023/06/06-08_EA_juin2023_online.pdf
- Eppich, W., & Cheng, A. (2015). Promoting Excellence and Reflective Learning in Simulation (PEARLS) : Development and Rationale for a Blended Approach to Health Care Simulation Debriefing. *Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare*, 10(2), 106-115. <https://doi.org/10.1097/SIH.0000000000000072>
- Fanning, R., & Gaba, D.(2007). The Role of Debriefing in Simulation-Based Learning. *Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare*, 2(2), 115-125. <https://doi.org/10.1097/SIH.0b013e3180315539>
- Grenier, C., & Josserand, E. (2014). Chapitre 5. Recherches sur le contenu et recherches sur le processus. In *Méthodes de recherche en management: Vol. 4e éd.* (p. 129-165). Dunod. <https://doi.org/10.3917/dunod.thiet.2014.01.0129>
- Halamek, L., Cady, R., & Sterling, M. (2019). Using briefing, simulation and debriefing to improve human and system performance. *Seminars in Perinatology*, 43(8), 151178. <https://doi.org/10.1053/j.semperi.2019.08.007>
- Horcik, Z. (2014). Former des professionnels via la simulation : Confrontation des principes pédagogiques issus de la littérature et des pratiques de terrain. *Activités*, 11(2). <https://doi.org/10.4000/activites.963>

- Houssaye, J. (2000). *Le triangle pédagogique. Théorie et pratiques de l'éducation scolaire*, Peter Lang, Berne (3e Éd.).
- Jonnaert, P., Ettayebi, M., & Defise, R. (2009). Curriculum et compétences : Un cadre opérationnel. De Boeck Supérieur.
- Klein, H. , Molloy, J., & Brinsfield, C. (2012). Reconceptualizing Workplace Commitment to Redress a Stretched Construct : Revisiting Assumptions and Removing Confounds. *Academy of Management Review*, 37(1), 130-151.
<https://doi.org/10.5465/amr.2010.0018>
- Krogh, K., Bearman, M., & Nestel, D. (2016). «Thinking on your feet»-a qualitative study of debriefing practice. *Advances in Simulation* (London, England), 1, 12.
<https://doi.org/10.1186/s41077-016-0011-4>
- Leplat, J. et Cuny, X. (1974). Introduction à la psychologie du travail. Grenoble : PUG.
- Levett-Jones, T., & Lapkin, S. (2014). A systematic review of the effectiveness of simulation debriefing in health professional education. *Nurse Education Today*, 34(6), e58-e63.
<https://doi.org/10.1016/j.nedt.2013.09.020>
- Mayen, P. (2012). Les situations professionnelles : Un point de vue de didactique professionnelle. *Phronesis*, 1(1), 59-67. <https://doi.org/10.7202/1006484ar>
- Oriot, D., & Alinier, G. (2018). Pocket Book for Simulation Debriefing in Healthcare. Springer International Publishing. <https://doi.org/10.1007/978-3-319-59882-6>
- Pastré, C. (2006). Apprendre à faire. Apprendre et faire apprendre.
- Pastré, P., Mayen, P., & Vergnaud, G. (2006). La didactique professionnelle. *Revue française de pédagogie. Recherches en éducation*, 154, 145-198.
<https://doi.org/10.4000/rfp.157>
- Pettigrew, A. (1990). Longitudinal Field Research on Change : Theory and Practice. *Organization Science*, 1(3), 267-292.
- Plard, M. & Martineau, A. (2019). Analyse qualitative assistée par Nvivo. Structurer et analyser un corpus de recherche dans Nvivo. <https://shs.hal.science/halshs-02409629/>
- Policard, F. (2018). Formateurs en soins infirmiers et simulation clinique : Profils et manifestations de l'engagement dans l'activité [Phdthesis, Université de Nanterre - Paris X]. <https://theses.hal.science/tel-02165891>
- Pourtois, J.-P. (1993). Huberman (A. Michael) et Miles (B. Matthew). — Analyse des données qualitatives : Recueil de nouvelles méthodes. *Revue française de pédagogie*, 105(1), 132-134.

- Rogalski, J., & Colin, B. (2018). Le rôle du formateur dans l'articulation des compétences acquises sur simulateur et des compétences cibles (« terrain ») : Le cas du moniteur dans la formation de pilotes militaires d'hélicoptères – armée de Terre. *Activites*, 15-2. <https://doi.org/10.4000/activites.3333>
- Rudolph, J., Simon, R., Raemer, D., & Eppich, W. (2008). Debriefing as Formative Assessment : Closing Performance Gaps in Medical Education. *Academic Emergency Medicine*, 15(11), 1010-1016. <https://doi.org/10.1111/j.1553-2712.2008.00248.x>
- Samurçay, S. (2009). Concevoir des situations simulées pour la formation professionnelle : Une approche didactique. In *Apprendre par la simulation De l'analyse du travail aux apprentissages professionnels* (Octarès Éditions., p. 221-239).
- Samurçay, R. & Rogalski, J. (1998). *Le travail humain. Paris*, 61, 4, p.333-345.
- Saubesty-Vallier, C. (2006, June). Quels apports du codage des données qualitatives. *In XVème Conférence Internationale de Management Stratégique*, Annecy/Genève (pp. 13-16).
- Savoldelli, G. (2011). *Pas de simulation sans débriefing !* Communication présentée à la Journée d'étude et d'échanges de la Maison des associations socio-politiques, Genève, Suisse.
- Sawyer, T., Eppich, W., Brett-Fleegler, M., Grant, V., & Cheng, A. (2016). More Than One Way to Debrief : A Critical Review of Healthcare Simulation Debriefing Methods. *Simulation in Healthcare*, 11(3), 209. <https://doi.org/10.1097/SIH.0000000000000148>
- Sawyer, T., Fleegler, M. B., & Eppich, W. J. (2016). Essentials of Debriefing and Feedback. In V. J. Grant & A. Cheng (Éds.), *Comprehensive Healthcare Simulation : Pediatrics* (p. 31-42). Springer International Publishing. https://doi.org/10.1007/978-3-319-24187-6_3
- Secheresse, T. (2020). La simulation au service de la formation en sciences de la santé : Évaluation des apprentissages et enjeux du débriefing [These de doctorat, Université Grenoble Alpes]. <https://www.theses.fr/2020GRALH012>
- Snyder, H. (2019). Literature review as a research methodology : An overview and guidelines. *Journal of Business Research*, 104, 333-339. <https://doi.org/10.1016/j.jbusres.2019.07.039>
- Torraco, R. (2005). Writing Integrative Literature Reviews : Guidelines and Examples. *Human Resource Development Review*, 4(3), 356-367. <https://doi.org/10.1177/1534484305278283>
- Torraco, R. (2016). Writing Integrative Literature Reviews : Using the Past and Present to Explore the Future. *Human Resource Development Review*, 15(4), 404-428. <https://doi.org/10.1177/1534484316671606>
- Vidal-Gomel, C. (2020). Conception de formation centrée sur l'activité : Élaborer une conduite de projet intégrant le travail des concepteurs. 87.

Vidal-Gomel, C., & Fauquet-Alekhine, P., & Guibert, S. (2011). Réflexions et apports théoriques sur la pratique des formateurs et de la simulation. Dans Ph. Fauquet-Alekhine & N. Pehuet (dir.), *Améliorer la pratique professionnelle par la simulation* (p. 115-141). Toulouse, France: Octarès.

Contact email: valerie.duvivier@umons.ac.be

Analysis of Automated and Personalized Student Feedback to Improve Learner Experience

Ikechukwu Ogbuchi, Atlantic Technological University, Ireland
Etain Kiely, Atlantic Technological University, Ireland
Cormac Quigley, Atlantic Technological University, Ireland
Donal McGinty, Atlantic Technological University, Ireland

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Due to the vast amounts of data generated at educational institutions and need for teachers to personalize feedback to every student, having an automated feedback system to support educators is important. Data research teams at the Atlantic Technological University have developed an automated feedback system that sends lecturer feedback to student based on their performance and learning patterns. This was developed using a combination of different technologies from the application of python programming, data cleansing, and API link using Microsoft Power Automate. This paper reports on the student feedback from this system and their experiences reading them. Data gathered from students regarding their experiences in educational institutions is known as student feedback. This feedback can be expressed in speech, writing, or gestures. Additionally, it is utilized by organizations or educators to implement changes to current practices. Students lose focus on the goal of learning when grades are attached to every assignment, whether it be summative or formative, and instead adopt the mindset that they must perform with mastery even from the first time they tackle an issue. This frequently prompts students to look for holes and short cuts to get a decent mark. They avoid learning so that, even if they have not grasped the content, they are more likely to succeed and receive the highest grades. The only way to escape from this grade-oriented fixation is through a fundamental educational change that emphasizes the value of feedback in student learning rather than relying on grades and results. Data used for this pilot study is taken from a selection of first year students (n=206) and this paper discusses the methods used to automate the personalized student feedback and reports on the student experience of the system.

Keywords: Data Analysis, Students, Automate, Microsoft, Feedback, Personalized, Education

iafor

The International Academic Forum
www.iafor.org

Introduction

Research in the field of education emphasizes the significant role of feedback in enhancing students' learning experiences (Mamoon et al., 2016). Alina Mag's study (2019) acknowledges feedback as a crucial aspect of learning, which has been largely overlooked in recent research, particularly from the perspective of students. Her work also emphasizes that students learn more effectively when they receive clear indications of their learning progress and guidance on how to improve. Henderson et al. (2021) further emphasize that learners have diverse needs, and it is important for educators designing feedback systems to consider these diverse groups of students. Nateil Carby's research (2023) concludes that personalized student feedback is an essential strategy for educators.

These studies underscore the increasing recognition of the importance of personalized feedback for students. However, educators and instructors encounter various challenges and obstacles in providing this vital component of student learning. Brit Paris' research (2022) reveals that instructors struggle with the high workload associated with individually providing feedback to numerous students. Michael et al. (2019) also highlights the time constraints faced by instructors in their work.

These challenges have prompted the need for further research to explore new techniques that can automate the feedback process and make it more personalized. The need to understand reasons for low engagement and student dropout as highlighted by O'Brien, C. (2022) also motivated this research.

Methodology

The first step in developing an automated and personalized student feedback system involved gathering student learner data from their virtual learning environment, Moodle. This data was obtained with appropriate permissions either through manual downloads or by utilizing the Moodle API. For our study, we extracted data for 206 first-year students who were enrolled in a Math Module. Once extracted, the data underwent cleaning and transformation processes using Python programming to make it suitable for analysis and personalized feedback generation. During this process, personally identifiable information, apart from student names and registration numbers (for identification purposes), were carefully removed. From the initial dataset containing 56 columns of data, we selected 8 key columns that were relevant for our reporting. The selected columns are described as follows:

Column	Description.
Average Grade	Grade scored for the math module. Numeric values.
Interactions	Interactions count from log files based on Moodle interactions. Numeric value.
Journal Score	Score of student participation in Journal classes (designed to encourage students work together and practice topics under guidance). Numeric value.
Quiz Scores	Score of students during their quizzes. Numeric values.
Journal Attendance	Gives a Percentage of student journal attendance rate. Numeric Value.
Lecture Attendance	Gives students general lecture attendance rate. Numeric value.
Name	Student name for Identification and personalization. String Value.
Email Address	Student's email, tied to the student registration numbers for sending personalized emails. String values.

During the data preparation phase, we conducted checks for missing values and replaced them to ensure data integrity and prevent errors. Following that, a Python script was executed on specific columns such as average Grade, Interactions, Journal score, Quiz, Journal Attendance, and Lecture Attendance. This script iterated through each student and generated five new columns containing comments based on their respective values.

The determination of threshold values for these comments relies on the discretion of the lecturer, and the number of comment categories can be expanded if needed. For this study, the comments were limited to 2-3 categories. However, it is flexible to increase the number of categories to meet the personalized feedback requirements of teachers. The essential aspect is to make decisions regarding the type of comments that should be assigned to students based on their scores within the predefined categories established by the teacher.

This is a snippet of the Python script automation to generate new columns:

```
for i in range(data.shape[0]):
    #Journal
    if data['Journal_score'][i]>=4.5:
        data.loc[i,('journalcomment')] += "Your Total Journal score was way above the average. Way to go! Keep it up."
    elif data['Journal_score'][i]>=2.5:
        data.loc[i,('journalcomment')] += "Your Total Journal score was above average.
        "Good one, keep trying hard to complete all journals."
    elif data['Journal_score'][i]<2.5:
        data.loc[i,('journalcomment')] += "Your Total Journal performance was below average.
        "...We know that maths could be challenging, but we believe that with consistent and frequent work you can
        "...achieve better outcomes."

    #Quiz
    if data['Quiz_score'][i]>4:
        data.loc[i,('quizcomment')] += "You performed well above average on your Quizzes. You should be happy! Keep it up"
    elif data['Quiz_score'][i]>=2.5:
        data.loc[i,('quizcomment')] += "You performed above the average score for your quizzes,however mastery requires
        "... repetition until can't get it wrong."
    elif data['Quiz_score'][i]<2.5:
        data.loc[i,('quizcomment')] += "Your performance on the Quizzes was below average. We believe you can achieve mastery
        "...if you try to put in more effort, we can support you."

    #Attendance
    if data['Lecture_attendance'][i]>=70:
        data.loc[i,('attendancecomment')] += "Your attendance rate has been great this semester. Keep it up"
    elif data['Lecture_attendance'][i]<70:
        data.loc[i,('attendancecomment')] += "You need to attend your classes often to improve your attendance score"

    #Interactions
    if data['interactions'][i]>=690:
        data.loc[i,('interactioncomment')] += "Our systems show you are interacting very well with Moodle.
        "That is a good habit. Keep it up"
    elif data['interactions'][i]>200:
        data.loc[i,('interactioncomment')] += "Our systems show your level of interaction with moodle is below average.
        "Evidence shows that students who interact frequently with the online materials perform well in the module."
    elif data['interactions'][i]<=200:
        data.loc[i,('interactioncomment')] += "Our systems show you have not been interacting with moodle that much.
        "We hope everything is okay? Let us know how we can help you through the feedback form"
```

Figure 1: Code Snippet showing Python Comment Automation

In the provided code snippet, thresholds were established for the Journal, Quiz, Attendance, and Interactions columns. Based on the scores within each column, individual comments are generated for every student. Let's consider the Journal score as an example. If a student achieves a score of 4.5 or higher, they are considered to be performing well, and the corresponding comment "Your total journal score was way above average. Way to go! Keep it up" is assigned. In case the first condition is not met, the code proceeds to the next condition, checking if the student's score is 2.5 or higher. In this case, the comment "Your total journal score was above average, good one, keep trying..." is assigned. Lastly, for scores below 2.5, the student is given the comment "Your Total Journal performance was below average. We know that math can be challenging, but we believe that with consistent and frequent work, you can achieve better outcomes."

The automation process applies the same logic for the Quiz, Attendance, and Interactions columns, with thresholds and corresponding comments set by the teacher.

After generating the new columns with comments, a preview of the data is conducted to verify that the columns were created correctly and that the assigned comments align with the corresponding scores, as illustrated in Figure 2.

Out[41]:

Lecture_attendance	attendancecomment	Quiz_score	quizcomment	Journal_attendance	Journal_score	Journal_without	journalcomment	Exam_Contribution
63.16	You need to attend your classes often to impro...	1.5	Your performance on the Quizzes was below aver...	78.57	1.21	1.54	Your Total Journal performance was below avera...	0.00
68.42	You need to attend your classes often to impro...	4.5	You performed well above average on your Quizz...	85.71	2.34	2.73	Your Total Journal performance was below avera...	6.07
94.74	Your attendance rate has been great this semes...	4.5	You performed well above average on your Quizz...	100.00	4.80	4.80	Your Total Journal score was way above the ave...	7.86
77.78	Your attendance rate has been great this semes...	4.5	You performed well above average on your Quizz...	83.33	3.03	3.64	Your Total Journal score was above average. Go...	6.79
22.22	You need to attend your classes often to impro...	0.0	Your performance on the Quizzes was below aver...	16.67	0.06	0.38	Your Total Journal performance was below avera...	0.00
...
50.00	You need to attend your classes often to impro...	0.0	Your performance on the Quizzes was below aver...	16.67	0.00	0.00	Your Total Journal performance was below avera...	0.00
100.00	Your attendance rate has been great this semes...	4.5	You performed well above average on your Quizz...	100.00	3.60	3.60	Your Total Journal score was above average. Go...	6.43
73.68	Your attendance rate has been great this	3.0	You performed above the	85.71	3.07	3.59	Your Total Journal score	7.14

Figure 2: Preview of Combined Data after Automated Comments

A configuration was established to integrate Microsoft Power Automate with the output generated by the Python script, enabling the dispatch of emails using a pre-designed template. The data containing individual comments is directed to Power Automate, where an email template containing general information for all students is generated. To establish the connection between the data with individual comments and the Power BI API, the Python requests package (Chandra et al., 2015) was utilized. In the provided code snippet, the section marked "http://" should be substituted with the URL link provided by Power Automate during the creation of the flow:

```
In [51]: import requests
count=0
url='http://XXXXXXXXXXXXX'
for i in testing_stream:
    headers = {'Content-type': 'application/json', 'Accept': 'text/plain'}
    r = requests.post(url, data=json.dumps(i), headers=headers)
    print(r)
    count+=1
```

Figure 3: Connecting to Power Automate for Email Dispatch

The email template in Flow once the data has been pointed to its URL, would look like this and is customizable:

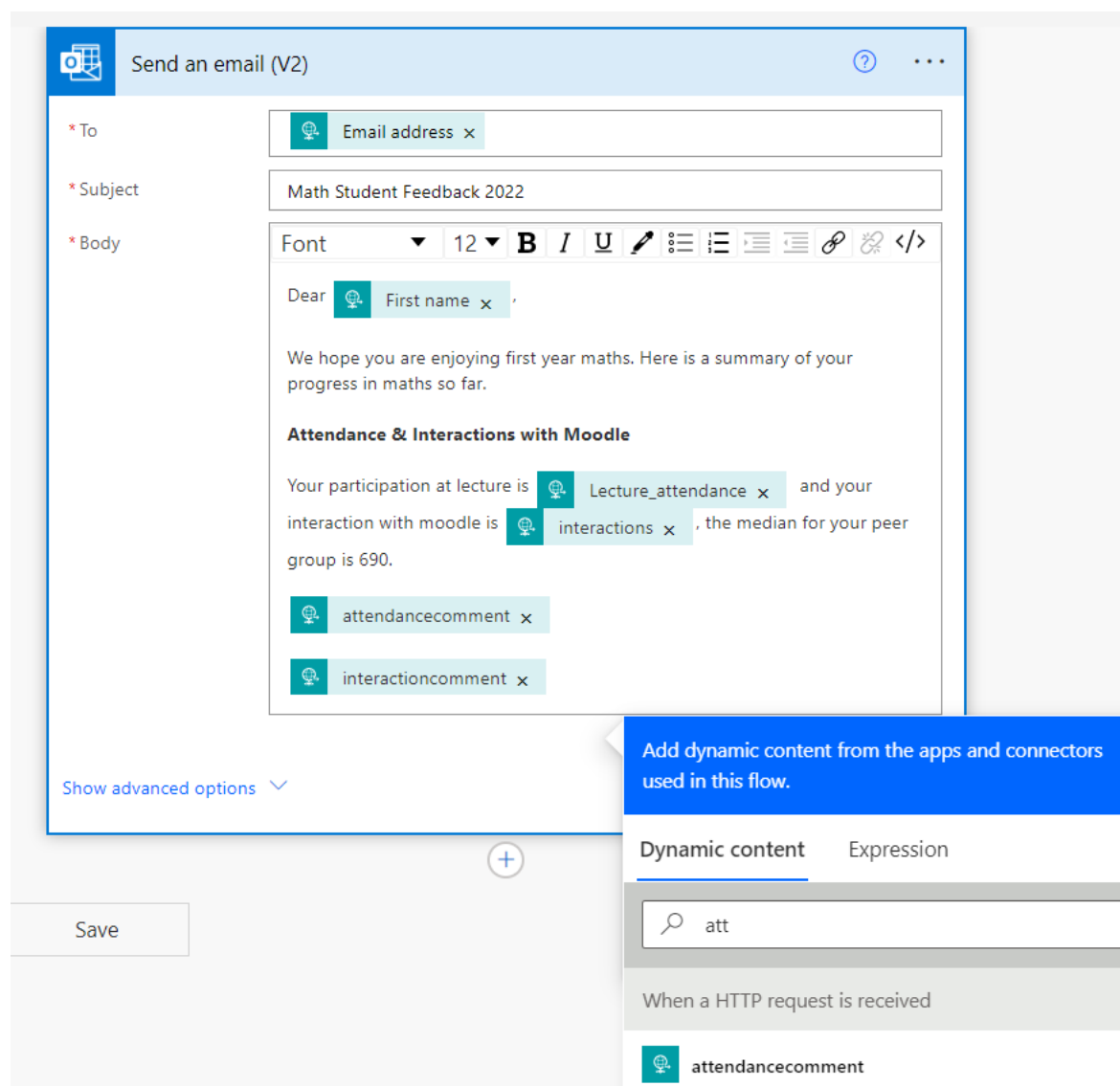




Figure 4: Customizing Power Automate Flow to pick values from automation

As shown in image above, once data from the Python script is connected to Flow, the column values will show as dynamic content. Dynamic content refers to data produced from an action and acts like a placeholder for each row of data coming through the API.

With this dynamic content, once template is created and customized, the personalized comments and different values will be replaced for each email sent from the template.


This was customized and emails were sent out to students within minutes after a few test emails using dummy data was used to test how the email would be received by students. The email below is a preview of the test emails sent with Exam score set at zero.


Student Feedback -



To:

Mon 21/11/2022 14:08



Dear [REDACTED]

We hope you are enjoying first year maths. Here is a summary of your progress in maths so far.

Journal Work (20%)	Quizzes (15%)	Exams (65%)	Marks so far	Average Mark so far %
1.21	1.5	0	2.71	100

Remember there is no such thing as a maths gene. All our brains have a remarkable capacity to grow and change with **frequent practice and effort**.

Attendance & Interactions with Moodle

Your participation at lecture is **63.16%** and your interaction with moodle is **376**, the median for your peer group is **690**.

You need to attend your classes often to improve your attendance score

Our systems show your level of interaction with moodle is below average. Evidence shows that students who interact frequently with the online materials perform well in the module.

Journal Work (Mandatory Attendance)

Your participation in journals is **78.57%**

Your journal score is **1.54** and weighted by your attendance is **1.21**.

Your Total Journal performance was below average. We know that maths could be challenging, but we believe that with consistent and frequent work you can achieve better outcomes.

Moodle Quiz Effort

Each Mastery Quiz is worth 1.5%, you need to get 100% in the Quiz to realise this.

Your quiz score is **1.5**

Your performance on the Quizzes was below average. We believe you can achieve mastery if you try to put in more effort, we can support you.

Quizzes are a great opportunity to practise and learn from your mistakes

Exams

You achieved **0** in your exams so far.

Total Marks For Maths

Your marks so far in maths is **2.71** out of the 19.5% available. This gives you an average score of **100** calculated by (course contribution/available marks) * 100%

We would like to get your feedback by 12:00pm on Friday, 25th November, 2022 through the form at this link: [Course Feedback Link](#)

Figure 5: Test Sample Email Created for Demonstration Purposes

After confirming the satisfactory appearance of the test emails, all 206 emails were automatically sent to the respective students based on their uniquely generated comments.

Results

Results of the feedback form received from the students to get their perspective on the form showed that 93% found this feedback very useful.

Rate the personalised feedback email (5 = really good, 1 = poor)

[More Details](#)

 Insights

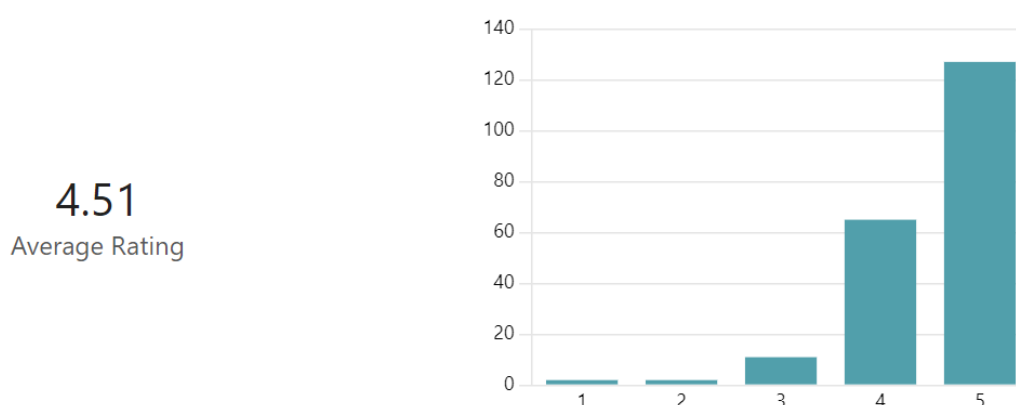


Figure 6: Overall Rating of Student Feedback by Participating Students

93% rated between "4 - 5" for this question

Score distribution

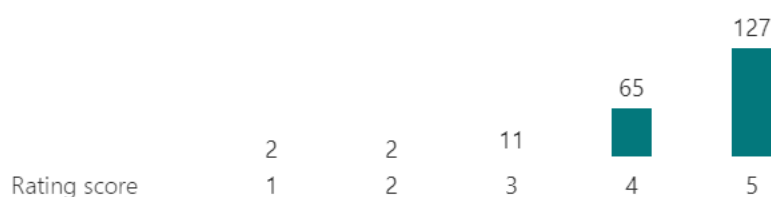


Figure 7: Rating Distribution for Question

We also asked students to comment freely on their choice of rating and we received 203 response many of which found the feedback good and useful. The figure below shows a word cloud of the most common responses we got:

Please comment

[More Details](#)[Insights](#)

203

Responses

Latest Responses

*"good"**"You get your feedback, that's all."**"i find them very handy and easy to understand"*[Update](#)53 respondents (26%) answered **good** for this question.

Figure 8: Word Cloud of Free Comments from the Students

We asked the students how best they would want to receive this kind of feedback and we found majority of students preferred to receive this kind of feedback by email as the word cloud of responses showed:

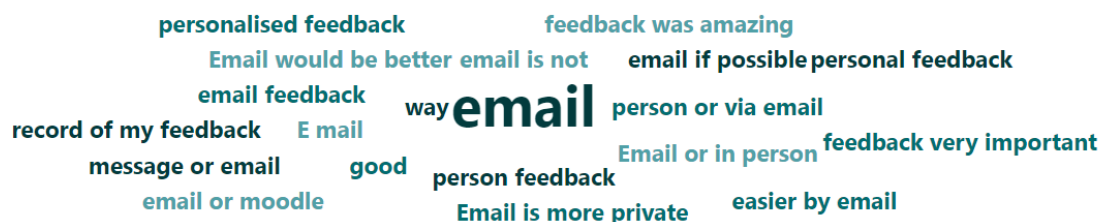
169 respondents (82%) answered **email** for this question.

Figure 9: Word Cloud of Student Preference to Receiving Personalized Feedback

Finally, we wanted to find out how the language used for this feedback made them feel. It was interesting to see a lot of positive responses as shown in the word cloud:

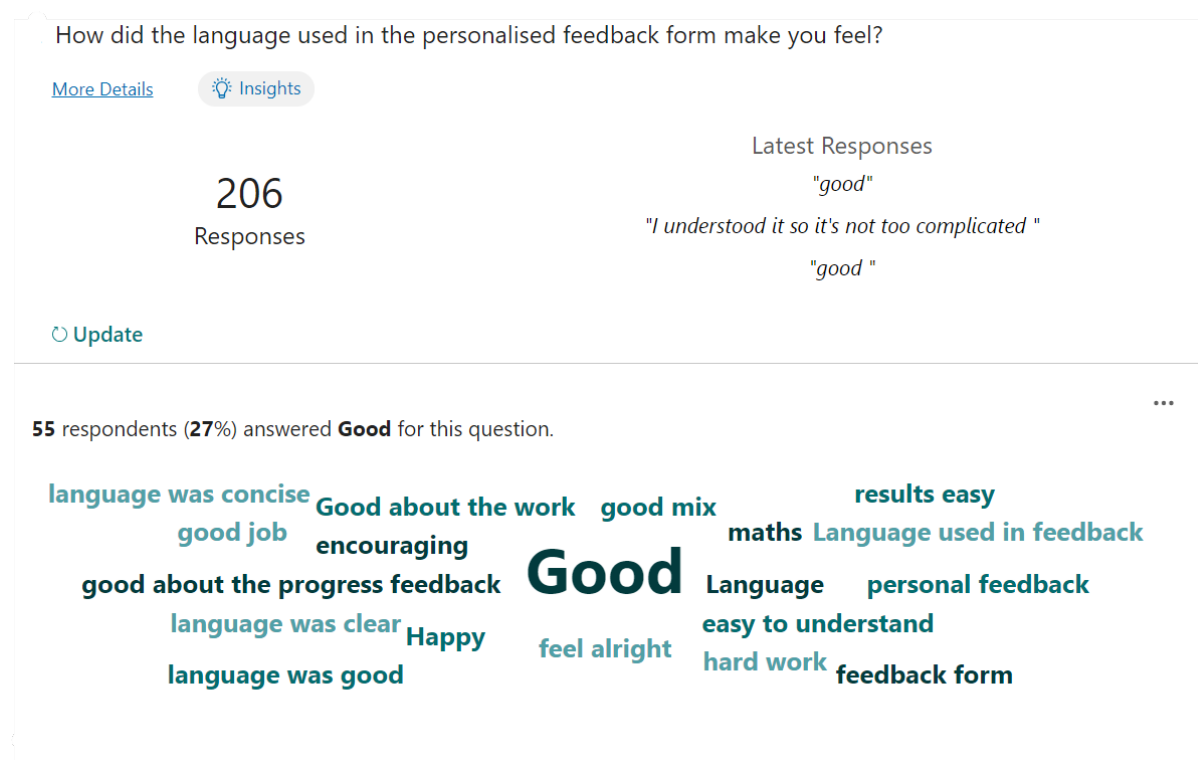


Figure 10: word Cloud Preview of How Language Used Made Students Feel

Conclusion

We believe from results of this research that automating personalized feedback for student hold potential to be of value to students and support educators overcome the challenges of having to give this kind of feedback considering the volume of students and time commitment required.

Acknowledgements

Grateful to the management and Staff of the Atlantic Technological University for sponsoring this research under the Research, Innovation and Strategic Endowment (RISE) funding streams.

References

- Carby, N. (2023). Personalized Feedback in a Virtual Learning Environment. *Journal of Educational Supervision*, 6(1). <https://doi.org/10.31045/jes.6.1.3>
- Chandra, R. V., & Varanasi, B. S. (2015). *Python requests essentials*. Packt Publishing Ltd.
- Henderson, M., Ryan, T., Boud, D., Dawson, P., Phillips, M., Molloy, E., & Mahoney, P. (2021). The usefulness of feedback. *Active Learning in Higher Education*, 22(3), 229–243. <https://doi.org/10.1177/1469787419872393>
- Henderson, M., Ryan, T., & Phillips, M. (2019). The challenges of feedback in higher education. *Assessment & Evaluation in Higher Education*, 44(8), 1237-1252. <https://doi.org/10.1080/02602938.2019.1599815>
- Mag, A. (2019). The value of students' feedback. *MATEC Web of Conferences*, 290, 13006. <https://doi.org/10.1051/mateconf/201929013006>
- Mamoon-Al-Bashir, M., Kabir, M. R., & Rahman, I. (2016). The value and effectiveness of feedback in improving students' learning and professionalizing teaching in higher education. *Journal of Education and Practice*, 7(16), 38.
- O'Brien, C. (2022). Student dropout rates climb across several universities amid concern over low engagement. *The Irish Times*. <https://www.irishtimes.com/ireland/education/2022/05/28/student-dropout-rates-climb-across-many-universities-amid-concern-over-low-engagement/>
- Paris, B. M. (2022). Instructors' Perspectives of Challenges and Barriers to Providing Effective Feedback. *Teaching & Learning Inquiry*, 10. <https://doi.org/10.20343/teachlearninginqu.10.3>

Contact emails: ikechukwu.nigel@yahoo.com
ikechukwu.ogbuchi@research.atu.ie

Controlling the Level of Anxiety in L2 Presentation Performance: Case Study of EFL Students in Japan

Ahrong Lee, York University, Canada
Younghyon Heo, University of Aizu, Japan

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The main objective of this research is to investigate the impact of pedagogical techniques involving L1 on reducing anxiety in L2 presentation performances among Japanese university students learning English as a foreign language (EFL). In our English presentation class, seventeen EFL students gave a short presentation in English based on homework in which they write short paragraphs on how to persuade the audience to purchase a product of their choice. The in-class presentation consisted of three stages: First, students gave a presentation in English; then they gave the same presentation in L1, which students were not previously informed of; finally, students gave the same presentation as in the initial round. All three stages of their presentations were evaluated per the following four categories: Content, language (accuracy, comprehensibility), non-verbal performance and overall performance. The result showed that student performance in L2 was improved through the technique of L1 presentation, where the language anxiety factor is removed. In comparing pre- and post-treatment stages, specifically, it was found that positive experience with reduced anxiety in the medial stage led to enhance performance in the final stage.

Keywords: Foreign Language Speaking, L2 Speaking Anxiety, EFL Pedagogy

iafor

The International Academic Forum
www.iafor.org

1. Introduction

This research explores pedagogical techniques aimed at improving L2 speaking performances by incorporating L1-involved practice prior to engaging in L2 speaking activities. The research focuses on Japanese university students enrolled in an English public speaking course, and data was gathered through video-recorded presentations in both L1 and L2. The analysis primarily centers on nonverbal performances relevant to L2 speaking anxiety. The findings reveal that content-focused speaking activities, particularly using L1 before L2 presentations, have the potential to alleviate anxiety and improve L2 speaking skills. The pilot task conducted during this study has some limitations; however, we hope that educators can apply the methods employed in their foreign language classrooms to help reduce language anxiety and public speaking anxiety experienced by L2 learners.

2. Background

2.1 L2 Oral Presentation Anxiety

Success in the academic and professional environment necessitates clear communication in spoken English. Consequently, many EFL classrooms in Japan incorporate oral presentations as a learner-centered activity to enhance students' communicative competence. However, previous studies have indicated that oral tasks are particularly anxiety-provoking for foreign language learners (Horwitz et al., 1986). Gregerson (2008) observed limited facial activity, reduced eye contact, and closed posture in anxious learners. Anxiety levels are often reported to be higher in Asian contexts like Japan (Williams and Andrade, 2008). Additionally, gender has been identified as a factor influencing foreign language classroom anxiety, with male students exhibiting higher levels of anxiety than female students (Kitano, 2001; Awan et al., 2010). Given that a majority of our students are engineering majors and male, we can surmise that speaking activities pose significant challenges in their English language learning.

2.2 Anxiety-Provoking Factors in L2 Speaking

Numerous factors contribute to anxiety during L2 speaking, including fear of making mistakes, negative evaluation, being laughed at, lack of vocabulary and grammar knowledge, imperfect pronunciation, low proficiency, lack of practice, personality traits, family background, and low self-confidence (Liu, 2006; Sadighi & Dastpak, 2017). However, if students concentrate on the content they are conveying rather than the language forms, the pressure of L2 speaking might be mitigated. Content-Based Instruction (CBI) aligns with this assumption, as it advocates for teaching content or information in the language being learned without explicit and separate language instruction. Rather than isolating language learning from content, CBI integrates language acquisition within meaningful subject matter, allowing learners to engage with the target language in a more authentic and purposeful context (Heo, 2006). It is grounded on the assumption that learners benefit most when language learning is presented in a meaningful and contextualized manner, with a primary emphasis on acquiring information. This approach shifts the focus away from solely addressing pronunciation, grammar, and sentence structure during language instruction. Instead, learners are encouraged to concentrate on the content they aim to convey, potentially alleviating the pressure associated with L2 speaking. Furthermore, this instructional method is not limited to comprehension and expression of content; it extends to producing utterances as well. In this context, the focus shifts from merely teaching the subject matter to guiding students to concentrate on the *what* of their communication, rather than solely on the *how*. By emphasizing the content of their message, learners may experience reduced

language-related anxiety and greater confidence in their L2 speaking abilities. As such, this study aims to investigate how incorporating content-focused speaking activities, such as using L1 (first language) before L2 (second language) presentations, can contribute to reducing anxiety and improving L2 speaking skills among Japanese university students in the EFL (English as a foreign language) context.

2.3 Relaxed L1 Presentation as a Successful Experience Boosting Self-Efficacy

Self-efficacy refers to an individual's belief in their own ability to accomplish specific tasks or achieve goals. It was introduced by Bandura (1997), who emphasized the role of self-belief in boosting confidence. Among the four sources of self-efficacy (Mastery experiences, Vicarious experiences, Verbal persuasions and Affective indicators), Bandura claims that "Mastery experiences" are the most influential source of efficacy information. When you succeed at something, it boosts your confidence and belief in yourself. Successes make you feel more capable. On the other hand, if you experience failure, it can lower your confidence and self-belief. We believe that L2 learners' boosted confidence and relaxed attitude during the L1 presentation phase, leading to a successful experience of giving a presentation, can raise the self-efficacy of the participants and result in better performance in the final presentation in L2.

3. Methodology

3.1 Participants

Participants in this study were 15 Japanese university students, 1 Vietnamese student and 1 Chinese student enrolled in an English public speaking course ("Presentation Skills"). The students were engineering majors and exhibited varying levels of English proficiency. The two international students from Vietnam and China exhibited higher proficiency in English compared to their Japanese classmates as they had to reach certain level of English to be able to be admitted to a Japanese university. They were proficient also in Japanese.

3.2 Procedure

The course ran for fourteen weeks, with two 100-minute sessions per week. In Week 12, participants were asked to give a short presentation in English based on a homework assignment in which they wrote short paragraphs persuading the audience to purchase a marker. The in-class presentations comprised three stages:

- Phase 1. Initial presentation in English (L2)
- Phase 2. (Uninformed) presentation in Japanese (L1 for most students)
- Phase 3. (Uninformed) final presentation in English (L2) again

We had seventeen students in total, who could participate in this activity in class and we made a pair to present together, so we had a total of nine groups, with one group, one student was missing.

3.3 Analysis

The presentations were video-recorded and evaluated using criteria for content, language, nonverbal performance, and peer evaluation, with a particular focus on nonverbal behaviors associated with L2 speaking anxiety (Table 1).

Category	Items	Descriptors	2	1	0
Content (6 points)	Coherence	Contains clear introduction, body and conclusion Information presented in a logical sequence Easy to follow			
	Content	Providing relevant information Presenting supporting/convincing description/argument Creative use of presentational aids (e.g., visual aids)			
	Length	Presentation is completed within the time assigned (Neither too short nor too long).			
Delivery (Presentation) – Verbal (10 points)	Comprehensibility	Overall intelligibility on part of audience			
	Accuracy (grammar, range of vocab)	Correct use of grammar Wide range of vocabulary			
	Speech rate/ Speed	Presentation at an appropriate speed (Neither too fast nor too slow)			
	Spontaneity/ ad lib	Spontaneous speech beyond the script Spontaneous use of presentational aids			
Delivery (Presentation) – Non-verbal (10 points)	Voice volume & clarity	Appropriate volume of voice Clarity of voice			
	Body language	Natural gesture (use of hand) Confident body posture (open posture throughout)			
	Eye contact	Eye contacts with audience, without looking down or away. (Frequency and proportion to the whole presentation)			
	Spoken, not read	Presentation in the spoken manner, not reading mode (% of relying on the script prepared)			
	Inter-speaker communication	Cooperative manner to make it as one presentation Mutual communication during the presentation			
Reception by Audience (4 points)	Overall naturalness	Overall impression of the presentation being natural, engaging, and persuasive			
	Peer feedback	Questionnaire result			
	Engaging the audience	Engaging the audience throughout the presentation Use of humor			

Table 1: Evaluation criteria

For the analysis in this study, we measured the length of their presentations for three different stages, and the number of their nonverbals such as eye contact with the audience, hand gesture and hand gesture per 10 seconds.

4. Results and Discussion

4.1 Presentation Duration

Below is one sample student presentation transcribed from the video (P1).

- A: *We got the new marker ... markers we are using.* [Brief eye contact]
 B: *Look at these three markers. Suppose this marker A.*
We use this marker everyday. You can use it for long time. ...
Thus, it is not easy for... Here is marker B.
 [Eye contact] *It is easy to hold it because the size fits your hand.*
 [Eye contact] *It is not easy for people to use it for long time.*
 A: *Finally, this is a new marker.* [Pointing at B's marker]
The size of this marker is ...[Eye contact] *It is easy to use.*
We can use .. for a long time with a new marker. [Brief eye contact]
On the other was, new marker has merits over marker A and B.

Do you want to buy it?
 [Audience laugh]
That's it for today. Thanks for listening.

Their video recordings for three different phrases were first measured in length.

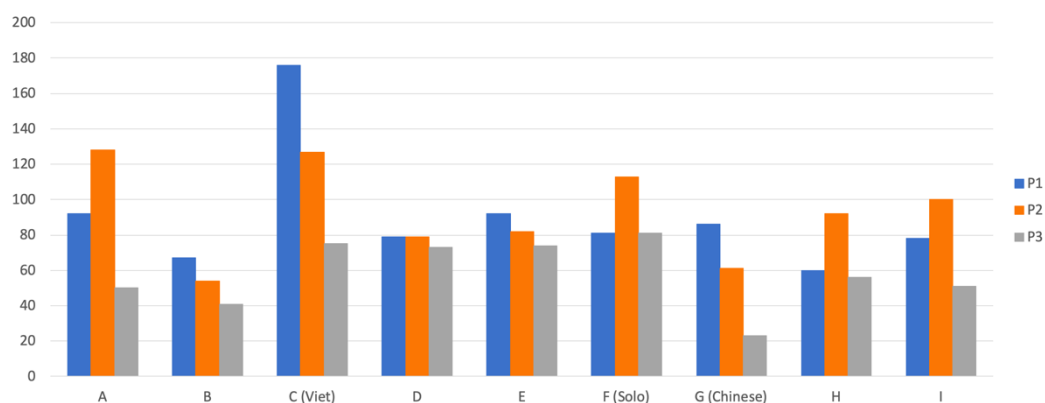


Figure 1: Presentation duration (in seconds)

Figure 1 shows the change in presentation duration for nine groups from Group A to I. The blue bar is the very first presentation in English. Orange bar shows the second one in Japanese (L1 for most students). The last gray bar indicates the length of their final English (L2) presentation, which they were asked to give without reading their original script. There are inter-group variations as to which one is the longest or shortest. The analysis of presentation duration indicates that students' third presentation (P3), conducted in English without the script, was the shortest. This reduction in duration is expected, considering that students had to recall the content from memory without referencing the script.

4.2 Nonverbal Cues During the Presentation

Although their presentations were shortened in length for their final rounds in L2 English, participants demonstrated increased eye contact and engaged more in hand gestures during the second and third presentations as shown in Figures 2 through 4, showcasing a higher level of comfort with their L2-speaking skills.

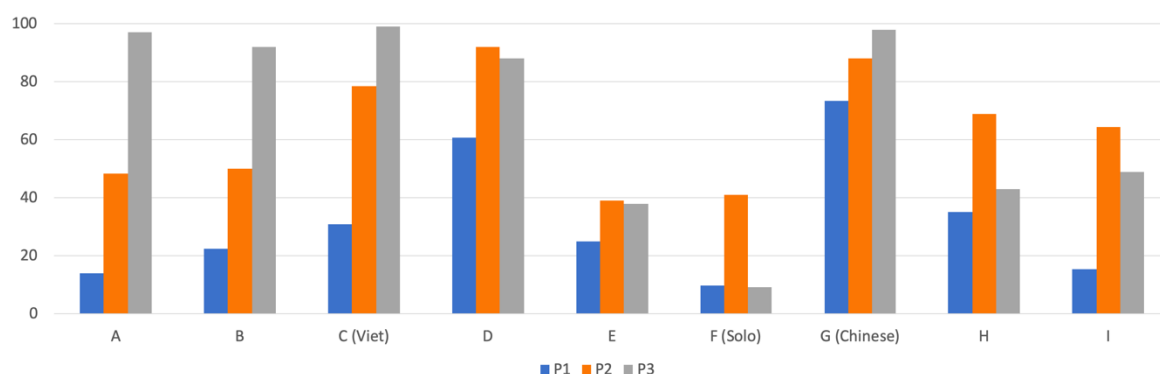


Figure 2: Change in the percentage of eye contacts

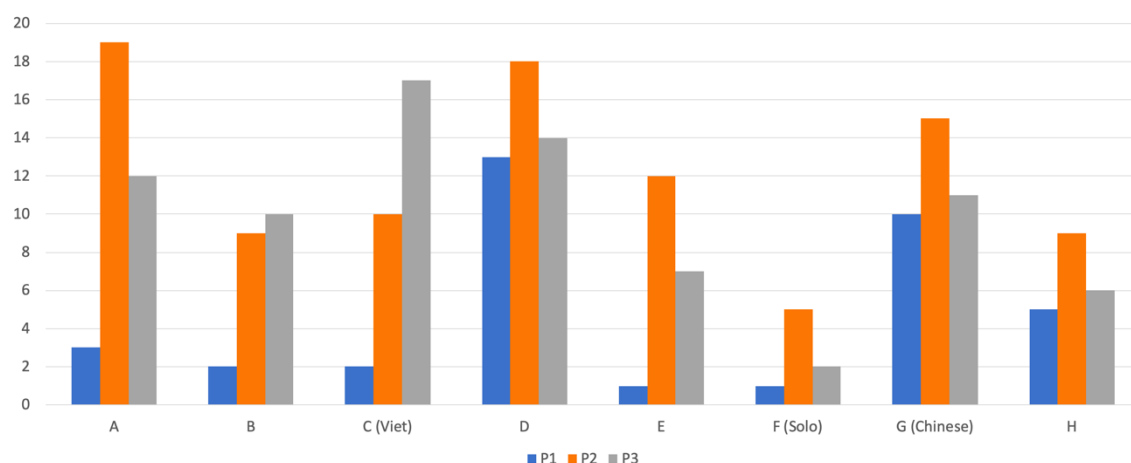


Figure 3: Number of hand gesture

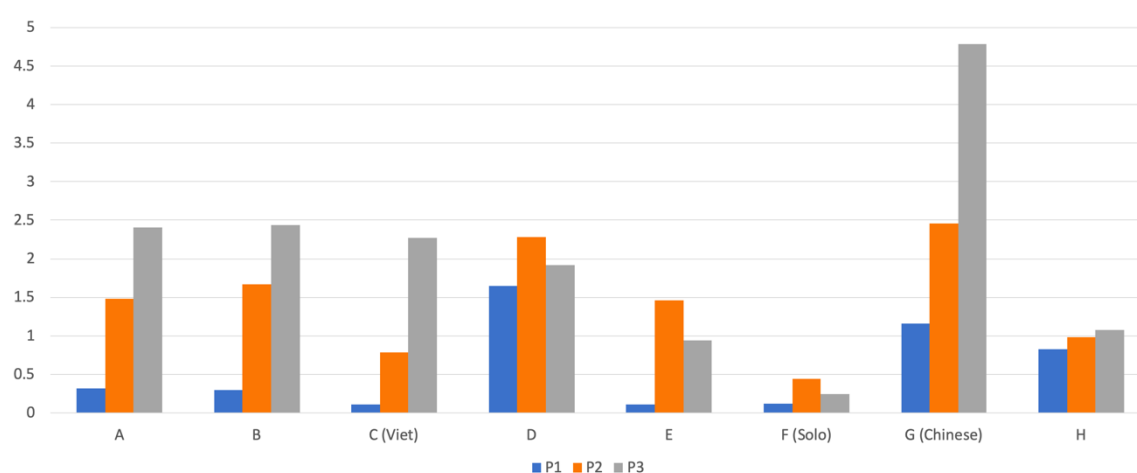


Figure 4: Number of hand gesture per 10 seconds

Moreover, students tended to provide more detailed explanations during their presentations in L1, and they became more interactive with the audience, incorporating humor and jokes. Positive experiences with reduced anxiety during the L1 stage appeared to lead to more relaxed and confident performances in the final L2 stage (Bandura 1997).

5. Conclusions

Learning English as a foreign language can be challenging, especially for students with limited exposure to the target language outside the classroom. The use of content-focused speaking activities, particularly L1 presentations before L2, has the potential to mitigate language anxiety and improve L2 speaking skills. Encouraging collaboration among students can create a supportive and non-judgmental atmosphere, enabling students to feel more comfortable expressing themselves in English. The research findings provide insights for educators to consider implementing similar techniques in their classrooms to enhance language learning experiences and reduce anxiety associated with L2 speaking.

It is important to acknowledge the limitations of this study. First, the sample size was relatively small, with 17 participants from various engineering majors. A larger and more diverse sample could provide more robust insights. Additionally, the study was conducted in a controlled classroom setting, and the findings may not fully capture the complexities of real-life language

use. Further research in authentic contexts could offer valuable insights into the effectiveness of L1-based techniques in reducing L2 speaking anxiety. Lastly, the study focused on nonverbal performances related to anxiety; future studies should consider incorporating verbal aspects to provide a comprehensive assessment of anxiety reduction techniques.

References

- Awan, R., Azher, M., Anwar, M., & Naz, A. (2010). An investigation of foreign language classroom anxiety and its relationship with students' achievement. *Journal of College Teaching & Learning*, 7(11), 33-40.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Gregerson, T. (2008). Non-verbal cues: Clues to the detection of foreign language anxiety. *Foreign Language Annals*, 38(3), 388-400.
- Heo, Y. (2006). Content-based instruction. *Hawaii Pacific University TESOL Working Paper Series*, 4(2), 25-31.
- Horwitz, E.K., Horwitz, M.B. & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal*, 70(2), 125-132.
- Kitano, K. (2001). Anxiety in the college Japanese language classroom. *Modern Language Journal*, 85(4), 549-566.
- Liu, M. (2006). Anxiety in EFL classrooms: Causes and consequences. *TESL reporter*, 39, 20-20.
- Sadighi, F., & Dastpak, M. (2017). The sources of foreign language speaking anxiety of Iranian English language learners. *International Journal of Education and Literacy Studies*, 5(4), 111-115.
- Williams, K. & Andrade, M. (2008). Foreign language learning anxiety in Japanese EFL university classes: Causes, coping, and locus of control. *Electronic Journal of Foreign Language Teaching*, 5(2), 181-191.

Contact email: arlee@yorku.ca

Framework for Filtering the Expectations of Common Behavior and Standards in a Highly Diverse Student Environment

Michelle J. Cummings-Koether, Deggendorf Institute of Technology, Germany
Franziska Durner, Deggendorf Institute of Technology, Germany
Ayelen V. Toscano Juanes, Deggendorf Institute of Technology, Germany

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The European Campus Rottal-Inn (ECRI), which is a part of the Deggendorf Institute of Technology, is considered to be one of the most culturally diverse campuses, with one of the highest international student populations, in Germany. The highly diverse and international environment of the campus, which is set in a rural area of Bavaria, offers an exceptional opportunity to study in a diverse and intercultural setting. However, it also means that the students, staff, and the local community often have differing expectations of behavior, interaction, and tolerance. The *Group Expectations Framework*, a framework for determining common expectations, was developed through various workshops and surveys that were conducted with the students, staff, and local community participants. The framework allowed for responses from the participants of differing interest groups to be analyzed and to determine how these fit into the of the different categories of subcategory of expectations, their norming or forming character, and if the expectations were seen as voluntary behavior or were seen as a code of conduct with a regulatory character.

Keywords: Expectations, Large Diverse Groups, International Students, Group Expectation Framework

iafor

The International Academic Forum
www.iafor.org

Introduction

Human life is driven by expectations, particularly in situations regarding to plan future steps of education, career planning or to stay abroad. These expectations are either aimed towards ourselves, towards others, or both. The tricky thing is to identify thoughts on these topics as expectations, to structure them and finally verbalize them.

As early as 360 b.c. Plato wrote, that “each man possesses opinions about the future, which go by the general name of Expectations” (Bury, 1967/1968, *Plato Laws*, 1.644c). Curtin (2019) argues humans form expectations automatically, sometimes conscious, and sometimes unconscious, with passion or reason. They can be based on information from private surrounding or public influences. This includes all kind of influences. Even today’s social media platforms might have an impact. They may even be a crucial driver in modern times.

Students at the ECRI campus in Lower Bavaria come from more than 80 different nations. The interaction between staff and students showed that there were noticeable and often very specific expectations the students had towards the university staff, their education, their fellow students, and the general public of the local community around them. The conditions at the campus are unique in this sense as the surrounding area is very rural and traditional, but nearly all the students were socialized in cultures other than Germany and even Europe. In order to make their study experience a successful and positive one, the decision was made to create an overview which contains all common expectations from students and other stakeholders at the campus. This overview was meant to function as a guide or Code of Conduct.

The challenge was to capture the expectations of the large diverse group, which was not only ethnically and culturally diverse, but also to be able to capture the correct definitions or types of expectations. How expectations are formed is dependent on the upbringing, cultural background, personal and social influences, and these varied greatly between our stakeholders (Rieger, 2018). So, in the first step, it was important to conduct a survey to collect the actual meaning of the word “expectation”. In the second step, a workshop was held to collect data about the specific expectations from the stakeholders towards themselves and others.

A very basic definition of “expectation” can be found in the Cambridge Dictionary: “The feeling or belief that something will or should happen” (Cambridge Dictionary, n.d.). The Oxford English Dictionary explains that an “expectation” is “the action or fact of anticipating or foreseeing something; the belief that something will happen or be the case” (Oxford English Dictionary, n.d.). Both definitions are oriented towards the future and should give the person expressing the expectation a plan or certainty. James (2011) defines two kinds of expectations: predictive and normative expectations. Whereas predictive expectations are formed based on the past, normative expectations are not. Latter imply what is seen as reasonable and desirable.

Research on groups has shown that people connect themselves by shared goals and most of us share expectations of respect, openness, and empathy (Forsyth, 2017). It was determined that a filter would be required to distinguish the different kinds of expectations mentioned by the research participants, and to be able to determine the possible differences in subjective meaning. The literature review concluded that there is not yet a framework that categorizes expectations of large diverse groups in terms of their motivational and binding character for

all members of the said group or community. This led to the decision to create a framework for this purpose.

Models for expectations in other scientific fields were explored. Most of the existing models on expectation research cover fields such as customer feedback, market research, predictions of the effectiveness of medical procedures, and even medications for the patients (Zhang et al., 2021; Sheth & Mittal, 1996). One example, the ViolEx Model shows that expectations are formed based on three long-term factors, which is one step above the *Group Expectations Framework* as it filters already existing expectations and not their formation (Rief & Glombiewski, 2016). The *Group Expectations Framework* differs, in that it identifies three main categories, five subcategories and seven types of expectations that can be assigned to specific responses. It is also designed to identify the underlying motivation and to consider potential intercultural factors.

Current State of Research

Expectations are part of our daily life and formed on both a conscious or unconscious level (Fuchs, 2022). They can be built regarding a certain expected behavior from a person or outcome of a situation. Most of the times expectations are result of past experiences (Fuchs, 2022). Favero and Kim (2020) agree with that statement and explain that past performances and past satisfactions have an influence on current expectations. Further expectations seem to be sturdy over time, as good experiences have been made before.

Leung et al. (2009) stated that expectations are oriented towards the future and people think they can influence the outcome by their current behavior and status. Therefore, expectations impact the goals people set for the future and how they plan it. Expectations have a guiding character for future behavior and development (Bandura 2001; Nurmi 1991; Seginer 2008). Howard (2005) determines a close connection between expectations and how students filter information and in a consequence make decision (as cited in Pike, 2006).

Types of Expectations

In general expectations can influence the behavior of people in and outside of their educational or professional setting. For this reason, expectations are not only influenced by the socialization of the individual but also vice versa (Pike, 2006).

Current discourse on the topic has shown different ideas to categorize and define expectations depending on how they were formed. Four types have been discussed so far which are relevant for the research described in this paper: *adaptive expectations*, *implicit expectations*, *explicit expectations*, and *rational expectations*. Adaptive expectations lie on the foundation of previous experiences made in a similar situation. The expected outcome may or may not occur as expected. Implicit expectations are not directly expressed and based on an assumed behavior of the other person, whereas explicit expectations are articulated through guidelines that allow people to act accordingly and consequently the outcome can be demanded. Rational expectations are based on past experiences like trends and are based on existing knowledge. Although these definitions are not evidence-based, they are helpful to think about and better explain why people have expectations and how they can differ from each other (Peterson et. al, 2016; Gertchev, 2007; Young & Darity, 2001).

Expectations of Groups

Expectations do not only concern individuals, but also groups often build shared expectations based on the facts which they form common goals, tasks, categorization, and systems (Forsyth, 2017). Participations and interactions of group members are dynamic processes which define the nature of the group itself and how the groups connect with other groups, other individuals, or larger institutions (Cartwright & Zander, 1968).

The literature mentions common expectations in group settings are respect, openness, being heard and seen, tolerance, support, and acceptance (Forsyth, 2017). Based on the characteristics of expectations mentioned above, the motivation for expressing expectations is not always clear. With diverse groups in particular, culture might influence the subjectivity of the expectation (Rieger, 2018). Expectations are dependent on the cultural background of a person as well as the context of the situation. It is important to consider, as an individual or a group, to be sensitive and open towards expectations from others (Kim & Goldstein, 2005).

Communicating Expectations

Communication plays a crucial role how expectations are expressed. It can be difficult when differing cultural background underly expectations (Katz et al., 2001). Curtin (2019) argues that if expectations are communicated in or to a group, they need to be expressed in a very clear and precise manner using short messages. One must be flexible enough to try to understand the cultural backgrounds and prejudice to be able to understand expectations in a large diverse group (Kim & Goldstein, 2005). Although spoken language is often the focus, body language must be included as well (Zhang et al., 2010). If the ability of intercultural communication is hindered or lost, apprehension, prejudice, and the lack of interest in the importance of spoken words are often the reason. Language skills play a crucial role in expressing expectations (Kim & Goldstein, 2005). In this context two verbal styles of indirect and direct communication must be considered. In individualistic cultures people tend to prefer direct talk and messages, whereas indirect talk is preferred in collectivistic societies (Ting-Toomey & Dorjee, 2019). If students communicate who have different linguistic backgrounds this can lead to misunderstandings in the intention of the counterpart. Using direct communication styles the speaker's intentions are clearly expressed, for indirect communication the opposite is the case (Toomey & Dorjee, 2019). As shown above, expectations need to be expressed in a precise manner with a clear sentence structure. This will definitely be harder to achieve by students from an indirect verbal background.

The following situation was observed at the campus. While the official language of the campus is English, for most of the students and staff members it is their second language. Misinterpreted, or mis-expressed expectations can lead to disappointment and the feeling of not being heard. Students need to be provided with a safe space where they can share and question their own assumptions in order to successfully communicate with others (Jin, Cortazzi, 1997).

Seo and Koro-Ljungberg (2005) pointed out that high quality higher education can only be provided if cultural identities and the heritage is considered. To avoid disappointment, which can be a consequence when expectations are not met, it was decided to research about what the students at ECRI expect, what motivated these expectations, and how they expected others to deal with them.

Influence of Culture on Expectations

Expectations form based on culture, upbringing, education, media, historical and societal circumstances. Ethnicity plays a role as well as generational influences (Rieger, 2018). Observations from staff and previous feedback from the students at the campus have shown, that they seemed to have developed expectations from the campus community as well as from themselves.

Drew (2023) located different situations in which individuals, depending on their cultural background, have certain expectations. These can, for example, concern the behavior in a classroom setting, behavior in libraries and situations outside a university. In general expectations concern our daily actions in interaction in various situations, places, and with other people (Drew, 2023). Members of a large diverse group expect different behaviors on public transport, greeting procedures, privacy and space rules, and gender norms. In all these situations different expectations can arise due to the cultural background and social upbringing (Drew, 2023).

Although there are different expectations depending on the group and the situational setting, there are certain values that can be found universally such as respect, openness, and honesty (Hackman, 2022). At workplaces or in universities, professional communication, constructive feedback, avoiding negative gossip, and clean shared spaces, such as common used classrooms or office spaces, are defined and verified expectations (Drew, 2023). These findings go along with the results from the research carried out at the international campus. Professional communication is expected between professors and students while simultaneously giving feedback in a respectful manner.

Measuring Expectations

Previous research provided different scales to measure expectations such as the Verona Expectations for Care Scale (VECS) or the Verona Service Satisfaction Scale (VSSS), but most of them concern either the public sector or medical fields (Ruggeri, Dall'Agnola, 2009). The latter measures patients', relatives', and professionals' expectations and satisfaction with the provided care. Another model from Zhang et. al deals with the satisfaction of citizens with public services. The Expectancy-Disconfirmation Model provides data on the correlation between expectations being exceeded and the impact on satisfaction (Zhang et.al, 2022).

The ViolEx Model shows expectations are formed based on three long-term factors: direct prior experiences, social influences, and individual differences (Rief & Glombiewski, 2016). Yet again the model is established in the field of clinical psychology.

Current research has numerous answers on the identification of expectations, how they are expressed or measured in medical, business, and consumer-oriented areas, but a method to filter them according to the underlying motivation is missing. The two most common qualitative methods for measuring expectations are focus groups and interviews, while observational studies are also a frequently used method, too (Ayala & Elder, 2011).

The research presented in this paper shows the process of the design for a framework created to code and filter the expectations of a large, diverse group, specifically, the groups of stakeholders found at ECRI and the relevant findings of the research. The main research

question that was asked was: “How can expectations of large diverse groups be filtered through a framework to identify a set of expectations or shared expectations among the campus community?”. Further important aspects were to understand the motivation behind the expectations of the students as well as the community and how people deal with them, especially if they were not met. Lastly, the clear understanding of the group expectations will presumably lead to improved group dynamics.

Methodology

The *Group Expectations Framework* was created by employing a qualitative methods approach that aimed to explore the expectations of all stakeholders of the international campus, as a sample to represent, a large diverse group. The expectations were to be measured in their relation to the functioning of the campus, the expectations regarding interaction among stakeholders, and their general expectations about the services that should be provided. The research design consisted of two forms of data collection: an online survey and a public workshop.

The online survey, which was conducted in 2021, aimed to allow respondents to define and identify their personal understanding and definitions of expectations. This was done to start measuring possible cultural or stakeholder differences in what the term “expectations” could subjectively mean, and to identify different subcategory of expectations that a diverse group might have.

A public workshop, that was subsequently held in July 2022, was developed with design thinking methodology. Especially the first three phases of the design thinking process were relevant for the workshop. The focus was on the understand and observe steps, and the synthesis step (Scheer et.al., 2012). This was intended to provide an opportunity for all stakeholders, as well as the general population surrounding the campus, who was not included in the online survey, to voice their expectation regarding various aspects of the international campus such as behavior towards each other.

Research Design

The initial survey was created using an exploratory research approach and was designed to allow the participants the ability to define their own expectations. This phase served to collect the data needed for the subsequent workshop design. The workshop used a descriptive research method, allowing the answers from both the survey and the workshop to be used to create the framework in a qualitative methods approach.

Survey Design

The survey was designed to allow the respondents to identify and define what they believed expectations to be. Although the response rate was low (n=29), the responses helped to create the fundamental categories the framework uses. The responses to the survey were primarily from students.

The survey was conducted using an online survey platform. It was anonymous and all questions were optional. It was designed to allow for open ended responses, and there were no identifying demographics asked aside from their status at the campus (what type of

stakeholder). The survey was open to all stakeholders at the campus. The responses were used to establish the primary expectation definitions.

The survey was analyzed using thematic analysis to determine the framework structure. The answers were coded using a deductive coding technique to help interpret the data and form the initial aspects of the framework.

Public Workshop Design

The responses from the workshop that was conducted in July 2022, helped to fine tune the results. Again, the response rate was fairly low (n=58). The respondents included: professors and teaching staff, general staff, students, and the general population of the region.

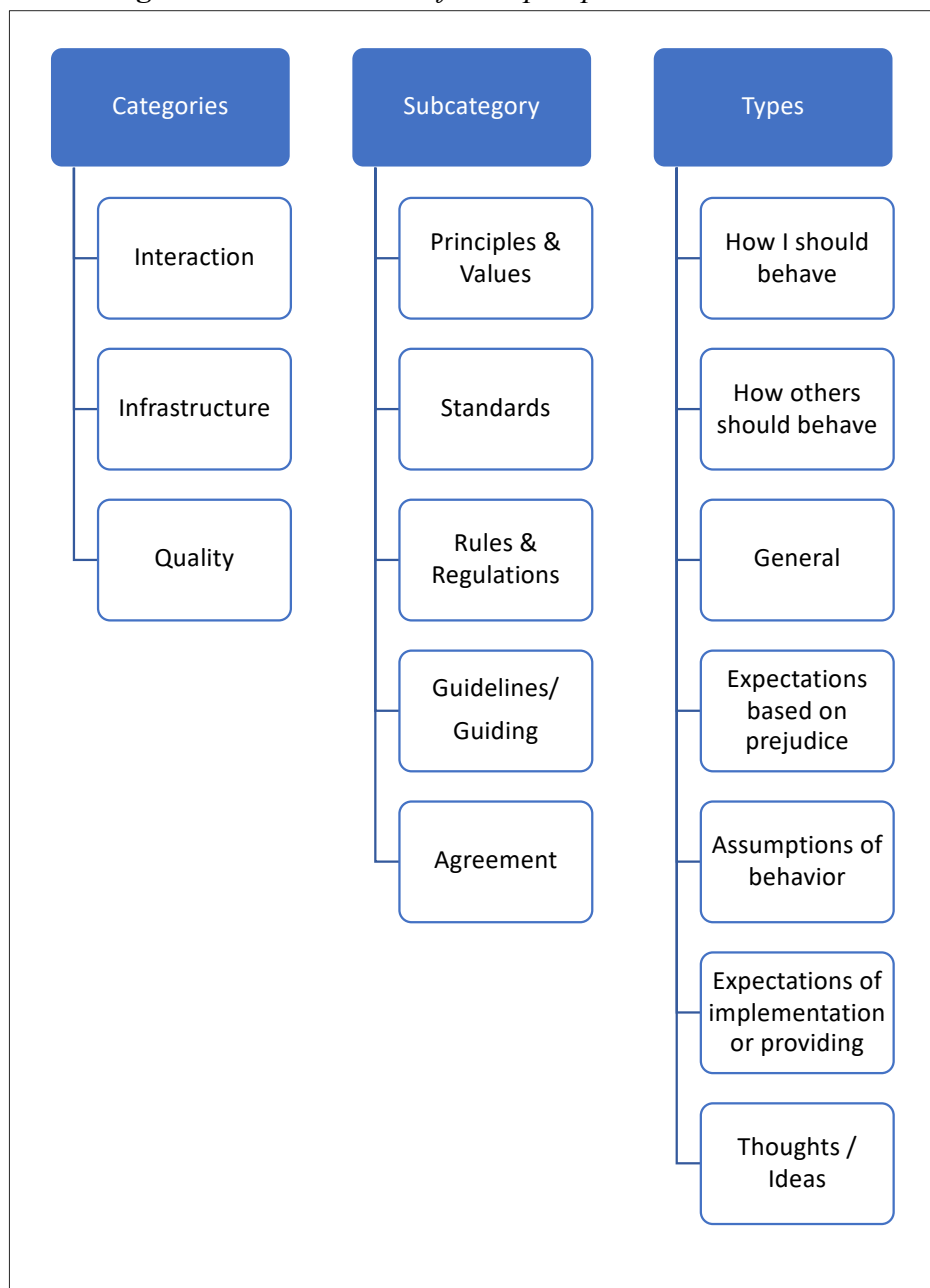
There was a design thinking facilitator that was asked to accompany the workshop. The questions were designed to both gather expectations from all stakeholders at the campus, and to also allow for the further refinement of the framework. The workshop included questions regarding behavior, as well as expectations about the campus in general. The respondents were left to move about the room and answer questions that were placed around the room. Each question had a separate moderator. The questions were left in the room for several hours, so responses could be given with enough time for reflection from the participants. Each response was color coded, to allow the identification of the stakeholder type, but no other identifying information was collected.

The workshop findings were analyzed by using a thematic analysis, that was partially based on the survey findings. The workshop was used to validate the framework and identify further categories, subcategories, or types of expectations, by identifying patterns of responses from all stakeholder groups.

Findings

The combined findings of the survey and the workshop helped to provide a diverse insight into the expectations that a large and diverse group can have within the context of an international campus. By including a variety of stakeholders, the response is designed to be representative sample of the campus population.

The analysis resulted in three categories of expectations, and five subcategories of expectations. The subcategory of expectations could be further divided into seven different types. The three categories are the main categories of expectations. Then the subcategories further define expectations by adding the reason for the expectation. Finally, the types identify the expectation and the motivation for it.

Figure 1: Full overview of Group Expectations Framework

Note: This figure shows all of the elements of the Group Expectations Framework

The three main categories of expectations that were identified were:

- *Interaction:* These are expectations that are primarily related to behavior.
- *Infrastructure:* These are expectations that are primarily related to the infrastructure that the respondents expect the university or community around the university to provide.
- *Quality:* These are expectations that the respondents had about the quality of teaching or services that the university provides, or of the quality of the students' work that the staff and teaching staff expect from them.

The five subcategory of expectations that were identified regarding *Interaction*:

- *Principles & Values (Flexible)*: Expectations that are built upon existing principles and values regarding behavior. These expectations are more generalized and often have a suggestive character, but a clear ethical or moral directive. The wording suggests flexibility regarding the implementation of these expectations.
- *Standards (Not flexible)*: Expectations built upon personal standards regarding behavior. The wording suggests that these expectations are not flexible and are to be implemented exactly as stated.
- *Rules & Regulations (Binding)*: Expectations that are considered as rules that need to be followed and are binding. The wording has the character of a codex and can be seen as expectations that can or should be enforceable.
- *Guidelines/Guiding (Non-binding)*: Expectations that are seen as suggestions are meant to guide others. The wording has the character of a guideline.
- *Agreement (Agreement from all response groups)*: These are expectations that are seen in all respondent groups and have a wording that suggests universal agreement across all cultures and respondent categories.

There were responses given that indicated expectations, but were not identifiable, either because of lacking context, lacking English skills, or because they were not decipherable. There were then out into a separate category:

- *Extras/Not identifiable*: Responses that are either not identifiable as expectations, or responses that are clearly not an expectation. This included statements, presentation of ideas that were not formulated to expect a response or behavior, or just not understandable in language or grammar.

All subcategories of expectations were identified and used in relation to the category of *Interaction*. However, expectations regarding Infrastructure and *Quality* primarily fell into the *Rules & Regulations (Binding)* and *Guidelines/Guiding (Non-binding)* subcategories.

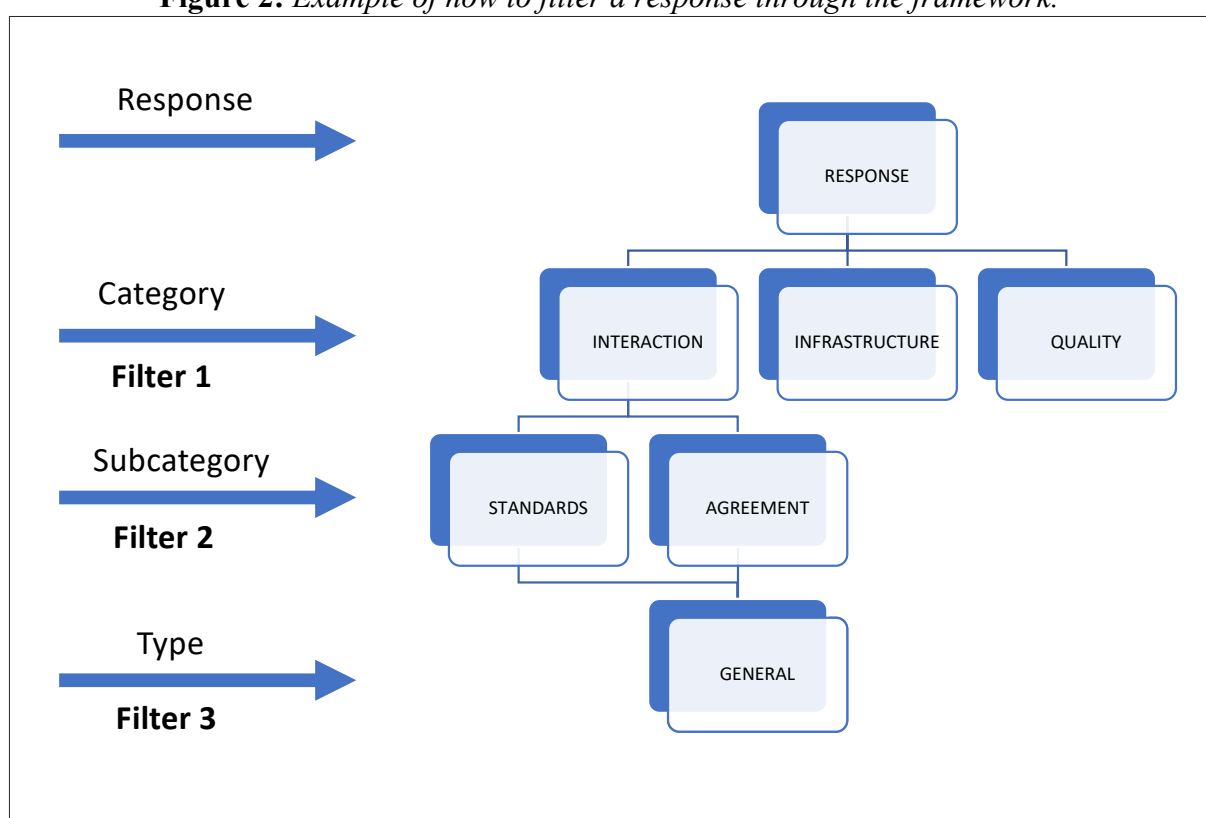
There were expectations that can overlap in their application or interpretation, and therefore the expectations were broken down further into seven types of expectations to be able to identify the intention or motivation even more accurately. The seven types were:

- *How I should behave (How to be)*: Expectations that are based on how one should behave towards others. This included other respondent groups or others in general.
- *How others should behave (To treat others/How I want to be treated)*: Expectations that are based on how others should behave towards either the respondent (group or individual) or others in general.
- *General (Expected behavior / Thoughts for understanding behavior)*: Expectations that are considered either as universal or have a character of a basic principle to help understand general expectations regarding behavior. There is some reflection towards others.
- *Expectations based on prejudice*: Expectations that are built on prejudice or bias towards others.

- *Assumptions of behavior*: Expectations that are built on the assumption that the expected behavior is the norm that should be followed by others, without any reflection towards others. The expectation is seen as universally understood or self-explanatory.
- *Expectations of implementation or providing*: Expectations that are based on the want or need of implementation to fulfill a need or desire or to provide something that is seen as necessary.
- *Thoughts / Ideas (not related to specific behavior)*: Expectations that are not related to behavior and don't seem to have any guiding character. These seem to be placed to help inspire action or a response, but do not define the expected result.

The framework is designed to be used as a filtering system, to allow the researcher to use a deductive approach in determining the types of expectations that a large, diverse group has.

Figure 2: Example of how to filter a response through the framework.



Note: This figure shows how the response “respect” was coded and filtered through the framework in three steps.

By filtering a response through the different aspects of the framework, it is possible to determine the motivation and possible expected response and or behavior to the expectation. In the example (Figure 1), the response was *respect*, which was a response from all stakeholders and was formulated as a standard. The context in which the response “respect” was given in both the survey and the workshop allowed for the identification of the term to be placed into the category of *Interaction*. Further context in the responses, particularly in the way the response was formulated in regard to expected behavior from oneself and the behavior of others, allowed for the response to be identified as a *Standard* and the responses regarding “respect” were so similar amongst all stakeholders, that it could also be identified as an *Agreement*. Even though the expectation of “respect” fits to two types, the sub-typing

allows this response to be seen as a general or universal expectation with a binding character for all.

Limitations and Further Research

This framework still lacks empirical validation. This is partially due to the COVID-19 pandemic, which made it harder to examine expectations, especially as there was little campus life or interaction. The framework will be used for annual surveys of the campus population for the next three years, after which it will be examined again. Through this research, it is expected that the intercultural aspect of expectations will be more distinguishable as a direct influence on expectations. The data collected so far is not enough to clearly make this distinction yet. It is also expected that further empirical research will lead to the discovery of other forms of expectations, as a future data analysis will likely show expectations that have not been considered in this framework.

The framework will also be offered to other organizations with large, diverse groups, to further expand the respondent groups for this framework. This will happen both inside and outside the higher education sector. Further research may also add more to insights into expectations for individuals in diverse populations.

Conclusion

The Group Expectations Framework is a framework that can be used to code and visualize expectations of large, and especially diverse, groups in an academic environment. Further empirical research will validate the framework as a tool for the identifying differing expectations among stakeholders from different status, age or cultural backgrounds. This can help to create an overview of the expectation and motivation of the group. It allows the identification and visualization of the expectations that are seen as having a binding, non-negotiable, or rule characteristic, and could potentially be enforceable, as well as the expectations that are not seen as enforceable or that carry an expectation of implementation. Hence, the importance of certain expectations can be raised above others and potentially improve group dynamics.

References

- Ayala, G. X., & Elder, J. P. (2011). Qualitative methods to ensure acceptability of behavioral and social interventions to the target population. *Journal of Public Health Dentistry*, 71(1), 69-79. doi: 10.1111/j.1752-7325.2011.00241.x
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26. doi: 10.1146/annurev.psych.52.1.1
- Bury, R.G. (1997/1968). Plato: Plato in Twelve Volumes. Cambridge: Harvard University Press. William Heinemann Ltd.
<http://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0166%3Abook%3D1%3Asection%3D644c>
- Cartwright, D., & Zander, A. (1968). Power and Influence in Groups: Introduction. *Group Dynamics: Research and Theory*, 3, 215-235.
- Curtin, R. T. (2019). Consumer Expectations. In: *Consumer Expectations: Micro Foundations and Macro Impact* (pp. 21-194). Cambridge: Cambridge University Press.
- Drew, C. (June 2, 2023). *Group Norms: 28 Examples & Overview*. Helpful Professor.
<https://helpfulprofessor.com/group-norms-examples/>
- Expectation – Cambridge Dictionary. <https://dictionary.cambridge.org/dictionary/english-german/expectation>
- Expectation - Oxford English Dictionary. (o. D.).
<https://www.oed.com/search/dictionary/?scope=Entries&q=expectation>
- Favero, N., & Kim, M. (2020). Everything is relative: How citizens form and use expectations in evaluating services. *Journal of Public Administration Research and Theory*, 31(3), 561-577. <https://doi.org/10.1093/jopart/muaa048>
- Fuchs, T. (2022). The not-yet-conscious. *Phenomenology and the Cognitive Sciences*.
<https://doi.org/10.1007/s11097-022-09869-9>
- Forsyth, D. R. (2017). *Group Dynamics* (7th ed.). Boston: Cengage Learning Inc.
- Gretchev, Nikolay (2007). A Critique of Adaptive and Rational Expectations. *Quarterly Journal of Austrian Economics*, 10, 313-329. DOI:10.1007/s12113-007-9023-1
- Hackman, J. R. (2002). *Leading teams: Setting the stage for great performances*. Cambridge: Harvard Business Press.
- Howard, J. A. (2005). Why should we care about student expectations? In: Miller, T.E., Bender, B.E., Schuh, J.H., & Associated (eds). *Promoting Reasonable Expectations: Aligning Student and Institutional Views of the College Experience* (pp. 10-33). San Francisco: Jossey-Bass.

- James, O. (2011). Managing citizens' expectations of public service performance: Evidence from observation and experimentation in local government. *Public Administration*, 89(4), 1419-1435. doi: 10.1111/j.1467-9299.2011.01962.x
- Jin, L., & Cortazzi, M. (1997). Expectations and questions in intercultural classrooms. *Intercultural Communication Studies*, 7(2), 37-58.
- Katz, J. P., Swanson, D. L., & Nelson, L. K. (2001). Culture-based expectations of corporate citizenship: A propositional framework and comparison of four cultures. *The International Journal of Organizational Analysis*, 9(2), 149-171. <https://doi.org/10.1108/eb028931>
- Kim, R. I., & Goldstein, S. B. (2005). Intercultural Attitudes Predict Favorable Study Abroad Expectations of U.S. College Students. *Journal of Studies in International Education*, 9(3), 265-278. <https://doi.org/10.1177/1028315305277684>
- Leung, K. K., Silvius, J.L., Pimlott, N., Dalziel, W., & Drummond, N. (2009). Why health expectations and hopes are different: The development of a conceptual model. *Health Expectations*, 12(4), 347-360. <https://doi.org/10.1111/j.1369-7625.2009.00570.x>
- Nurmi, J. (1991). How do adolescents see their future? A review of the development of future orientation and planning. *Developmental Review*, 11(1), 1-59. [https://doi.org/10.1016/0273-2297\(91\)90002-6](https://doi.org/10.1016/0273-2297(91)90002-6)
- Peterson, E.R.; Rubie-Davies, C.; Osborne, D.; Sibley, C. (2016). Teachers' explicit expectations and implicit prejudiced attitudes to educational achievement: Relations with student achievement and the ethnic achievement gap. *Learning and Instructions*, 42, 123-140. <https://doi.org/10.1016/j.learninstruc.2016.01.010>
- Pike, G. R. (2006). Students' Personality Types, Intended Majors, and College Expectations: Further Evidence Concerning Psychological and Sociological Interpretations of Holland's Theory. *Research in Higher Education*, 47, 801-822.
- Rief, W., & Glombiewski, J. A. (2016). Expectation – Focused Psychological Interventions (EFPI). *Verhaltenstherapie*, 26, 1-7. <https://doi.org/10.1159/000442374>
- Rieger, C. L. (2018). How (not) to be rude: Facilitating the acquisition of L2 (im)politeness. *Intercultural Pragmatics*, 15(5), 651-691. <https://doi.org/10.1515/ip-2018-0023>.
- Ruggeri, M., & Dall'Agnola, R. (2009). The development and use of the Verona Expectations for Care Scale (VECS) and the Verona Service Satisfaction Scale (VSSS) for measuring expectations and satisfaction with community-based psychiatric services in patients, relatives and professionals. *Psychological Medicine*, 23(2), 511-523. <https://doi.org/10.1017/S0033291700028609>
- Scheer, A., Noweski, C., & Meinel, C. (2012). Transforming Constructivist Learning into Action: Design Thinking in Education. *Design and Technology Education*, 17(3), 8-19.

- Seginer, Rachel (2008). Future orientation in times of threat and challenge: How resilient adolescents construct their future. *International Journal of Behavioral Development*, 32(4), 272-282. <https://doi.org/10.1177/0165025408090970>
- Seo, S., & Koro-Ljungberg, M. (2005). A hermeneutical study of older Korean students' experiences in American higher education: From Confucianism to western educational values. *Journal of Studies in International Education*, 9(2), 164-187.
- Sheth, Jagdish N., & Mittal, Banwari (1996). A framework for managing customer expectations. *Journal of Market-Focused Management*, 1, 137-158. <https://doi.org/10.1007/BF00128687>
- Ting-Toomey, Stella, & Dorjee, Tenzin (2019). *Communication Across Cultures* (2nd edition). New York: The Guilford Press.
- Young, Warren, & Darity, William A. (2001). The Early History of Rational and Implicit Expectations. *History of Political Economy*, 33(4), 773-813.
- Zhang, J., Chen, W., Petrovsky, N., Walker, R.M. (2022). The Expectancy-Disconfirmation Model and Citizen Satisfaction with Public Services: A Meta-analysis and an Agenda for Best Practice. *Public Administration Review*, 82(1), 147-159. <https://doi.org/10.1111/puar.13368>
- Zhang, Zuochen, & Zhou, George (2010). Understanding Chinese International Students at a Canadian University: Perspectives, Expectations, Experiences. *Canadian and International Education*, 39(3), 43-58.

Contact email: michelle.cummings-koether@th-deg.de

Future Preschool Teachers' Perspectives on Integrating Music Into the Teaching Activities

Ligita Stramkale, University of Latvia, Latvia

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This paper focuses on the positive effects of music on the development of children's musical and general abilities and the readiness of future preschool teachers to use music in different daily activities. The aim of the study was to determine the students' opinions about the importance of music in preschool education and the musical skills needed to integrate it into teaching activities. The study involved 194 ($n = 194$) students. An online questionnaire on Google Drive was created and completed by eight groups of students from March 2022 to November 2022. The study addressed three research questions: RQ1: At what level do students assess the importance of integrating types of musical activities into preschool education? RQ2: What musical skills are required for a preschool teacher? RQ3: What level of musical skills do future music teachers have? Three research scales were defined in the study: the importance of music ($\alpha = .747$), musical skills ($\alpha = .840$), and students' competence ($\alpha = .832$). Cronbach's alpha, descriptive statistics, Kolmogorov-Smirnov and Mann-Whitney *U*-Test were calculated to analyze the data obtained. The study determined that students rate all types of musical activities except learning music theory at a high level but prefer using speech games and movement games. The students acknowledge that a preschool teacher needs the skill to improvise and engage children in different musical games. Singing and actively listening to music cause the most difficulties. The results obtained in the study can be used to improve the musical competence of students.

Keywords: Future Preschool Teachers, Types of Musical Activities, Musical Skills, Competence, Preschool Education

iafor

The International Academic Forum
www.iafor.org

Introduction

Preschool children are provided with music lessons twice a week, usually led by music teachers who have received an education in the music field. However, learning music twice a week is not enough for the child's development because implementing musical activities in the daily educational work at preschool develops not only the musical abilities of young children but also cognitive, language and diverse cross-cutting skills. Preschool children need frequent and regular musical activities where the process is more important than the outcome. Preschool teachers can provide that every day.

During the study process at the university, future preschool teachers acquire knowledge and skills to develop the competence needed for using different types of musical activities in working with children aged 1.5 to 6 years. Particular attention is paid to how future preschool teachers gain the skills required for integrating singing, speech and rhythm games, and actively listening to music in daily work. The quality of the singing is determined by the development level of the student's musical hearing, but the accuracy of speech and rhythm games depends on the stage of the sense of rhythm. On the other hand, active listening to music is related to the perception of music, which includes an emotional response to music and cognitive process activity, as well as the ability to express evaluative judgments about a piece of music.

Many studies have emphasized the positive impact of music-making on the development of preschool children's general and musical abilities. Researchers believe that musical activities in preschool are designed to develop movement coordination (Williams, 2018), actualize the learning of social values (Öztürk & Can, 2020), improve languages (Herrera et al., 2014), influence the child's speech development and promote pre-reading skills (Bačlija Sušić, 2019). Music helps children express their feelings and ideas while moving to the rhythm (Hodijah & Kurniawati, 2020). Furthermore, varied types of musical activities improve children's ability to sing and their attitude towards music (Barrett et al., 2020), which are powerful tools for emotional expression, self-regulation and social connection (Bautista et al., 2022).

The topicality of the study was determined by the positive impact of music-making on the development of preschool children musical and general abilities and, at the same time, the readiness of future preschool teachers to use music in educational activities. Based on the observations during teaching in the study course, it is noticed that students have different developmental levels of musical skills, which, in turn, can hinder them from implementing various types of musical activities in preschool education. Different levels of future preschool teachers' musical skills create inconsistent understanding and attitudes towards music. **The aim of the study** was to determine the students' opinions about the importance of music in preschool education and the musical skills needed to integrate it into teaching activities.

Literature Review

Integrating different types of musical activities into the daily work with children requires a positive attitude towards music from preschool teachers. A study conducted by Margaret Barrett and her colleagues revealed that whilst most teachers have no education in the field of music and no previous experience in playing musical instruments and singing, they still have a positive attitude towards music. In addition, the more experience a teacher has in educational work, the more positive their attitude towards music (Barrett et al., 2019). A

positive attitude is also essential because it determines what and how children will learn. It affects children's learning behavior and habits (Schulze, 2019). A preschool teacher's positive attitude towards music is one of the factors required for enhancing children's musical and general development.

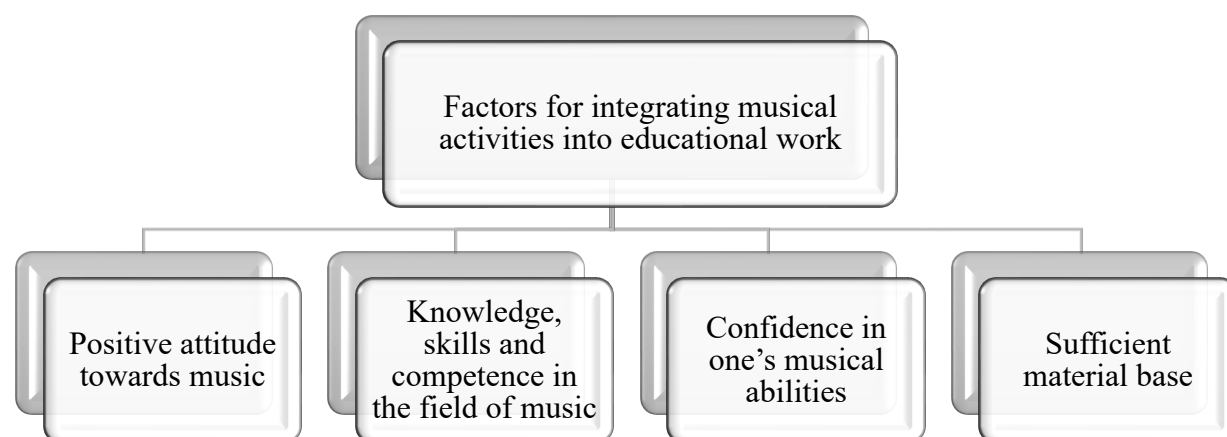
A positive attitude towards the use of musical activities in the work of a preschool teacher is essential, but it is not the only necessary factor for the implementation of music in the learning process. Preschool teachers must have the required knowledge and skills to do that, which enable them to be competent in this field of activity. Several studies have found that preschool teachers have insufficient knowledge and skills to use different musical activities in educational work. For example, Graham Welch has identified that preschool teachers have limited knowledge about organizing effective music education (Welch, 2021). On the other hand, Deborah Arasomwan and Nontakozo Mashiy, while studying the role of music in developing children's communication skills, concluded that teachers know how to use music but are insufficiently prepared to do so (Arasomwan & Mashiy, 2021). Daniela Carmen has also found that preschool teachers are not ready to implement such intensive musical practices (Carmen, 2020). The use of music in the preschool teacher's work is related to the knowledge of music (Hodijah & Kurniawati, 2020; Pestana, 2022). The level of music knowledge also determines the frequency of using musical activities (Balduc & Edrard, 2017). One of the most significant parts of a preschool teacher's work is singing (Swain & Bodkin-Allen, 2014) because preschool teachers use this type of musical activity daily when they sing along with the song on the recording with the children (Rajan, 2017). However, preschool teachers limit the use of musical activities if they believe that music is a subject that requires special skills (Ehrlin & Tivenius, 2018). It means that focusing on music as an art form that requires innate abilities may emerge the desire to avoid integrating musical activities into everyday teaching activities.

The implementation of musical activities can also be hindered by an insufficient material base (Stramkale, 2018), and therefore, preschool teachers need better access to musical instruments and functional technologies (Kirby et al., 2022). That can be compensated if preschool teachers with children make different sound tools from natural materials and various objects. Researchers believe that such activities promote responsibility and caring for the environment (Moi & Abdullah, 2011). In addition, it also gives preschool teachers the opportunity to create music centers in a group, which contain not only self-made sound tools but also other didactic materials related to music.

Another factor affecting preschool teachers' ability to integrate musical activities into their daily work is confidence in what they are doing. Teachers' confidence is associated with self-efficacy and can indicate whether the preschool teacher is convenient for their musical abilities. Self-efficacy as an essential factor for using different types of musical activities in working with children is also highlighted in several studies (Digby, 2020; Pestana, 2022; Ehrlin & Wallerstedt, 2014). Preschool teachers who play a musical instrument can be more self-efficient (Burak, 2019), which leads to a more effective musical lesson (Sökezoğlu Atilgan & Türkkaş Özer, 2021). However, in general, preschool teachers' level of self-efficacy in teaching music is low, which does not depend on either gender or the type of educational institution (Koca, 2013). Confidence in leading children's musical activities is influenced by previous education (Moore, 2017) and experience in the music field (Varga, 2020). In particular, the belief in the use of musical activities is influenced by the negative experiences gained in childhood related to music (Barry & Durham, 2017). Marjory Ebbeck and colleagues, who determined the confidence level of preschool teachers while performing

musical activities with young children, have concluded that the highest level of confidence was in singing and the lowest level was in composing and improvising (Ebbeck et al., 2008). On the other hand, the most popular activity used by preschool teachers is singing with finger play (Lee, 2009). The lack of self-efficacy in the preschool teacher's educational work affects the success of integrating different types of musical activities into preschool education.

The literature analysis shows that the integration of musical activities in the educational work of preschool teachers can be affected by four factors: positive attitude towards music; knowledge, skills and competence in the field of music; confidence in one's musical abilities and sufficient material base (see Figure 1).



Source: author

Figure 1: Factors for integrating musical activities into the preschool teachers' educational work.

Improving self-efficacy is the first step to helping future preschool teachers develop the skills and knowledge needed to teach music (Vannatta-Hall, 2010). All preschool teachers need help, regardless of their educational level. Preschool teachers believe that they need support in playing musical instruments (piano, guitar, etc.) (Stolič, 2015) and in getting ideas about the possibilities of using musical activities (Lee, 2009). Working preschool teachers who lack confidence in integrating different types of musical activities into their daily work should participate in professional development events. Researchers believe that participation in professional development events is necessary to promote positive perceptions of self-identity and self-efficacy (Digby, 2020), to discover new teaching tools and strategies that maintain effective music teaching in preschool (Augustine et al., 2016), to learn playing musical instruments (Ersoy & Der e, 2012). Preschool teachers who may not have the confidence to integrate music into the educational work with children could be supported by a mentor (Bainger, 2010; Barrett et al., 2019; Welch, 2021). By observing the main factors of integrating different types of musical activities into the educational work, engaging in professional development events and, if necessary, receiving support from a mentor, Preschool teachers may effectively use music for the development of the general and musical abilities of children.

Methodology

Participants. The study was conducted in the period from March 2022 to November 2022 and included 194 ($n = 194$) students from eight groups studying in the 1st level higher professional education study program. In this study program, students must acquire the

content of music teaching and the learning approaches in preschool. During the study, 95 ($n = 95$) respondents studied 100% remotely, while 99 ($n = 99$) from them studied 50% face-to-face and 50% remotely. There was no group of students who studied 100% face-to-face.

Data Collection Instruments. A questionnaire comprising three parts was created in the Google Drive environment for data collection. The first part of the questionnaire included nine types of musical activities that students can integrate into the daily work of preschool teachers. The respondents had to rate the importance of each musical activity type on a five-point Likert scale: very important (5), important (4), rather important (3), rather unimportant (2) and unimportant (1).

The second part of the questionnaire included ten musical skills required to work as a preschool teacher. The respondents should rate each of them on a five-point Likert scale: 5 points mean that the specific musical skill is very necessary, 4 points – necessary, 3 points – rather necessary, 2 points – rather not necessary, and 1 point – not necessary.

The third part of the questionnaire included seven musical skills, which students learn during the study process. Each respondent had to rate the difficulty degree of each musical skill on a five-point Likert scale: 5 points mean that the use of the specific musical skill never causes difficulties for the respondents, 4 points cause difficulties, 3 points sometimes cause difficulties, 2 points often cause difficulties and 1 point always cause difficulties.

The study addressed three research questions: RQ1: At what level do students assess the importance of integrating types of musical activities into preschool education? RQ2: What musical skills are required for a preschool teacher? RQ3: What level of musical skills do future music teachers have? Three study dimensions were defined to answer the research questions: (1) the importance of music ($\alpha = .747$), (2) musical skills ($\alpha = .840$), and (3) students' competence ($\alpha = .832$). The results of the first study dimension were reflected in five levels: integration of musical activities into the educational work is unimportant (1.00 - 1.79 points), rather unimportant (1.80 - 2.59 points), rather important (2.60 - 3.39 points), important (3.40 - 4.19 points) and very important (4.20 - 5.00 points). In the second study dimension, the results were reflected in three levels: the necessity of musical skills for preschool teachers considered at a low level if the score ranges between (1.00 - 2.33 points), at a medium level if it was between (2.34 - 3.67 points) or at a high level if the score was between (3.68 - 5.00 points). In the third dimension, the results were also reflected at three levels: the students' competence to deal with the difficulties caused by using musical activities is at a low level if the score was between (1.00 - 2.33 points), at a medium level if it was between (2.34 - 3.67 points) or at a high level if it was between (3.68 - 5.00 points).

Data Collection Procedure. The questionnaire was distributed in digital format by sending a link to each respondent to access it. Each respondent was informed about the purpose of the survey and the questions included in it. Before filling out the questionnaire, the respondents knew that participation in the survey was anonymous, the results obtained will be presented in a summarizing form only, and they could refuse to complete and send the questionnaire at any time.

There was no time limit for completing the questionnaire, but before the survey, the respondents were informed that it would take about 15 minutes to complete it. While completing the questionnaire, each respondent could ask questions if necessary, as both the researcher and the respondents were connecting on the MS Teams platform.

Data Analysis Method. Cronbach's alpha coefficient for each study dimension was determined to assess the internal consistency reliability. It was assumed that $\alpha > 0,9$ shows excellent internal consistency reliability, $\alpha > 0,8$ indicates a good one, and $\alpha > 0,7$ was acceptable. The study used several measures of descriptive statistics such as *M*, *SD*, *SE*, *Mdn*, *Skewness*, and *Kurtosis* to determine central tendency, variation, skewness and kurtosis indicators. The Kolmogorov-Smirnov test was calculated to examine if the empirical distribution function is consistent with the theoretical distribution function. The study used non-parametric methods because the data did not follow a normal distribution. Mann-Whitney *U*-test was used to assess differences between two independent measures. In addition, Spearman's correlation coefficient produced the relationship between two or more variables.

Results

Future preschool teachers believe that it is very important to integrate musical activities such as speech games ($M = 4.58$, $SD = .615$), rhythm games ($M = 4.48$, $SD = .540$), movement games ($M = 4.54$, $SD = .602$) and listening to music ($M = 4.36$, $SD = .709$). The respondents rated the learning of music theory at the lowest level, as they believe it is rather important ($M = 3.39$, $SD = .906$). The study determined that the respondents associate the importance of learning music theory with singing ($r = .187$, $p < 0.01$), singing games ($r = .249$, $p < 0.01$), playing percussive and musical instruments ($r = .407$, $p < 0.01$), movement games ($r = .208$, $p < 0.01$) and with improvisation ($r = .257$, $p < 0.01$).

Students believe that it is important to integrate into their educational work such activities as playing percussive and musical instruments ($M = 3.67$, $SD = .693$), improvisation ($M = 4.05$, $SD = .749$), singing ($M = 4.10$, $SD = .705$) and singing games ($M = 4.09$, $SD = .723$). None of the musical activities was considered unimportant or rather unimportant by future preschool teachers (see Table 1). The respondents think that the most important musical activities in preschool are speech games and movement games, but the least important is learning music theory. The study determined that future preschool teachers' understanding of the importance of integrating different types of musical activities into their daily work is statistically significantly related to their desire to implement them in their teaching work ($U = 16603.50$, $z = -2.040$, $p = .041$) and their competence to do so ($U = 7560.50$, $z = -10.362$, $p = .000$).

Musical activities	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>Mdn</i>	<i>Skewness</i>	<i>Kurtosis</i>
Speech games	4.58	.615	.044	5.00	-1.462	2.293
Rhythm games	4.48	.540	.038	5.00	-.356	-1.072
Singing	4.10	.705	.050	4.00	-.417	-.033
Singing games	4.09	.723	.051	4.00	-.482	.044
Playing a percussive and musical instrument	3.67	.693	.049	4.00	-.205	-.053
Movement games	4.54	.602	.043	5.00	-.970	-.058
Improvisation	4.05	.749	.053	4.00	-.466	-.074
Learning music theory	3.39	.906	.065	3.00	-.280	-.370
Listening to the music	4.36	.709	.050	4.00	-.926	.545

Source: author

Table 1: The importance of integrating musical activities into pedagogical activity.

Future preschool teachers need to learn several musical skills, so it is essential to determine which musical skills are required at a high, medium or low level from students' point of

view. The study revealed that preschool teachers need the following skills at a high level: Improvising ($M = 4.45$, $SD = .712$), analyzing the music you listening to ($M = 4.00$, $SD = .791$), chanting ($M = 4.35$, $SD = .789$), performing rhythm games ($M = 4.41$, $SD = .672$), using sound gestures ($M = 4.25$, $SD = .751$), making musical performance ($M = 3.80$, $SD = .816$) and engaging children in musical games ($M = 4.45$, $SD = .713$) (see Table 2).

None of the musical skills was rated at a low level. The students assessed only three musical skills at a medium level - singing skill ($M = 3.60$, $SD = .802$), instruments playing skill ($M = 3.05$, $SD = .880$), and composing skill ($M = 2.47$, $SD = 1.039$). The respondents considered composing to be the least necessary skill in the work of a preschool teacher. The study determined that the respondents' composing skill is related to their skill in producing musical performances ($r = .405$, $p < 0.01$).

Respondents think a preschool teacher often needs the skills to improvise and engage children in musical games. The study found that improvising skill is related to such skills as analyzing the music listening to ($r = .448$, $p < 0.01$), chanting ($r = .490$, $p < 0.01$), performing rhythm games ($r = .414$, $p < 0.01$), using sound gestures ($r = .341$, $p < 0.01$), creating musical performance ($r = .385$, $p < 0.01$) and engaging children in musical games ($r = .445$, $p < 0.01$). On the other hand, children's engagement in musical games is closely related to all the musical skills reflected in Table 2. In addition, the study determined that the respondents' opinions about the musical skills needed to be a preschool teacher are statistically significantly related to their competence to integrate different types of musical activities into the educational work ($U = 12002.50$, $z = -6.256$, $p = .000$).

Musical skills	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>Mdn</i>	<i>Skewness</i>	<i>Kurtosis</i>
Singing	3.60	.802	.057	4.00	-.068	-.142
Playing instruments	3.05	.880	.063	3.00	-.331	-.142
Improvising	4.45	.712	.051	5.00	-1.352	2.385
Analyzing the music listening to	4.00	.791	.056	4.00	-.642	.573
Composing	2.47	1.039	.074	2.00	.391	-.359
Chanting	4.35	.789	.056	5.00	-1.350	2.433
Performing rhythm games	4.41	.672	.048	5.00	-1.247	2.944
Using sound gestures	4.25	.751	.053	4.00	-1.277	3.049
Creating a musical performance	3.80	.816	.058	4.00	-.433	.119
Engaging children in musical games	4.45	.713	.058	5.00	-1.802	5.289

Source: author

Table 2: Musical skills required for a preschool teacher.

Musical skills can be developed during the study process. However, applying some musical skills for future preschool teachers might be more difficult than others. The respondents believe that most of the musical skills they possess are good enough, as they rated, at a high level, the skills to use speech games ($M = 4.09$, $SD = .811$), rhythm games ($M = 3.98$, $SD = .826$), singing games ($M = 3.79$, $SD = .981$), and playing rhythm instruments ($M = 3.82$, $SD = .916$).

The respondents believe that none of their musical skills is at a low level (see Table 3). They rated, at a medium level, such skills as singing ($M = 3.40$, $SD = 1.201$), integrating listening to music into daily work ($M = 3.60$, $SD = .846$), integrating music theory into musical activities ($M = 2.94$, $SD = .961$).

Musical skills	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>Mdn</i>	<i>Skewness</i>	<i>Kurtosis</i>
Singing	3.40	1.201	.086	3.00	-.268	-.792
Integrating listening to music	3.60	.846	.060	4.00	.070	-.662
Leading speech games	4.09	.811	.058	4.00	-.769	.900
Leading rhythm games	3.98	.826	.059	4.00	-.592	.214
Playing rhythm instruments	3.82	.916	.065	4.00	-.461	-.360
Leading singing games	3.79	.981	.070	4.00	-.507	-.284
Integrating music theory into musical activities	2.94	.961	.069	3.00	.079	-.053

Source: author

Table 3: Future preschool teachers' self-assessment of their musical skills.

The study found that the skill to sing is closely related to all the musical skills shown in Table 3, except leading speech games activities ($r = .171$, $p < 0.05$), which can be implemented without singing successfully, which, in turn, encourages future preschool teachers to implement it in their educational work even if they do not have sufficient development of musical hearing. According to the respondents' opinions using speech games is less difficult for them than integrating music theory into musical activities. The study revealed that future preschool teachers' perspectives on their musical skills are statistically significantly related to their desire to integrate musical activities into their daily teaching work ($U = 9907.50$, $z = -8.179$, $p = .000$).

Discussion

The study found that the skill to play musical instruments is not very necessary for a preschool teacher, which is also supported by Ersoy and Dere's study, which determined that 58.08% of preschool teachers do not use musical instruments during musical activities (Ersoy & Dere, 2012). If preschool teachers rated their musical skills at a medium level, they would believe that they do not play musical instruments well enough (Sökezoğlu Atılğan & Türkkaş Özer, 2021). However, preschool teachers are interested in playing musical instruments, which, at the same time, could be an essential indicator of motivation to acquire one of the musical instruments (Denac, 2008).

The finding that future preschool teachers have the most difficulty in singing is also supported by several previous studies, which found that preschool teachers who consider themselves tone deaf, despite the fact they took part in musical activities that require singing skills, their participation could be hindered because they realize that they are non-singers. (Swain & Bodkin-Allen, 2014). Singing for preschool teachers is difficult because of the need to sing in just intonation, with a steady rhythm and correct articulation of text, as children learn to imitate a teacher in preschool (Blaškovič, 2015). If preschool teachers are confident and competent in singing, they use singing more often and more successfully in the educational work, but if they are not convenient with their skills, they usually avoid this musical activity (Heyning, 2011). Confidence in one's singing skills is related to competence in teaching children to sing. Preschool teachers' confidence in singing skills decreases if they must sing solos in front of children and if an adult attends (Richards, 1999). Singing is a common and significant part of a preschool teacher's work.

Conclusion

The first research question intended to find out the perspectives of future preschool teachers on the importance of integrating musical activities into the educational work of a preschool teacher. The study showed that future preschool teachers rated all musical activities, except learning music theory, at a high level. The most important musical activities in preschool educational work are speech games and movement games. Learning music theory is considered the most irrelevant activity in preschool education. The study found that future preschool teachers' understanding of integrating musical activities into educational work is statistically significantly related to their desire to use musical activities and competence.

The second research question determines future preschool teachers' opinions about the musical skills required to work with preschool children. The study found that future preschool teachers have rated the need to improvise and engage children in musical games at a high level. The respondents believe that all musical skills required for a preschool teacher are essential and did not rate any of them at a low level. The future preschool teachers think that skills such as singing, playing musical instruments and composing are needed at a medium level. In addition, the study determined that the respondents' perspectives on the musical skills necessary for preschool teachers are statistically significantly related to their competence to integrate musical activities into daily educational work.

The third study question identified the level of future preschool teachers' musical skills. The future preschool teachers think that none of the musical skills they possess is at a low level. The majority of the respondents have a high level of musical skills. But the most difficult for the students is the integration of singing, listening to music and music theory into the educational work. The respondents rated these three musical skills at a medium level. The study revealed that future preschool teachers' views on the level of their musical skills are statistically significantly related to their desire to integrate musical activities into their daily teaching work.

References

- Arasomwan, D. A. & Mashiy, N. J. (2021). Early Childhood Care and Education Educators' Understanding of the Use of Music-based Pedagogies to Teach Communication Skills. *South African Journal of Childhood Education*, 11(1), a896. <https://doi.org/10.4102/sajce.v11i1.896>
- Augustine, C., Yi, H. W., Wong, C. (2016). Music Teaching Readiness among Non-Specialised Music Teachers in Government Preschools. *Malaysian Music Journal*, 5(2), 54-69.
- Bačlija Sušić, B. (2019). Preschool Education Students' Attitudes about the Possible Impact of Music on Children's Speech Development. *International Journal of Cognitive Research in Science, Engineering and Education (IJCRSEE)*, 7(1), 73-84.
- Bainger, L., (2010). A Music Collaboration with Early Childhood Teachers. *Australian Journal of Music Education*, 2, 17-27.
- Barrett, M. S., Flynn, L. M., Brown, J. E., & Welch, G. F. (2019). Beliefs and Values About Music in Early Childhood Education and Care: Perspectives From Practitioners. *Frontiers in Psychology*, 10, Article 724, 1-18. <https://doi.org/10.3389/fpsyg.2019.00724>
- Barrett, M. S., Zhukov, K., Brown, J. E., & Welch, G. F. (2020). Evaluating the Impact of a Generalist Teacher-led Music Program on Early Childhood School Children's Singing Skills and Attitudes to Music. *Psychology of Music*, 48(1), 120-136. <https://doi.org/10.1177/030573561879035>
- Barrett, M. S., Zhukov, K., & Welch, G. F. (2019). Strengthening Music Provision in Early Childhood Education: A Collaborative Self-development Approach to Music Mentoring for Generalist Teachers. *Music Education Research*, 21(5), 529-548. <https://doi.org/10.1080/14613808.2019.1647154>
- Barry, N. H., & Durham, S. (2017). Music in the Early Childhood Curriculum: Qualitative Analysis of Pre-Service Teachers' Reflective Writing. *International Journal of Education & the Art*, 18(16), 1-18.
- Bautista, A., Yeung, J., McLaren, M. L., & Ilari, B. (2022). Music in Early Childhood Teacher Education: Raising Awareness of a Worrisome Reality and Proposing Strategies to move Forward. *Arts Education Policy Review*, 1-11. <https://doi.org/10.1080/10632913.2022.2043969>
- Blaškovič, J. (2015). The Effect of Singing Education on Some Preschool Education Students' Music Achievements. *The Journal of Music Education*, 23, 17-37.
- Bolduc, J. & Edrard, M. (2017). Music Education from Birth to Five: An Examination of Early Childhood Educators' Music Teaching Practices. *Research & Issues in Music Education*, 13(1), 1-21.

- Burak, S. (2019). Self-efficacy of Pre-school and Primary School Pre-service Teachers in Musical Ability and Music Teaching. *International Journal of Music Education*, 37(2), 257-271. <https://doi.org/10.1177/0255761419833083>
- Carmen, D. (2020). Teachers' Perception of the Importance of Music in School Learning. *Journal Plus Education*, 27(2), 117-124.
- Denac, O. (2008). A Case Study of Preschool Children's Musical Interests at Home and at School. *Early Childhood Education Journal*, 35, 439-444.
- Digby, J. (2020). *Teacher Confidence to Facilitate Children's Musical Learning and Development in the Reception Year at school*. UCL Institute of Education.
- Ebbeck, M., Yim, H., & Lee, L. (2008). Music in Early Childhood Education: Teachers' Levels of Confidence and Happiness. *Australian Journal of Music Education*, 2(2), 22-30.
- Ehrlin, A., & Tivenius, O. (2018). Music in Preschool Class: A Quantitative Study of Factors that Determine the Extent of Music in Daily Work in Swedish Preschool Classes. *International Journal of Music Education*, 36(1), 17-33. <https://doi.org/10.1177/0255761417689920>
- Ehrlin, A., & Wallerstedt, C. (2014). Preschool Teachers' Skills in Teaching Music: Two Steps Forward One Step Back. *Early Child Development and Care*, 184(12), 1800-1811. <http://dx.doi.org/10.1080/03004430.2014.884086>
- Ersoy, Ö., & Dere, Z. (2012). Examining of Implementations of Early Childhood Teachers Working at Preschools in Ankara in Music Education. *Journal of Faculty of Educational Sciences*, 45(1), 249-268.
- Herrera, L., Hernández-Candelas, M., Lorenzo, O., & Ropp, C. (2014). Music Training Influence on Cognitive and Language Development in 3 to 4 year-old Children. *Revista de Psicodidáctica*, 19(2), 367-386.
- Heyning, L. (2011). "I Can't Sing!" The Concept of Teacher Confidence in Singing and the Use within their Classroom. *International Journal of Education & the Arts*, 12(13), 1-28.
- Hodijah, S., & Kurniawati, L. (2020). Teachers' Understanding on Music for Early Childhood. *Advances in Social Science, Education and Humanities Research*, 538, 159-162.
- Kirby, A. L., Dahbi, M., Surrain, S., Rowe, M. L., & Luk, G. (2022). Music Uses in Preschool Classrooms in the U.S.: A Multiple-Methods Study. *Early Childhood Education Journal*, 51, 515-529. <https://doi.org/10.1007/s10643-022-01309-2>
- Koca, Ş. (2013). An Investigation of Music Teaching Self-efficacy Levels of Prospective Preschool Teachers. *Educational Research and Reviews*, 8(12), 897-900.

- Lee, Y. (2009). Music Practices and Teachers' Needs for Teaching Music in Public Preschools of South Korea. *International Journal of Music Education*, 27(4), 356-371.
- Moi, S. N., & Abdullah, S. (2011). Learning to Play Natural Percussion Instruments: An Environmental Expression for Preschool Trainee Teachers. *Educational Research*, 1(9), 1481-1487.
- Moore, C. W. (2017). *Making Music in Early Childhood Classrooms: Design and Implementation of an Individualized Teacher Development Program*. The University of Texas at Austin.
- Öztürk, E. & Can, A. A. (2020). The Effect of Music Education on the Social Values of Preschool Children. *Cypriot Journal of Educational Sciences*, 15(5), 1053-1064. <https://doi.org/10.18844/cjes.v15i5.5150>
- Pestana, G. (2022). Preparing Preservice Early Childhood Educators to use Music in Australian Settings: An Audit of Programmes. *Australasian Journal of Early Childhood*, 47(1), 74-86.
- Rajan, R. S. (2017). Preschool Teachers' Use of Music in the Classroom: A Survey of Park District Preschool Programs. *Journal of Music Teacher Education*, 27(1), 89-102. <https://doi.org/10.1177/105708371771668>
- Richards, C. (1999). Early Childhood Preservice Teachers' Confidence in Singing. *Journal of Music Teacher Education*, 9(1), 6-17. <https://doi.org/10.1177/105708379900900103>
- Schulze, M. (2019). The Teachers' Attitude and Its Impact on (Musical) Learning. *Advances in Social Science, Education and Humanities Research*, 255, 287-290.
- Sökezoğlu Atılgan, D. & Türkkaş Özer, M. (2021). The Importance of Preparing Creative Music Activities for Pre-School Period. *International Online Journal of Education and Teaching*, 8(4), 2803-2824.
- Stolič, J. (2015). The Development of Preschool Children's Musical Abilities through Specific Types of Musical Activities. *Research in Pedagogy*, 5(2), 31-44.
- Stramkale, L. (2018). Students' Perspectives on the Implementation of Musical Activities in Preschool Education. *Journal of Education Culture and Society*, 9(2), 109-116. <https://doi.org/10.15503/jecs20182.109.116>
- Swain, N. R., & Bodkin-Allen, S. (2014). Can't sing? Won't Sing? Aotearoa/New Zealand 'Tone-Deaf' Early Childhood Teachers' Musical Beliefs. *British Journal of Music Education*, 31(3), 245-263. <https://doi.org/10.1017/S0265051714000278>
- Vannatta-Hall, J. E. (2010). *Music Education in Early Childhood Teacher Education: The Impact of a Music Methods Course on Pre-Service Teachers' Perceived Confidence and Competence to Teach Music*. University of Illinois at Urbana-Champaign.

Varga, V. (2022). *How do Early Childhood Educators' Preprofessional Music Experiences Shape their Practices with Young Children: An Interpretive Phenomenology Study*. University of Victoria.

Welch, G. F. (2021). The Challenge of Ensuring Effective Early Years Music Education by Non-specialists. *Early Child Development and Care*, 191(12). 1972-1984.

Williams, K. E. (2018). Moving to the Beat: Using Music, Rhythm, and Movement to Enhance Self-Regulation in Early Childhood Classrooms. *International Journal of Early Childhood*, 50, 85-100. <https://doi.org/10.1007/s13158-018-0215-y>

Contact email: ligita.stramkale@lu.lv

Understanding and Teaching Slam Poetry: An Empirical Research of University Students

Réka Sólyom, Károli Gáspár University of the Reformed Church in Hungary, Hungary
Andrea Pap, Eötvös Loránd University, Hungary

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This paper focuses on the definition of slam poetry and its possible uses in the classroom. Based on two Hungarian slam poetry performances, qualitative empirical research has been conducted on Hungarian university students. During a slam poetry performance, the slammer creates a rhetorical situation, in which a new genre organises the experiences of the audience (cf. Sólyom, 2022, Sólyom & Pap, 2021). Slam poetry can, therefore, be regarded as a proactive genre (Simon, 2016, p. 96), and a hybrid medium (Mészáros, 2020, p. 77). The present study's two key questions are 1) how does slam poetry differ from canonical literary genres? And 2) how can it be employed in the classroom? The first survey was conducted in Autumn 2022, and the second in Spring 2023. The respondents of the surveys belong to two groups of students: 1) those majoring in Hungarian; 2) those with different language majors, and Hungarian as a foreign language minor. After having watched the performances, the respondents worked in small groups, and based on concise instructions, with the help of clustering techniques, they collected the most prevalent features of slam poetry concerning the questions of genre, and the possible use of slam poetry texts in the educational process. Based on the two surveys, a comparative analysis is possible: similarities and differences can be highlighted between the answers of the two groups regarding their attitudes and understanding processes towards slam poetry.

Keywords: Clustering, Genre, Slam Poetry, Survey, Tertiary Education

iafor

The International Academic Forum
www.iafor.org

Introduction

Employing a functional cognitive framework, this paper focuses on the definition of slam poetry and its possible uses in the classroom. Its aim is to answer questions about the definition, understanding and slam poetry's appearance in the classroom. Two major questions are considered, namely how slam poetry differs from canonical literary genres, and how slam poetry can be employed in the educational process. To answer these questions, this study presents the results of two surveys conducted on different groups of university students, based on brainstorming and reflecting on two slam poetry performances.

Definitions of Slam Poetry

In February 2023, readers of the Facebook Page of Slam Poetry Hungary (Slam Poetry Magyarország) witnessed an interesting experiment: ChatGPT was asked to write an article for a blog about slam poetry. It is worth examining ChatGPT's knowledge of this genre, especially regarding texts which seek to define slam poetry (data retrieved on 3rd February, 2023). ChatGPT emphasises that slam poetry "(...) is typically performed in a competition format, where poets perform their original works in front of a live audience and a panel of judges." As key elements, audience interaction and engagement are highlighted, as well as the focus on social and political issues. ChatGPT's definition is that "(...) slam poetry is a dynamic form of performance poetry that combines elements of spoken word, theatre, and audience participation."

As a genre, slam poetry has many definitions. Norbert Vass defines it as a "post-modern performance poetry" (Vass 2012: 2) and emphasises that it is a kind of "oral poetry" (Vass, 2012, p. 38), whereas Mészáros considers it to be a "hybrid medium" (Mészáros, 2020, p. 77). Simon emphasises that it is a "proactive genre" (Simon, 2016, p. 96), while Cello adds that it involves "performative co-participation" (Cello, 2022, p. 342). In short, it is a hybrid genre, which is created through language, but also builds upon the relationship between the slammer and their audience that is forged during its performance (Cello, 2022, p. 345).

It is essential to remember that the slammer and their audience take place in a classical rhetorical situation, during which a novel genre (viz. slam poetry) is being created. This genre contains many features of "classical," "canonical" genres known by the audience, which is why the process of the performance can evoke the audience's previous experiences (cf. Ayosso & Marichez, 2010, Sólyom & Pap, 2021, Sólyom, 2022).

There are, however, dilemmas linked to the definitions of a genre characterised by its "hybridity" (Mészáros, 2020, p. 87). From a cognitive linguistic viewpoint, the fuzziness of boundaries during categorising (cf. Langacker 1987, p. 17, Tolcsvai Nagy 2013, p. 125) the genre of slam poetry (viz. the different viewpoints in its definitions) can also be witnessed, but "(...) other phenomena can play a role in the overlaps and heterogeneity within genre categorisation (...)" (Sólyom, 2022, p. 100). We can assume that the "canonical" theory of genres, which is taught in schools, conventionalises and rigidly interprets the essentially ephemeral phenomenon of slam poetry. Consequently, its definitions are based on and related to the "canonical" genres and forms (e.g., poem, free verse, drama, etc.).

In this paper, we emphasise the importance of the dynamic and "mixed" features of slam poetry, which can be studied and characterised by language users' experiences, attitudes, and opinions about it. In other words, we seek generic definition from the bottom up rather than

the top down. To do so, two surveys of university students were conducted, and based on the data given by the respondents, language users' attitude and knowledge about slam poetry will be shown.

Main Research Questions, Hypotheses, and Informants

The two main research questions of the survey were the following: 1) how does slam poetry differ from canonical literary genres? and 2) how can it be employed in the educational process?

There were two hypotheses: firstly, we assumed that it was difficult or even impossible to introduce slam poetry into the definitions of the canonical genres. Secondly, we supposed that some differences could be observed between the two groups of respondents (university students with different majors) in terms of what conceptual schema were used to define slam poetry.

The first survey took place in Autumn 2022, and the second survey in Spring 2023. The respondents consisted of two groups of university students. In the first group (2022), there were 20 students majoring in Hungarian, all of whom attended Károli Gáspár University of the Reformed Church in Hungary, whereas in the second group (2023), which consisted of students attending Eötvös Loránd University, there were also 20 students, with different majors, and Hungarian as a foreign language minor.

Based on these two surveys, conducted in a different period with two different target groups, a comparative analysis is possible, in which similarities and differences can be highlighted between the answers of the two groups regarding their attitudes towards and understanding of slam poetry.

Methodology

During the survey, the respondents had to fulfil two types of tasks, the first of which took place before having watched two Hungarian slam poetry performances, and the second of which took place after having watched the performances. The first task was brainstorming on their own: in about ten minutes, informants were asked to write down their associations, experiences or memories about slam poetry. We told the students that they could write about anything that came to mind (e.g., about the genre, the performers or their attitude toward slam poetry).

The second task entailed group work: after having watched two slam poetry performances twice, the students had to work in small groups of three or four to prepare mind maps about slam poetry, with the help of clustering techniques. They were told that 1) they should work together; and 2) they could put anything into the mind-maps that they considered important.

Working with mind maps can be a useful tool in collecting and studying the associations of language users on a specific topic, not only in research, but also during the teaching process. The advantages of using mind maps are summarised by Óhidy as follows: "On the one hand, it helps collect the creative ideas and associations, which can be linked to the topic (...); on the other, it helps systematise knowledge through the representation of different logical relationships and connections. The graphical representation of concepts, ideas linked to the topic correspond to the arranging activity of the human brain" (Óhidy, 2005, my translation).

In tertiary education, the benefits of using mind maps are undeniable. Firstly, when used in group work, preparing mind-maps strengthens group cohesion. Secondly, it helps collect various ideas and associations, and arranges them in a functional, organic whole. Thirdly, it depicts the students' cognitive processes. Finally, it motivates students to talk about their ideas and associations fluently and effectively, so it can be good practice for students (and especially for future teachers, who took part in the two surveys).

Differences Between the Results in the Two Surveys: Brainstorming

As previously mentioned, in this task, respondents in both groups were asked to brainstorm on their own, and without watching the two slam poetry performances or talking about the genre, they had to put down their conceptual associations regarding the topic.

In this task, we asked students to freely associate their ideas about genre itself and to try to define it (if possible), and then list all the features and characteristics connected to slam poetry (e.g., contests, slammers, their personal opinions). Students who did not know anything about slam poetry were asked simply to write down: "I do not know anything about slam poetry." There were four respondents altogether, all of whom were in the second group and none of whom were majoring in Hungarian, that informed us they did not know anything about slam poetry, but they tried to get the gist of the genre from the meaning of the words in the term (e.g., by starting their ideas either from the word *slam* or *poetry*).

Those who wrote comments in this task reflected on five aspects of slam poetry: 1) on the genre itself (they tried to define it according to "canonical" genres or forms like poem or free verse); on the slammer or their audience (with special regard to their relationship); 3) on the performance (the circumstances and tools used during the performances); 4) on the content (prototypical topics and stylistic features were mentioned); 5) they expressed their personal attitudes towards the genre.

In this section, their comments concerning these points of view will be listed, illustrated with examples. Their replies will be listed in two groups, according to the major of the students.

As for the comments on the genre, students majoring in Hungarian wrote e.g., "it can either be a poem or a prose"; "free form"; "rhythm"; "something between a poem and rap." Students with Hungarian as a foreign language minor wrote e.g., "there are not many tropes"; "poem-like"; "free verse"; "it is a new genre." The free form of slam poetry texts was mentioned in both groups.

Concerning the comments on the slammer and/or on the audience, students majoring in Hungarian wrote e.g., "young people"; "peers," "trendy"; "feelings & thoughts"; "contests, and concrete names of slammers were mentioned. Students with Hungarian as a foreign language minor wrote e.g., "young people"; "the slammer 'gets down to business'"; and names of slammers were mentioned. Both groups mentioned that either the slammers or the audience consisted of young people, and in both groups, there were students who could mention the names of particular Hungarian slammers.

Additionally, there were comments on the performance of the slammer in both groups of respondents. Students majoring in Hungarian mentioned "improvisation," "oral performance," and the names of the Hungarian cities where slam poetry contests were held. Students with Hungarian as a foreign language minor wrote e.g., "oral performance,"

“performance with music,” “performance in front of an audience.” As we can see, the orality of slam poetry was mentioned in both groups, and while students who were not majoring in Hungarian focused on the circumstances of the performances, students with Hungarian major wrote some concrete data (e.g., names of cities).

As for the comments on the content, those majoring in Hungarian mentioned the fact that it tends to be “outspoken” [style], “frank,” “critical,” “freedom,” “current [topics].” Students with Hungarian as a foreign language minor mentioned its “creativity”, the fact that “there was a pun in the text,” along with its “freedom,” “outspoken [style],” “cursing,” and “vulgarity.” Both groups mentioned the outspoken style, but while the students majoring in Hungarian focused on more positive features of the genre (e.g., its “frankness,” “freedom,” “current”), students without a Hungarian major emphasised more negative characteristics (e.g., its “cursing,” and “vulgarity”).

In the case of opinions concerning the respondents’ personal attitude towards the genre, the most prominent difference was that in the case of students with a major in Hungarian there was only one answer that said they did not like the genre and would not like it in the future. Yet in the case of students with no Hungarian major, a dislike or lack of interest in slam poetry was expressed five times. Respondents majoring in Hungarian observed: “I do not like it, and I will not like it”; “I like it”; “once I attended to a contest”; “it will suppress the traditional genres.” Answers among students with Hungarian as a foreign language minor, e.g. “I personally do not like it, it is too ‘edgy’ for me”; “I have only seen slam poetry in American films”; “I do not know it, it must be a kind of poem”; “I do not know it, it must be some kind of poetry, but I am interested in it”; “I have not seen a performance, but I am interested in the genre”; “I have not heard about it”; “I am not interested in it” (four times); “I have not seen any performances”; “I have not heard about it, and I do not want to get to know it.”

In conclusion, there were more critical remarks concerning the content of performances among students not majoring in Hungarian. In the case of the personal attitude of this group, there were also more negative attitudes towards the genre itself (e.g., they are not interested in it).

Mind Maps: 1) Students With Hungarian Major (Figure 1, 2); 2) Students With Hungarian as a Foreign Language Minor (Figure 3, 4)

In this section, we show four of the thirteen mind maps the students produced. We chose to show these four mind maps because these proved to be the most prototypical representation in characterizing the different ways of organizing thoughts in the process understanding and interpreting the two slam poetry performances.

The first and the second mind maps below (Figure 1, 2) were prepared by students majoring in Hungarian, while the third and the fourth mind maps (Figure 3 and 4) were prepared by students with Hungarian as a foreign language minor. The second and third mind maps (Figure 2 and 3) primarily focus on describing the genre of slam poetry. In the first mind map (Figure 1), the two texts and slammers were the basis of describing the various aspects and characteristics, whereas in the final mind map (Figure 4), we can observe that the term slam poetry does not appear. As we can see, differences can be observed in the four prototypical mind maps, which we analyse in more detail.

Figure 1 represents the prototype of the 13 analyzed mind maps which is based on the description of the two texts and slammers. The two texts and the slammers were compared. The term 'slam' appears in the middle of the figure, and the two slammers (1. Zsófi – her first name, 2. Saiid – his stage name) are connected to it on the right and the left side (framed in black). Below each slammer, we can read the characteristics of their poetry, considering various analytical aspects: 1. Zsófi: "cynicism, sarcasm, self-presentation, self-criticism, mention of specific people, writer's vein"; 2. Saiid: "social topic, call to action, more rhythmic - rapper past, political approach, references to pop-culture." In the middle of the mind map, linked to the term 'slam', there are comments on various aspects that characterize both performances (e.g.: "puns, change of speaking pace, enumeration, repetition, contrast, metaphor, simile, rhymes, alliteration, outspoken, no formal requirements, works only verbally"). On this mind map five citations were also written from the two texts.

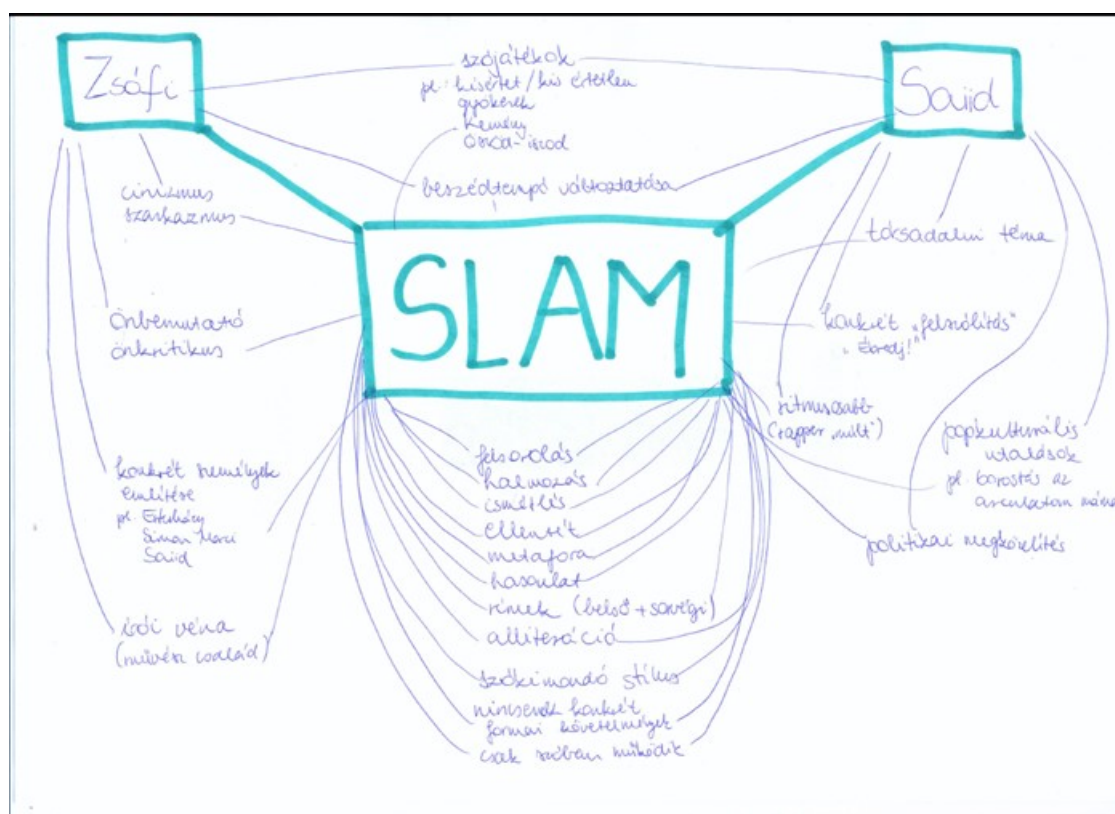


Figure 1: Mind map of students majoring in Hungarian.

In the case of the second mind map, which was also prepared by students majoring in Hungarian (Figure 2), a different method was employed to interpret slam poetry, namely it was made based only on the generic description of the genre. The term slam is located at the centre of the mind map, and the three genres (lyric, epic, drama) are named in connection to it, as well as the comments referring to slam poetry (framed in red), without emphasizing each analytical aspect or category: "pun, emphasis, condensed plot, dialogue-like, references, intertext, politics, emotions, rhyme, refrain, *figura etymologica*, enumeration, characters, linear." On this mind map six citations were also written.

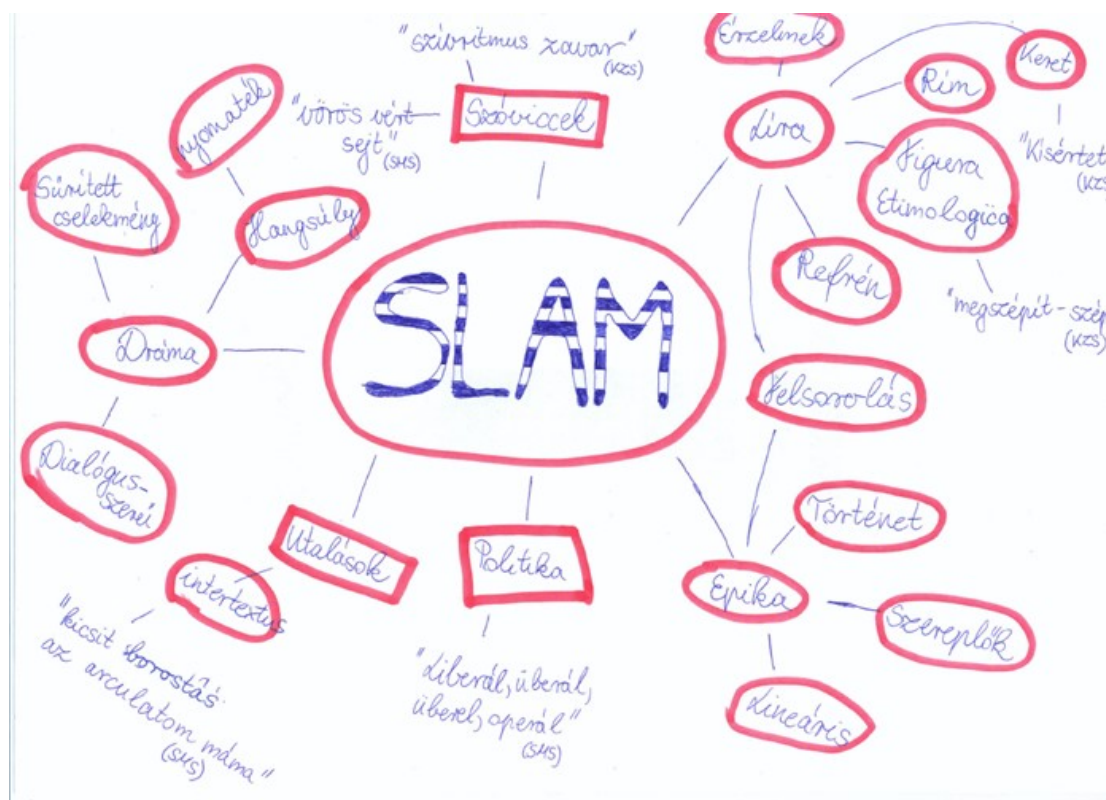


Figure 2: Mind map of students majoring in Hungarian.

The central aspect of the third mind map, which was prepared by students with Hungarian as a foreign language minor, is the term 'slam poetry.' Below this, characteristics related to the genre, topic and style are highlighted: "poem, rap (stand-up comedy); social criticism, modern, vulgar, outspoken, puns, rhymes." On this mind map five citations were also written (e.g.: "I'm only bothered by the heart rate.").

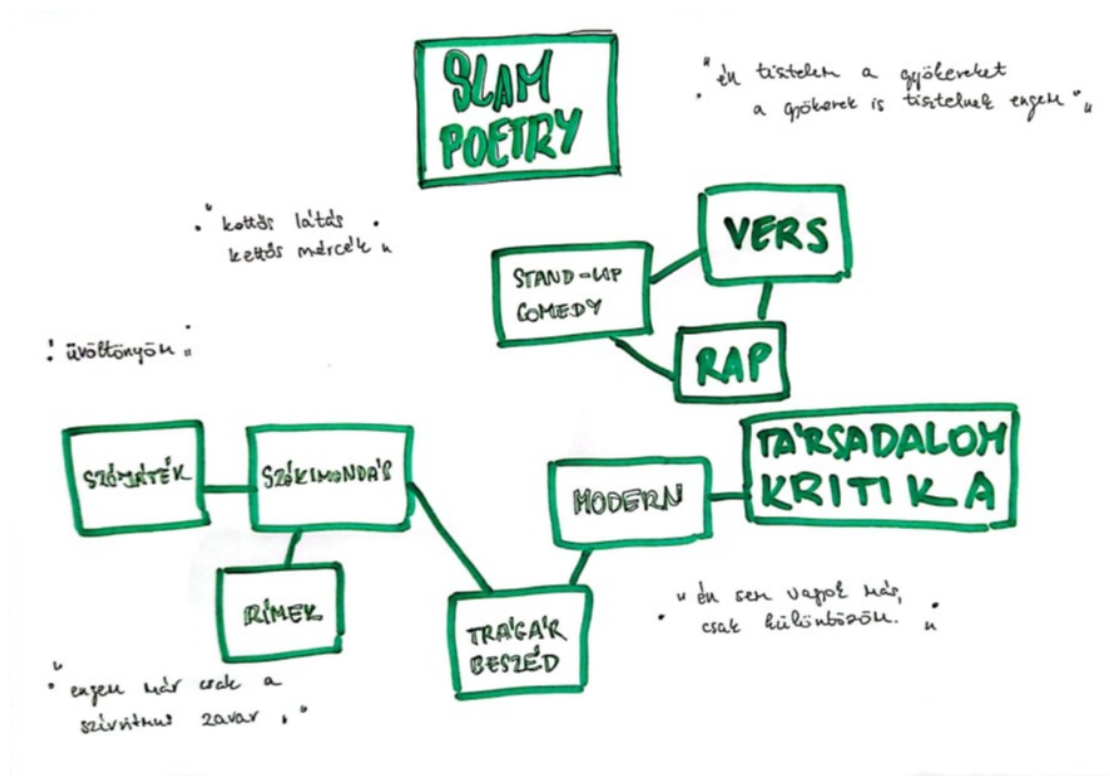


Figure 3: Mind map of students with Hungarian as a foreign language minor.

The fourth mind map, which was also prepared by students with Hungarian as a foreign language minor, Figure 4, could be considered the most significant one in that the term ‘slam poetry’ does not appear at all. The central, starting idea can be read at the top of the mind map (framed in green): criticism. In connection with this, four other important aspects are highlighted (in relation to slam texts), to which additional characteristics are connected: 1. “world, society, politics”; 2. “feelings” (e.g.: “temper, anger, cynicism, irony, disillusionment, alienation”); 3. “literary devices” (e.g.: “simile, alliteration, rhymes, frame structure”); 4. presentation style (e.g.: pause, volume, emphasis, mime).”

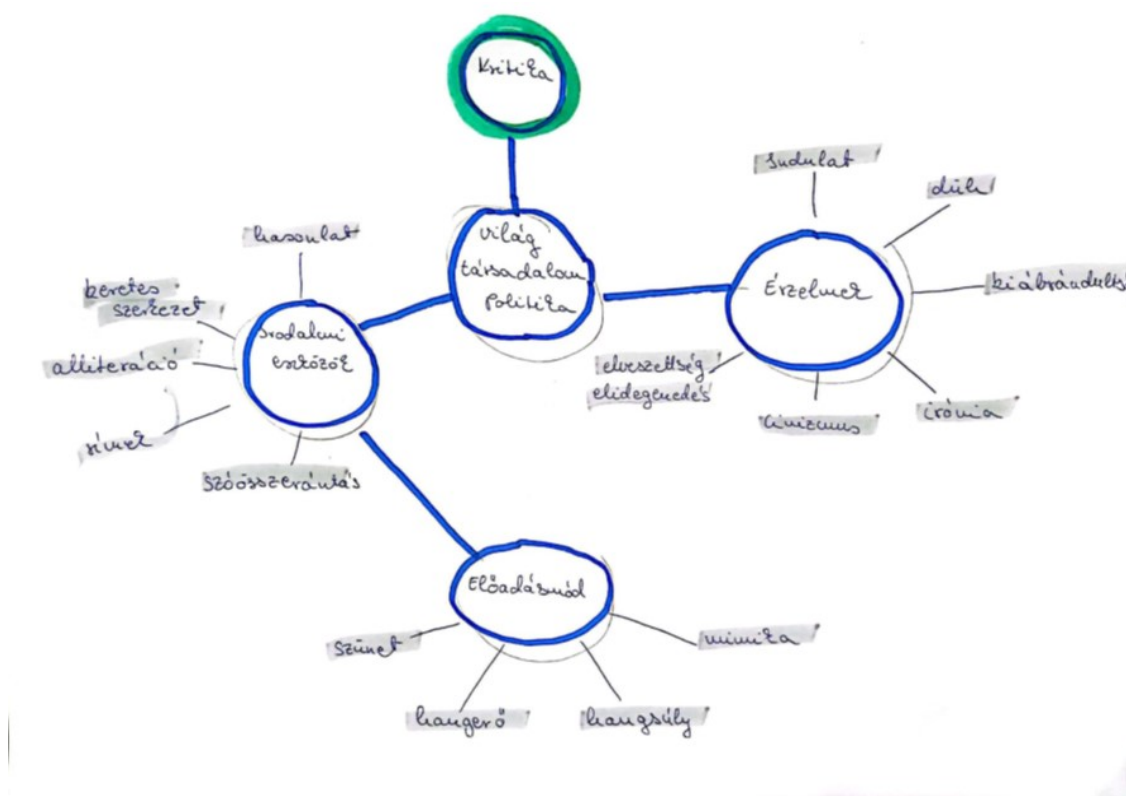


Figure 4: Mind map of students with Hungarian as a foreign language minor.

Mind Maps: A General Overview

This subsection provides a general overview of the mind maps, and the significant findings of this part of the research will be presented. In the analyses, we have worked with a total of thirteen mind maps (7 mind maps prepared by students majoring in Hungarian, and 6 prepared by students with Hungarian as a foreign language minor).

In the case of (1) students majoring in Hungarian, the performances were analysed in two ways (on the mind maps): 1) The two texts and slammers were the basis for organizing thoughts, ideas, and formal aspects of the poetry. Students compared the two texts and described similarities and differences like comments on the genre; on the content/topic; on the stylistic features/language, or on the performance. 2) In the other case, the mind maps were made based on the genre description: like general information, comments on the genre, the content/topic, the stylistic features, and on the relationship between the slammer and the audience.

In the case of (2) students with Hungarian as a foreign language minor, different ways of analyses are identifiable. Differences can be observed in the association process: the mind maps were made based only on the genre description, and the two slam poetry performances and slammers were not characterized separately. In one mind map, the term slam poetry does not appear.

In a part of the mind maps, there are also some quotes cited from the texts (in the case of group 1: in 5 maps; in group 2: in 3 maps); and in some mind maps, the students' analysis was more prominent (in the group 1: in 2 maps; in the group 2: in 4 maps). In conclusion, there are certain differences between the association processes of the two groups. Another

relevant observation was that the students majoring in Hungarian cited the poems a good deal more.

Analysis of Mind Maps: Differences

While analysing the mind maps, particular attention was paid to what the students were studying. The main difference that can be seen between the mind maps is that some groups of students majoring in Hungarian divided the mind maps into two groups, based on the performer's (slammer's) name. In the case of students with Hungarian as a foreign language minor, their mind maps are not divided into two parts based on the performers' names. They focused either on the content or the audience.

Another difference is that the mind maps of students majoring in Hungarian contain more precise descriptions and terms, which usually refer to the genre. We can suppose that this characterisation is based on the former and present studies of the students, and the terms they use can be found in literary terms, e.g., "alliteration," "free verse," "intertext," "metaphor," "pun," "rhythm," and "simile."

As previously mentioned, the mind maps of students with Hungarian as a foreign language minor do not focus on the two slammers, but they collect features of the performance instead. Although some concrete terms (e.g., "poem," "rhymes," "pun") occur in their mind maps, there are not as many stylistic terms among them as in the mind maps of students majoring in Hungarian. This group focused on the content and the audience of the performances instead; they highlighted the most prevalent, but everyday features of the two performances. Words that characterise the topic of the performances are e.g., "depression," "disillusion," "taboo dissolution," and "historical," while words that refer either to the slammer or the audience are include "millennials," "self-criticism," "stand-up comedy," and "young people." As we can see, the most important difference between the mind maps of the two groups is their focus, which is used during the description of the genre, and the details, which characterise the descriptions. The mind maps of the group majoring in Hungarian contained more precise, academic terms than the mind maps of the group with no Hungarian major. This might be due to their studies in tertiary education, both in linguistic and literary fields.

Analysis of Mind Maps: Similarities

Besides the differences, some similarities are apparent. These similarities can be divided into four fields, based on the topics to which they refer. The first group contains comments on the literary forms in the case of both groups, e.g. "drama," and "lyric." The second group focuses on the genre, e.g., "rap," and "verse." The third type of comments refers to the content, e.g., "politics," and "society criticism." And there are comments also on the form of the texts, e.g., "alliteration," "curses," "outspoken," "rhymes," "simile," and "slang." Ultimately, both groups of students recorded some general comments on their mind maps, but these features characterise the genre of slam poetry in general, and they mostly contain elements, which are taught during primary and secondary school years.

Proving the Hypotheses

In Hypothesis 1, we assumed that it was difficult or even impossible to introduce slam poetry into canonical definitions, and based on this we assumed that the comments would show the students' previous "school" experiences, based on previously acquired knowledge and

expectations. The analysis showed that prior knowledge has an impact on the interpretation of slam poetry, but such a form is difficult to define according to canonical genres. Based on these results, we can conclude that slam poetry is a “non-canonical” genre.

In Hypothesis 2, we assumed that the two groups of university students use different categorization schema to define slam poetry. In the case of students majoring in Hungarian, two principles of categorization were used: 1) one principle focused on the two slammers; 2) the other principle was based on the general description of the genre. Students with Hungarian as a foreign language minor did not focus on the two slammers, but only on generic description.

Conclusions

This paper has been focused on the understanding and teaching processes of a “non-canonical” genre, namely slam poetry. Based on two recent surveys (conducted in Autumn 2022 and Spring 2023), the differences, and the similarities in the answers of the two groups of university students have been compared.

It has been revealed that students majoring in Hungarian (who are future teachers of Hungarian) focused more on the description of the genre as a part of literary knowledge, adding more precise features to their descriptions of the genre in general, along with reflections on the content and the form of the slam poetry performances. However, students with no Hungarian major focused only on the content and the style of the performances, and they did not add as many precise, technical elements to their mind maps.

The results of this survey can be used in other fields. Firstly, they can be incorporated into planning the teaching process of present-day literary genres at different levels (primary, secondary and tertiary). Secondly, with the help of data gained during empirical research, more emphasis can be put on the former knowledge of students, which might be useful in avoiding repetitions of former knowledge during the description of the genre, and in teaching new aspects of slam poetry.

Acknowledgements

Work on this paper was supported by the research grant K-137659 “Corpus-based cognitive poetic research on person marking constructions” and by Eötvös Loránd University.

References

- Ayosso, J., & Marichez, H. (2010). Écrire, déclamer, inventer : l'expérience d'un groupe Thérapeutique de slam pour adolescents. *Enfances & Psy*, 48, 85–94.
- Cello, S. (2022). Slammeurs et public : une coparticipation performative. *Altre Modernità: Rivista di studi letterari e culturali*, 28, 342–350.
- Langacker, R. (1987). *Foundations of cognitive grammar. Vol. I. Theoretical Prerequisites*. Stanford, California: Stanford University Press.
- Mészáros, M. (2020). A slam poetry mint műfaj és/vagy medium. [Slam poetry as a genre and/or a medium.] *Partitúra*, 2, 77–88.
- Óhidy, A. (2005). Az eredményes tanítási óra jellemzői. Kooperatív tanulási formák a gyakorlatban. [Features of the effective lesson. Cooperative learning forms in practice.] *Új Pedagógiai Szemle*, 12, digital publishing, <https://folyoiratok.oh.gov.hu/uj-pedagogiai-szemle/az-eredmenyes-tanitasi-ora-jellemzoi> (retrieved: 2023.04.10.).
- Simon, G. (2016). On Patterns of Intersubjective Cognition in Didactic Poetry. *Logos & Littera: Journal of Interdisciplinary Approaches to Text*, 2, 90–112.
- Sólyom, R. (2022). A slammer bölcsészszemmel: kérdőíves felmérés egyetemisták körében két slam poetry szövegről. [The slammer through the eye of an arts student: a questionnaire among university students about two slam poetry texts.] *Tempevölgy: kultúra, művészet, tudomány*, 3, 92–104.
- Sólyom R., & Pap A. (2021). Magyar költők megidézése. Két slam poetry szöveg empirikus vizsgálatának tanulságai. [Evoking Hungarian poets. Lessons from the analysis of two slam poetry texts.] In K. Laczkó, & Sz. Tátrai (Eds.), *Líra, poétika, diskurzus* (pp. 273–292). Budapest: ELTE Eötvös József Collegium.
- Tolcsvai Nagy, G. (2013). *Bevezetés a kognitív nyelvészetbe*. [An Introduction to Cognitive Linguistics.] Budapest: Osiris Kiadó.
- Vass, N. (2012). Kis hazai slamtörténet, avagy a text-tusák kontextusa. [Short history of domestic slam, or the context of the battles of texts.] *Szépirodalmi Figyelő*, 6, 36–51.

Contact emails: solyom.reka@kre.hu
pap.andrea@btk.elte.hu

Othello: A Legal Alien in Multicultural Renaissance Venice

Oumeima Mouelhi, El Manar University, Tunisia

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Venice was like no other city in the world during the Renaissance. It was the beating heart of the Eastern Mediterranean. With its extensive political, cultural, and economic prowess, Venice served as a site of encounter between the East and the West. A seemingly quite integrated and racially diverse society, Venice was an opulent city and a multicultural metropolis where Muslims, Christians, and Jews would find a niche in its wide-opened doors. As a cosmopolitan city in constant movement, Venice attracted immigrants from all walks of life. It embraced the pluralities of ethnicities, creeds, and commercial trades. Thanks to its multicultural and ethnic character, the city served as a site of encounter in the Mediterranean basin of the 16th century fostering a blurring of boundaries of all types. Yet, running parallel to this opulence and openness, there was a dim side about this multi-cultural city. The glamorous cross-cultural Venetian society was tainted with “ethnocentrism” where “the other,” as embodied in Shakespeare’s Othello, was misperceived, discarded, and racially unwelcomed. This paper aims to communicate the dual nature of a dazzling Venetian city caught between the binaries of integration and seclusion, openness and aversion to aliens. This paper will focus, more accurately, on the character of Othello and his suffering in a multicultural society which denied all his services on the basis of his colour and race.

Keywords: Diversity, Multiculturalism, Plurality, Discrimination, Renaissance, Othello, Venice

iafor

The International Academic Forum
www.iafor.org

Introduction

Venice during the early modern was like no other city in the world over. It was perceived as an ecumenical city where different nationalities poured into a culturally flowing society further contributing to its enrichment and florescence. With an unparalleled political framework, a commercial dominance over the whole region, and a unique tolerance over the three faiths and creeds, Venice was the direction of many adventurers and art lovers who saw in this city a haven, an implacable sanctuary to exist and coexist peacefully with assorted races in “the Queen of the Adriatic.”¹ Such an artistic spot enchanted its visitors with its singular natural charm, art, architecture, local tales, and fashion already crossing its path to future centuries of amazement and wonder. During the Renaissance and even some time before there were streams of immigrants coming from the adjacent countries and the far-fetched ends of the earth. Jews along with Greeks, Albanians, Ottomans, Venetian dominions and many others were outflowing to this global city. Venice welcomed all races with hands wide open as long as they would contribute to its well-being and prosperity through individual merit. Each community enriched the Venetian soil with its multi-faceted background giving a share in a cross-cultural dialogue and breaking barriers and frontiers. Admittedly, Venice was “an ideal [place] in which civic virtue produces a powerful, free society that in turn protects and nurtures the honor and freedom of its members” (Hadfield, 1997, P. 8).

Glamorous Cross-Cultural Venice

It is significant to note that Venice captured the attention not only through the world of mercantilism and commercial deeds, but it was also seen as a gateway to a multitude of ethnicities sharing features of their cultures, tongues, and identities. In Renaissance Venice, colors, races, and faiths would mix and meet on a daily basis. In that microcosm of the world, you could “heare all the languages of Christendome, besides those that are spoken by the barbarous Ethnicks” (Horodowitch, 2008, P. 79). In Venice of the Renaissance, it was clear that either for travelers or *cittadini*, Venice was a multilingual metropolis radiating with a multitude of tongues granting the city a culturally diversified feature. Joining a dinner on Venetian summer evening, French traveler Jean- Baptiste Tavernier noted the significant use of no less than thirteen languages including, “Latin, French, German, English, Dutch, Italian, Portuguese, Persian, Turkish, Arabic, Indian, Syrian and Malaysian.” He added that in this social gathering, a conversation was “begun in one language (. . .) continued in another and completed in a third.” This polyglot communion unfolded the multilinguistic skills mark of various nations such as the Turks and Armenians “who do not know three or four languages” (Tavernier, 1981, P. 272). Nowhere were diversified languages as much widespread as in the Venetian society. Being a mosaic of East and West, Orient and Occident, old and new, Venice was without any equal during its time and the centuries that would follow. The open republican city state could match the unmatched and make distinct points unite. Through its wedding culturally, politically, and commercially with the East, Venice managed to make ends meet at the different layers of life. Preserving its long-standing traditions and traces while welcoming ‘foreign’ ones, sometimes totally new to the native culture, Venice manifested a willingness to bridge the gap between unlike attitudes and cultural milieus leading to a sort of cultural dynamism and educing a passage to modernity.

¹ This is a name attributed to Venice among others as, “City of Bridges,” “City of Masks,” “City of Water,” “La Serenissima,” “The Floating City,” and “La Dominante.”

A City of Paradoxes

However cumulative and thriving, it is distressing to feel among the layers of such an affluent society trace of ethnocentrism and prejudice against some races and minorities. The feeling of ‘otherness’ as felt by some outsiders leaves no room to think that the vibrant image of the city with lagoons hides secrets about cultural disintegration and the marginalization of some ethnicities, color, and religion. Venice of the Renaissance era is defined by its belonging and defense of the Christian faith which it harbors and protects from the threats of the Ottoman Empire which was conquering the world, back then, in the name of Islam. Sensitive an issue as it might be, the issue of faith happened to play against the grandeur of a city supposedly transparent to different creeds and spiritual orientations. Venice maintained its position as a Christian Catholic axis in Europe and held a pivotal role among its neighbors and foreigners as a white European force in the region to be revered and highly esteemed. Venice was a carrier of the message of Christianity and civilization to the world and any juxtaposed image to this was received with a sort of skepticism. Particularly when it came to Muslims which Venice came to explore more about with its intermingling with Turkish traders, Venice would show less leniency in this particular regard. As a matter of fact, the prevailing presence of the Ottomans in Europe and their conquest of many parts of this continent and the African one was conceived with a lot of awe and fear. Europe apprehended the Ottoman empire which extended its invasions East and West and earned many lands which it kept under its dominion.

Therefore Venice saw in the Ottomans, with all their background culture, not only a potential threat but also a sense of insecurity which destabilizes its very hegemony in the area with all the magnificence that Venice entertained at the time. Venetians abhorred the Turks, and all the details related to their culture as pictured in Shakespeare’s *Othello* through its General Othello. They demonized their race and tainted their image with the worst possible portraits. During Shakespeare’s time, Judaism and Islam were perceived as precursory religions at a conjuncture where Protestantism, under the reign of Queen Elizabeth, was precarious with the country switching from Protestantism to Catholicism at different intervals under the rule of different crowns. Thus, the non-European identity along with the non-Christian belief jeopardized the peace of Europe. Vitkus remarks that Venice was “a sphere of tolerance and rationality located between the twin tyrannies of papal superstition on the one hand and Islamic “paganism” on the other” (Vitkus, 1997, P. 163). Religion and identity mattered during the Renaissance with the radical changes the continent was witnessing. The constant threat and fear of Islamic expansionism at the heart of Europe was quite manifest and could not pass unnoticed. The overriding ascendancy of Muslims and their infiltration within the different walks of life and layers of the European states granted a legal justification to fear it. In his book, *Turks, Moors and Englishmen in the Age of Discovery*, Matar notes that, “the English were unable to situate the Muslims conveniently in their world of colonial enterprise. Unable to defeat them, as they had defeated the American Indian natives, the Englishmen borrowed discourses of difference from their encounter with the American Indians” (Matar, 2000, P. 15). Given its wide-spread hegemony over different parts of Europe as the Ottomans conquered the Dalmatian hinterland culminating in the invasion of Cyprus, a dominion of Venice in the 16th century, the Turks were misperceived by Venetians. The term “Turk,” itself, was conceived to be synonymous of any individual embracing the Muslim creed.

After the chute of the Roman capital, Constantinople, in mid-fifteenth century the Muslim presence was carefully looked at namely in light of its great artistic and literary achievements. Such an existence destabilized the secure feeling that Venice had as a supreme

cultural center of Europe. Harbored feelings of prejudice and ignited racial animosity as created through the stereotypical images of Muslims and Africans in the Muslim diaspora has at as an origin, 'the difference from the other.' Shakespeare captured these meanings of alienation and highlighted the white European supremacy through the character of his protagonist Othello. *Othello*, the play, was written at a peculiar time of Euro-Arab contests over who would have the upper hand over the East Mediterranean. This period marked a great interconnectedness in terms of diplomatic relationships as well as trade deals. Paradoxically the Renaissance was not without deep chasm between Christian Europe and the Muslim world as reflected through the hegemonic presence of the Turks over big parts on Europe. When Shakespeare wrote his play, *Othello*, both Venice and the Ottoman Empire were giant powers in the East Mediterranean.

Alienated Othello

In this regard, it was obvious to sense a sort of fractures in relationships between both superpowers, which Othello epitomized more saliently in his tragedy within a white European Christian society. Being dark skinned within a community that favored fair skin of Western origin threw the African Moore in unparalleled adversity and big tribulations he could hardly survive at the end of the play. Race becomes Othello's capital challenge as it is not perceived in shallow terms as "dark" as much as it is comprehended as a token of 'apparatus' in a cultural frame. Othello's tragic flaw stems primarily from his feeling as an outsider in a place not meant for him given his race and color. Such a feeling of being a 'misfit' brings about the birth of his *alienation*. In this light Othello is both an outsider and an alienated. Othello's alienation is linked to his 'black' ethnicity and what is believed by his western counterparts as an 'inferior culture.' Serving as a model to the entire world during the Renaissance, Europe could not conceive of any potential presence other than white and European. Based on this logic, any other alternative rival or power had to be misperceived, underrated, and even subjugated to the main European force. "For whiteness to exist, not only must Black people be subjugated by white people but they also must not function as 'people' under their conceptualization in the first place" (Hari, 2017, P. 144). Under this spectrum, "black" was not a rival, not even a parallel but an entity unworthy of meritocracy to be condoned and 'excluded'. Kiernan claims that, "the tragedy arises first of all from the fact that Othello is black, and thus racially and culturally an alien -an intensely vulnerable alien-within a hierarchical predatory and therefore not yet fully human society" (Kiernan, 1989). The prevailing image that in Venice, racial and religious boundaries were dissolved should be taken with a pinch of salt. Venice in many respects abominated the cultural 'other' who was seen at once enriching and disgracing. This image ripples upon the surface when we consider Othello's status. Being a successful navy General, Othello descends from black African roots. Appreciated for his outstanding military skills, Othello was swept into the elite of the Venetian society because of his loyalty, distinguished services, and after he converted to Christianity. Caught between the binaries of his differences, Othello feels a 'legal alien'. He desperately attempts to readjust into unlikable worlds by marrying Desdemona, a white charming Lady of the upper Venetian class whom he presumably 'bewitched' to win her heart. Othello's identity was called into question since the outset of the play. Boyarin argues that the "open secret in [Othello's] heart was the secret of Islam in Europe (...) the Moors had ruled many European" Christians "for centuries" (Boyarin, 2011, P. 254). Despite Othello's remarkable achievements and prowess including leading a military campaign to Cyprus to fight the Turks, which gained him the respect of his high white superiors, Othello could not elope the denigrating gaze of those surrounding him by virtue of his color which they associate not only with 'otherness', but also with a derogatory connotation. Racial stereotypes

continue to strangle him however hard he tries to win the admiration of all. Othello's color and ethnicity turn out to be his primary obstacle, an intruder into a homogenous society reputed for being heterogenous. This makes him an outsider, an intruder into a circle he initially did not belong to.

In a multicultural diversity, Othello becomes a target by virtue of his race. Being dark-skinned builds barriers within a Venetian European society. It breeds antagonism and dissonance among the two different parts. Othello's sole guilt, therefore, becomes his race which portrays him as "cruel and treacherous, and his evil is directly associated with his blackness." (Cowhig 1985, P. 2). The stereotyping image surrounding the character of Othello, that the devil is always depicted in "black garb", (Mei, 2006, P. 31) has been announced since the beginning of the play. As the play opens, Iago and Roderigo both corroborate the idea of 'difference' by referring to Othello's race. Iago, the play's unparalleled manipulator fueled by his own jealousy against Othello who had Cassio promoted to the position of lieutenant than him sarcastically addresses Othello telling him: "Your heart is burst; you have lost half your soul, Even now, now, very now, an old black ram" (I.1.85-90). Loomba believes that the renaissance perception was somehow different about the skin color tone. According to her, the moors descending from an Arab origin whose skin color was relatively fair enjoyed some prerogatives while Sub-Saharan Africans were "associated *with* a lack of religion and culture, and painted as low-born" (Loomba, 2002, P. 81). This issue is further illustrated in the vehement racial sentiments that the trio: Iago, Roderigo, and Brabantio have for Othello. Iago explicitly verbalizes his hostility towards Othello saying: "I hate the Moor" (III.1.385). Roderigo, also, cannot but join Iago in his ethnic campaign against Othello calling him "wheeling stranger." As the play is drawing to an end, seeing Desdemona dying after making sure that Othello took his life, Emilia blasts in Othello's face reminding him that the devil is black "O, the more angel she, and you the blacker devil!" (V.2.161). The racial discrimination is crowned with Othello's father-in-law, Brabantio, who could not hide his ignited racial animosity towards the Moor considering his marriage to an upper-class Venetian Lady as an act of transgression, "a treason of the blood" (Okin 1987, P. 166). Through the physical intermingling between Othello and Desdemona, there is a shattering of the boundaries that set the East and the West apart. Othello's wedding to Desdemona is seen as an act of defiance to the limits of the progressive European white world epitomized by Desdemona and the primitive African black one as represented by Othello. Such an act bought Othello a big deal of contempt and abasement. Desdemona was the only one to venerate and dignify the Moor beyond the racist ethnocentric gaze. Seeing him deeper than his skin, she could see his worth in his mind and deeds when she declares that, "I saw Othello's visage in his mind" (I.3.252).

Yet the play, through the reconciliation of the apparently irreconcilable, is a foreboding of what is going to happen at the end. In the same way as Africa and Europe stand out as two worlds apart, Shakespeare is warning against the shattering relationship between Othello and Desdemona. The play closes on the most unexpected tragic scene with Othello strangling the woman he loved the most to death after he was manipulated by Iago to think that she is adulterous. Strangely enough, Othello, the distinguished military commander who has been deployed to protect Cyprus, a Venetian dominion from the Ottoman attacks, has become himself a threat to awe to his wife and the Venetian society as a whole. Sadly enough, despite his interminable devotion in his services to the Venetian state and his wife, "But that I love the gentle Desdemona," he delicately says (I.2.25), Othello's coexistence has always been inadmissible. Despite all the odds he went through to finally unite with the woman he loved the most, Brabantio rejects his quest for marriage. Above all despite his conversion to

Christianity while born Muslim, Othello remains the same alienated outsider, a misfit in a place he always cherished the hope to fit into. “Blackness cannot exist as humanness within the realm that whiteness conceives,” Writes Hari. “Black lives cannot matter under the standards of whiteness, by necessity and design” (Ziyad, 2017, P. 147). As a matter of fact, “blacks -were- monsters, strange creatures from outside the boundaries of the world,” (Aubrey, 1999, P. 96). according to the European thought.

In the Western imagination, the color ‘black’ has always been associated with the ‘devil,’ ‘magic,’ the ‘treacherous’ while ‘white’ has been linked to the ‘angelic,’ the ‘pure’ and the ‘good,’ social constructions which have often been thwarted by empirical evidence. Such binaries are reflected in the intense relationship governing the life of the Moor military and his soft-skinned spouse. It is no coincidence that Iago speaks of the “devils [who] will the blackest sins put on” (II.3.329) while Emilia calls Othello “the blacker devil” (V.2.132). Shakespeare underlies the idea that the ethnocentric fracture between the Orient and the Occident shattering the two spheres of the globe has also contaminated private relationships. Therefore, the split relationship at home between two opposite worlds extend to reflect a microcosm of the opposite relationships on an international scale. Once again, Shakespeare reverts back to the idea that Venice, however enchanting it might look superficially and though multiculturalism seems to be its norm, it is also the city of endless contradictions despite its apparent tolerance to foreigners. The ‘social injustice’ making differences between people on the basis of color, race, and religion turned into an ‘ideology’ to legitimize discrimination against Jews and the Moors seeing them inherently evil and morally depraved. Othello the Moor, by virtue of his color, sets the stage for a frenzy of racial diatribe against him. The man with the “thick lips” (I.1.66) and “old black ram” (I.1.98) falls prey to the racial malevolence of Iago who inculcated in his mind the image of infidelity; the thought that a White European Lady cannot mingle with a black African. Othello’s marriage to Desdemona only heightened this prejudice. Entrapped in his endless doubts and insecurities, Othello’s sense of identity shattered down. When he believes Desdemona is cheating on him, he exclaims: “Othello’s occupation is gone” (III.3.409); “Haply, for I am black...She’s gone” (III.3.263-9).

The communication breakdown of between Othello and his disintegration in his new culture is strikingly stereotypical. The Venetian multicultural milieu could, regrettably, not erase the long-standing prejudice, ethnocentrism, and bigotry against the black ‘other.’ Instead of celebrating individual differences as a significant contribution to the Venetian culture, it rather exacerbates the already existing fissure and corroborates identification to the supreme European model, which they take it to be. Via the tragedy of his main protagonist, Othello, Shakespeare stresses the idea that the identity crisis and the cultural divide between the Arab and the European worlds have not been bridged, that dissimilation rather than assimilation remains the norm. It becomes obvious that barriers of all sorts could not withstand the test of time since Shakespeare’s days till today. The situation has been aggravated in the present times to embrace new terms such as ‘Islamophobia,’ most of which is merely socially constructed images by the opposite part reaching an obnoxious portrait of Muslims as demonstrated by Shaheen (Shaheen, 2009). In the beginning of the play, Othello was not feeling distinct from others except in his genuine services to the state accepting his “negative oversimplified stereotype of himself” (Neill, 2005, P. 195-96). It is Iago who succeeds in colonizing Othello linguistically and psychologically raising within him a racial awareness through the use of offensive animalistic language that reminds him of his barbaric origins. Iago makes a full sense of the idea of “race” when Iago poisons his mind with ideas of inferiority, the fact that an upper-class Lady cannot intermingle with a black African man as

it is perceived against nature. Desdemona's father also believes that his daughter's marriage to Othello is "against all rules of nature." Brabantio suspects Othello having resorted to malevolent acts of magic and sorcery to reach Desdemona's soul. He brutally says: "Damn'd as thou art, thou hast enchanted her" (I.2.64).

Iago also uses segregationist terms to describe Othello's otherness as, "black Othello" (II.3.28), "the lusty Moor" (II.2.284), "the devil," "a Barbary horse" (I.1.112) and "an erring Barbarian" (I.3.350). All these qualifiers are the best testimony that however devoted Othello might be to the state and the people, he is also seen from the lens of Venetians as an alien. The racist discourse amplified in the significant amount of racial discrimination above has served across the previous centuries to legitimize the colonial enterprise. Representing the black in an image of bestiality and sexual lust dehumanizing him, has justified the means through which the West sought to aggrandize its empire of conquest through trade slavery. Blackness was an accomplice of barbarity and truculence and such was Othello's image in the eyes of Brabantio and his mates. A man who "springs startlingly close to the sources of animal energy, the *feritas* in man." (Sukanta, 1981, P. 164). The process of 'othering' marginalizing the outsider as an intruder into a homogenous society on the basis of the bias of difference is meant to corroborate the superiority of one power over the inferiority of the other. The logocentrism ideology based on classification and the dichotomy of 'us' vs 'them', 'black' vs 'white,' East' vs 'West,' further perpetuated the presence of aliens. It is in light of these binaries that the play, Othello, should be read; a play about Black pride subverted by white supremacy. Such subversion is built on a false set of cultural beliefs of one pole vis-à-vis the other. It is worth noting, in this regard, that it is the potent party that tries to standardize its values and set of beliefs at the expense of a marginalized dominated party which turns over time into the defamed 'other', subject to the cruel categorization of the predominant power.

It is worth noting that an international mega city like Venice which prides itself upon being a transparent door to multiethnicities from the world over, appears to be more lenient and tolerant towards settlers and immigrants belonging to the same European ancestry. Othello is not the only foreigner to be sharing the Venetian life. Roderigo and Iago are also outsiders, yet not discriminated against by virtue of their common faith and race. Andrew Hadfield points out that both "Iago and Roderigo are Spanish names which also makes them to be strangers and outsiders like Othello, though their foreignness is clearly disguised because they are whites." (Hadfield, P. 5). In the final scene of the play. When Othello finds out that the handkerchief he gave to Desdemona as a token of love was in Cassio's hands, he falls into frenzy using the same 'black' jargon that he has been victim to. In Othello's subconscious, he remains a dark-skinned African Moor regardless of his concessions of converting to Christianity in his desperate attempt to further assimilate to the Venetian society. Parekh believes that in the process of being fully assimilated into a new culture cannot be made concrete but with an undeniable conversion from one creed to another.

Othello is by no means of a high rank to his equals. He is in an "in-between" position; neither fully integrated in a society that accepted him only on the basis of his courageous services to defend the Venetian state against any possible external enemies, nor fully allied with his mother culture. Othello, finally, realizes that he is no more than a hired mercenary to be rid of when times call. Following this, "the Venetian aristocrats will certainly not admit him [Othello] to their inmost society, and they certainly do not want their daughters to marry Moors" (Wain, 1982, P. 14). His act of murdering Desdemona is an act of retaliation not only against his wife but against the whole Venetian society and by extension to the whole

Western hemisphere that inculcated within the black the idea of inferiority and vileness. According to Cartelli and Rowe, race is the cause of Othello's crime (Cartelli & Rowe, 2007). Othello bursts in a verbal outrage in front of treacherous Iago saying, "Arise, black vengeance, from thy hollow cell!" (III.3.448) preparing to kill Desdemona whose "name, that was as fresh as Dian's visage, is now begrim'd and black as mine own face" (III.3.387-389). His bloody revenge is the ultimate testimony that he, himself, has descended into the fires of desperation of his own hatred. More than ever, Othello testifies to himself, first, that he is not worthwhile, that grand achievements from the vintage point of the west are not measured by the potency of the deed nor by its bravery but rather by the color of the skin and the sharing of the same white race. Thus, "He correctly perceives himself, in other words, to have been both the alien victim of Venetian society and the active though unwitting accomplice of its destruction of him" (Kiernan, 1989, P. 57).

Conclusion

Having Shakespeare's, *Othello*, end tragically, is far from intentionally meaning to reach a cathartic purpose. The main incentive behind Shakespeare's portrait of the psychological ills of his protagonist is to demonstrate the devastating effects of racism and ethnic exclusion of what we call "the other" and the costs of this seclusion upon the psyche of the "dominated." The play finally culminates in a bath of blood carrying in its maze the tears of a broken African military commander who neither his good ethics, nor his achievements in the military service he renders to the state brought him solace against his ethnic roots. Othello who has been admitted into the Venetian society by dint of his military worth and rhetorical skills is, ultimately, felt inferior to the aristocratic senator like, Brabantio, and even to his peers. This point leads us to another serious issue of the Venetian society which is its limited openness. However, dazzling in thousand colors the city might be, and however richly multilingual, and multiethnic, diversity was apparently not the norm essential to communication in a non-sleeping city over the sea. The prevailing idea about the unique multicultural character of Venice seems to have declared its bankruptcy in *Othello*. In Shakespeare's work, Venice is revealed as a segregationist and discriminatory against the foreigner foregrounding intense feelings of European racism and challenging centuries-long held beliefs that Venice is an opened gate to the world where all mixed races could live in peace and harmony. Such was the image communicated by Shakespeare voicing "Venetian society's deeply racist and sexist ideology of power. Iago's strategies of fiction-making are based on his acute perception of what constitutes culture's "common sense" (Ganguly, 2012, P. 7).

References

- Aubrey, J. (1999). James R. Aubrey on Monster Imagery and Racism in Othello. *Bloom's Notes*.
- Boyarin, D. (2011). Othello's Penis: Or, Islam in the Closet. *Shakespeare: A Queer Companion to the Complete Works of Shakespeare*. Edited by Madhavi Menon. Durham: Duke UP, 254-62.
- Cartelli, T & Katherine R. (2007). *New Wave Shakespeare on Screen*. London, United Kingdom: Polity Press.
- Chaudhuri, S. (1981). *Infirm Glory: Shakespeare and the Renaissance Image of Man*. Walton Street: Oxford University Press.
- Cowhig, R. (1985). Blacks in English Renaissance drama and the role of Shakespeare's Othello. Dabydeen, D. (Ed). *The Black Presence in English Literature*. Manchester: University Press, 2-15.
- Hadfield, A& Hammond, P. (1997). *Shakespeare and Renaissance Europe*. London: Thomas Learning.
- Hari, Z. (2017). Playing 'Outside' in the Dark: Blackness in a Postwhite World. *Critical Ethnic Studies*, vol. 3, no. 1, 143–61.
- Horodowich, E. (2008). *Language and Statecraft in Early Modern Venice*. Cambridge, CUP.
- Kiernan, R. (1989). *Shakespeare*. New York: Harvester Wheatsheaf.
- Loomba, A. (2002). *Shakespeare, Race, and Colonialism*. Oxford: Oxford University Press.
- Matar, N. (2000). *Turks, Moors and Englishmen in the Age of Discovery*. New York: Columbia University Press.
- Neill, M. (1998). "Mulattos", "Blacks" and "Indian Moors": Othello and Early modern Constructions of Human Difference." *Shakespeare Quarterly*. 49 (4) Winter, 361-374.
- Neill, M. (2005). Race in Othello. In Peter Erikson and Maurice Hunt (eds), *Approaches to Teaching Shakespeare's Othello*. New York: The Modern Language Association of America, 195-196.
- Okin, M. (1987). Othello and the plain face of Racism. *Shakespeare Quarterly*. 38(2) Summer, 166-188.
- Shaheen, J. (2009). *Reel bad Arabs: How Hollywood vilifies a people*. Massachusetts: OLIVE BRANCH PRESS.
- Swati G. (2012). "The turn of the shrew: Gendering the power of loquacity in Othello". In *Multicultural Shakespeare: Translation, Appropriation and Performance*, 9, 7-14.

Tavernier, J.B. (1981). *Les six voyages de Turquie et de Perse*, ed. Stéphane Yerasimos, 2 vols. Paris: Wentworth Press.

Vitkus, D. (1997). Turning Turk in Othello: The Conversion and Damnation of the Moor. *Shakespeare Quarterly* 4. Summer, 145-176.

Wain, J. (1982). *Othello*. London: Macmillan Press Ltd.

Contact email: oumeima777@gmail.com

An Evaluation of the Maltese School Literacy Environments and Practices of Students With Down Syndrome

Loredana Muscat, Institute for Education, Malta
Helen Grech, University of Malta, Malta

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This study aimed to evaluate the literacy abilities of students with Down Syndrome (DS) from the perspective of educators while also evaluating the school literacy environments of students with DS within the Maltese context. This enabled the researchers to investigate the level of collaboration between educators and other professionals, to evaluate whether educators were sufficiently knowledgeable about their students' abilities and how to use these skills to help them progress through the literacy acquisition journey. A quantitative explorative design was utilised to evaluate students with DS's literacy experience from their educators' perspective. Fifty-eight educators of students with DS were involved in the study. The researchers use *Chi-square* testing to analyse the collected data and identify similarities and differences between the different sectors and schooling levels. The study identified that students with DS could achieve a monoliterate or biliterate reading level in Malta. Results also shed light on the different literacy training practices. Not all educators were aware of the students' skills and difficulties and that such knowledge could contribute to better literacy intervention planning. The results have several educational implications, such as training for all educators in managing children with DS in the educational setting in relation to literacy intervention techniques and bilingualism. Results also highlight the importance of providing bilingual exposure to Maltese students with DS.

Keywords: Down Syndrome, School Literacy Experiences, Literacy Intervention, Learning Support

iafor

The International Academic Forum
www.iafor.org

Introduction

Children with Down Syndrome (DS) in Malta avail themselves of many early intervention services. Early Childhood Intervention Services (ECIS), Educators, Speech-language pathologists (SLPs), and Occupational therapists actively promote early literacy and literacy skills and share common goals. The Maltese public sector offers all these services through national insurance coverage. Children are also supported by various non-governmental organisations (NGOs) and private practice services. All services also move on towards implementing their goals in a school setting. Collective decisions are taken during *Individualised Educational Plan* meetings, and future therapeutic plans are drawn up. Each plan is individualised, and different goals are shared between professionals. The teachers and Learning Support Educators (LSEs) implement literacy training and instruction in a school setting coordinated by the school Inclusion Coordinator. In Malta, most children with DS are educated in a mainstream setting, in line with international practices (Burgoyne, 2009). However, an evidence-based literacy intervention strategy for children with DS is, to date, still not clearly stated.

Næss et al. (2012) discuss that sight word reading has often been prioritised in DS, influencing language and vocabulary. Such training could include the repeated use of familiar or 'useful' words that could be functional for the individual daily use. Children with DS have predominantly been exposed to a visual method of reading (Lemons & Fuchs, 2010). This trend has been mostly brought about by the acclaimed visual strengths of children with DS, the difficulties in auditory short-term memory, and claims that children with DS find it difficult to develop PA skills (Cossu et al., 1993). The latter is considered an important precursor to reading development. However, a shift in the more recent literature supports other reading instruction methods.

Scaffolded or mixed-method reading instruction is currently being encouraged (Goetz et al., 2008; Lemons & Fuchs, 2010; Muscat & Grech, 2023). Buckley (2003) maintained that pre-schoolers should first be introduced to a visual method of reading. Once the child acquires word recognition of around 40 flashcards by sight, they should be introduced to a reading instruction phonic method. Reading methods with an increased phonological component are increasingly being implemented. Goetz et al. (2008) maintain that an intervention method, which includes teaching word recognition and decoding abilities and training PA, is very useful for this population. Bayliss and Snowling (2012) found that a training program involving alphabet instruction, letter-sound activities, word and shared book reading and comprehension skills improves letter knowledge. While a program involving both language and literacy intervention by Burgoyne et al. (2012) indicates that individuals with DS benefit from an approach that taught reading and phonics, including a language component in which vocabulary and expressive skills training are incorporated. Yet the element of individual variability is a common trait amongst these studies. Variation in reading acquisition in DS has been reported extensively, e.g. (Burgoyne, 2009; Bird & Chapman, 2011; Robles-Bello et al., 2020). Variability can depend on the children's characteristics and the method and frequency of reading instruction (Goetz et al., 2008; Robles-Bello et al., 2020; King et al., 2020).

In summary, research about reading intervention studies identifies that children with DS benefit from PA training (Lemons et al., 2017, 2018; Næss, 2015) and that PA progresses as reading increases. Some studies also identified that letter knowledge predicts reading (Steele et al., 2013). Most studies recognised the importance of a mixed modality and holistic approach to reading instruction (Burgoyne, 2009, Burgoyne et al., 2012). Intervention methods with easy-

to-follow instructions, high visual elements, and less reliance on expressive verbal skills could positively impact literacy development (Loveall et al., 2021). However, inconsistency and variation between groups have also been noted, possibly due to the individual variability of participants.

An evaluation of the local Maltese community is missing. To date, no specific investigation of how Maltese children with DS are exposed to literacy training is available. The need is highly felt, particularly with Maltese having a shallow orthography, since reading acquisition could differ from that of languages with varying orthographic depths. Investigating the Maltese scenario will also shed light on intervention methods within a bilingual setting. A gap in the literature exists in this area; to the author's knowledge, no studies investigating bilingual literacy intervention with individuals with DS in Malta have been published to date.

Research Questions

This study aims to answer the following research questions:

- Research Questions 1:** What literacy practices are used with children and adolescents with Down Syndrome in a Maltese school setting?
- Research Questions 2:** Can a difference in practices be identified between different school settings and school levels?
- Research Questions 3:** How does the bilingual context affect the school literacy environment and literacy practices when working with Maltese children and adolescents with Down Syndrome?

Participants

Fifty-eight (58) educators participated in this study. Each educator had at least one student with DS in the classroom. The researcher invited educators, which were both teachers (24.6%) and Learning Support Educators (LSEs) (72.4%), to participate in the study. The data were collected through an online questionnaire distributed to all schools in Malta. Refer to Appendix A p. for the questionnaire. The principal researcher approached all 280 registered schools in Malta and asked the Heads of Schools to distribute the questionnaires to their staff if they had a student with DS within their school. The educators were asked to respond to the questionnaire according to the student they were following at the time. A resource centre is not considered mainstream as it allows students to have specialised educational experiences. A national statistic about the distribution of students with DS within the different schooling systems is currently unavailable. (NSO, personal communication, 2022). Table 1 represents information about the students. Table 2 illustrates the distribution of the participants across the different school settings.

Table 1: *Information about the students with DS*

School Level of Student	Age of Student	
	<i>N</i>	Percentage
Early Years (KG2- Year1)	8	13.8%
Primary Years (Year 2- Year 6)	21	36.2%
Middle School (Year 7-8)	5	8.6%
Senior School (Year 9-11)	19	32.8%
Resource Centre: Secondary Years	5	8.6%

Table 2: Mainstream Setting of Students with Down Syndrome

Does the student participate in a mainstream setting?	The proportion of school hours in mainstream	
	<i>N</i>	Percentage
<i>Yes</i>	47	81%
<i>No</i>	9	15.5%
<i>Mainstream in a Resource Centre</i>	2	3.4%
		Less than 20%
		20 %
		40 %
		60 %
		80 %
		100%
	11	19%
	10	17.2%
	10	17.2%
	9	15.5%
	11	19%
	7	12.1%

Results

The data were analysed using the IBM SPSS Statistics 25 software. Differences between groups are analysed through Chi-Square Testing. The results are presented in 4 sections; Language Abilities, Reading and Writing Skills, Reading and Writing Instruction; Use of Technology for literacy exposure.

Language Abilities

The educators' awareness of the students' language and language-related skills and explored the bilingual aspect of students with DS in the Maltese school setting were explored next.

The use of spoken English (40%) at school was more predominantly reported when compared to Maltese (28%). However, a substantial proportion of students used both languages (3%). These results are summarised in Table 3. Educators were also asked about the students' hearing abilities. 10.3% reported that the student had hearing difficulties, 75.9% reported no hearing difficulties, and 13.8% said that they were not aware of the hearing abilities of the student.

Table 3: The predominant spoken language

Predominant Language at School			Predominant Language at Home		
	<i>N</i>	Percentage		<i>N</i>	Percentage
<i>Maltese</i>	16	28%	<i>Maltese</i>	27	47%
<i>English</i>	23	40%	<i>English</i>	21	37%
<i>Both</i>	19	33%	<i>Both</i>	6	10%
			<i>I don't know</i>	4	7%

All educators reported a level of bilingualism by the students. The educators reported different levels of language use between Maltese and English, with a greater proportion of English use reported. Consequently, the difference between the language used at school was tested across school types, revealing no difference in language use between school types (Table 4).

Table 4: Spoken language proportion by bilingual students

Question: If both languages are used at school, can you give an estimate of the use of each language?

	N	%
50% Maltese 50% English	11	19.0%
60% Maltese 40% English	8	13.8%
60% English 40% Maltese	6	10.3%
70% Maltese 30% English	4	6.9%
70% English 30% Maltese	4	6.9%
80% Maltese 20% English	10	17.2%
80% English 20% Maltese	15	25.9%

Results related to the spoken language of the participants at school are presented in Table 3. A *Chi-square* analysis indicated no difference in the responses according to the type of school (see Table 5).

Table 5: Language spoken within the school setting

The language during Literacy Instruction ¹			Choice of Language of Literacy Instruction ²		
	N	Percentage		N	Percentage
Maltese	10	17.2%	During an IEP	28	48.3%
English	24	41.4%	By the Teacher	5	8.6%
Both	24	41.4%	By the Parents/Guardians	23	39.7%
			Missing responses	2	3.4%

Note: ¹ $\chi^2(1) = 9.86; p = .131$; ² $\chi^2(1) = 3.67; p = .721$

Reading and Writing Skills

A set of questions investigated the students' reading attainment levels as reported by the educators. The educators were primarily asked whether their students were assessed specifically for reading abilities by an Educational Psychologist, an SLP or a Literacy Specialist. 50% of the educators reported that an assessment report was available, 19% responded negatively, and 31% were unaware of an assessment.

The students' level of letter recognition and letter-to-sound correspondence are presented in Table 6. Further analysis investigated whether this response differed according to the students' school year. A *Chi-square* analysis revealed no difference between school years (refer to note).

Table 6: Letter Recognition

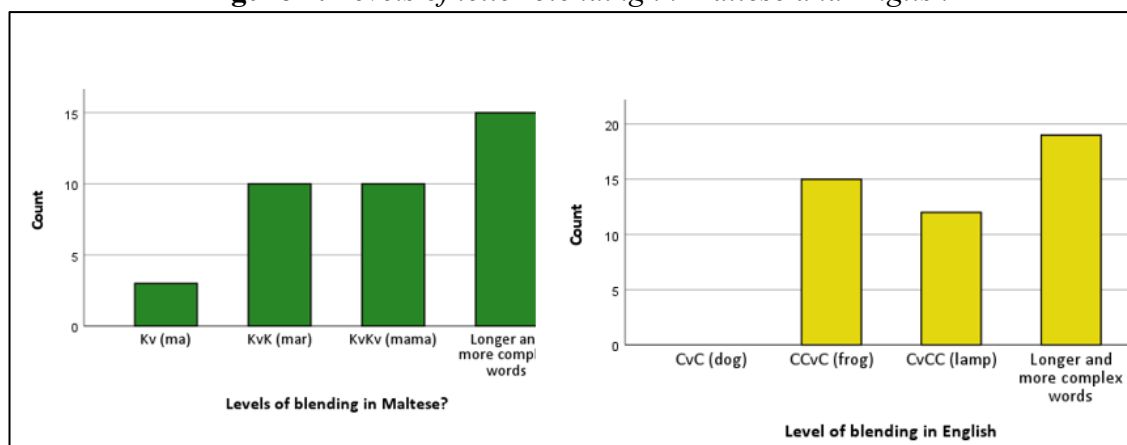
Letter Recognition in Maltese ¹			Letter Recognition in English ²		
	N	Percentage		N	Percentage
Not yet	12	20.7%	Not yet	4	6.9%
Has Sometimes	6	10.3%	Has Sometimes	0	0
Occasionally	6	10.3%	Occasionally	7	12.1%
Often	10	17.2%	Often	8	13.8%
Usually always	24	41.4%	Usually always	39	67.2%

Note: ¹ $\chi^2(1) = 21.43; p = .162$; ² $\chi^2(1) = 10.44; p = .577$

The levels of letter blending were investigated in both languages. A substantial number of students with DS were reported to be able to blend complex letters to words in both languages (Figure 1). The *Chi-Square* analysis did not reveal any difference between school levels on blending in English; however, a difference in responses between school levels was found in

the Maltese sample $\chi^2 (1) = 23.45$; $p = .005$. A post-hoc analysis allowing for Type 1 Error Bonferroni correction identified that *a 0% was reported in the group of students within the Primary level of education on blending consonant-vowel-consonant-vowel words*. This result was statistically significantly smaller ($p=.0019$) than other group years. Throughout other school levels, the distribution was more even.

Figure 1: Levels of letter blending in Maltese and English



Sentence and paragraph reading was investigated in both Maltese and English (see Table 7). A *Chi-square* investigation reveals no difference between school settings in these responses.

Table 7: Reported Reading Levels

	Reading Level							
	Sentences in English ¹		Sentences in Maltese ²		Paragraphs in English ³		Paragraphs in Maltese ⁴	
	N	%	N	%	N	%	N	%
Yes	42	72.4%	21	36.2%	28	48.3%	15	25.9%
No	16	27.6%	37	63.8%	30	51.7%	43	74.1%

Investigating the responses related to the students' reading comprehension level reveals a variability among the students. Most educators responded that the students could comprehend short phrases in both languages. A higher proportion of educators reported that the students found it difficult to comprehend the meaning of words in Maltese (27.6%) compared to English (8.6%). Several educators also mentioned that they were not aware of the level of reading comprehension of their students, and this was most evident in Maltese (12.1%) compared to English (3.4%). Results are presented in Table 8.

Table 8: The reported level of Reading Comprehension

What level of Reading Comprehension does the student have?

	Maltese		English	
	N	%	N	%
Difficulty in understanding the meaning of written words.	16	27.6%	5	8.6%
Understands the meaning of single words	8	13.8%	9	15.5%
Understands the meaning of short phrases	12	20.7%	18	31.0%
Understands the meaning of short paragraphs	9	15.5%	16	27.6%
Understands the meaning of a long text	6	10.3%	8	13.8%
I do not know the level of reading comprehension	7	12.1%	2	3.4%

Independent book reading was next explored. The educators reported difficulty in the area where most students could not read books independently in both Maltese and English. Poor engagement in pretend reading was also reported. Results are summarised in Table 9. A *Chi-square test* tested did not identify a difference between school settings.

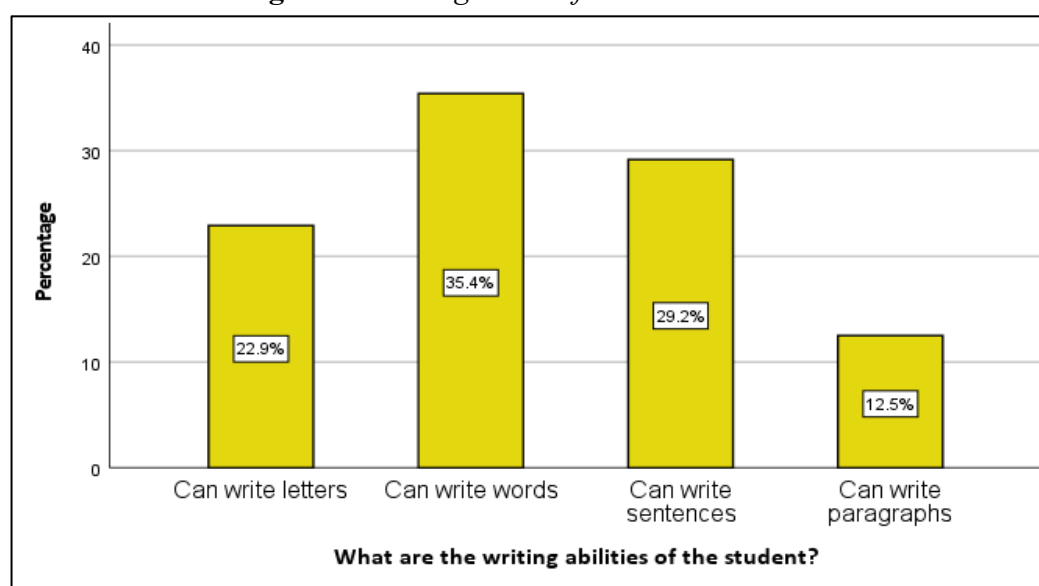
Table 9: Independent reading and Pretend reading

	Independent Reading Maltese ¹		Independent Reading English ²		Pretend Reading ³	
	N	%	N	%	N	%
Yes	12	20.7%	18	31%	18	31%
No	46	79.3%	40	69%	40	69%

Note: ¹ $\chi^2 (1) = .918; p = .821$; ² $\chi^2 (1) = 1.933; p = .586$, ³ $\chi^2 (1) = 5.204; p = .157$

Three questions investigated the writing abilities of students. Students were reported to possess different levels of writing abilities. 36.2% of the students were reported to be able to write Independently. 43.1% were also reported to write using several writing aids such as flashcards, computers, and tablets. 20.7% were reported to be unable to write. 8.6% of the students were reported to write in Maltese, 63.8% in English and 13.8% in both languages. The different levels of writing abilities are reported in Figure 2. No difference according to the school setting or the school level was identified.

Figure 2: Writing levels of students with DS



Note: School Setting $\chi^2 (1) = 11.96; p = .216$; School Level $\chi^2 (1) = 11.48; p = .488$.

Reading Instruction and Writing Instruction

A set of questions investigated reading and writing instruction with students with DS. Educators reported that 56.9% of the students received additional help during reading exercises, and the LSE provided 43.1% of the time. Most educators reported that challenges are evident during reading instruction (72.4%). Results of questions investigating the frequency of participation in literacy lessons indicate that many educators reported that the students Never or Rarely Participated in literacy lessons (43.1%). In contrast, most students have between 1 and 2 hours of weekly literacy training (39.7%). Results are summarised in Table 10.

Table 10: Participation in Literacy Activities

Frequency of participation in activities relating to reading instruction in the classroom?			How much time per week is dedicated to literacy activities?		
	<i>N</i>	Percentage		<i>N</i>	Percentage
Never/rarely participates	25	43.1%	Less than 30 minutes a week	13	22.4%
Occasionally participates	16	27.6%	Between 1-2 hrs a week	23	39.7%
Participates sometimes	6	10.3%	3 -4 hrs a week	12	20.7%
Participates often	10	17.2%	More than 4 hrs a week	9	15.5%
<i>Missing</i>	1	1.7%	<i>Missing</i>	1	1.7%

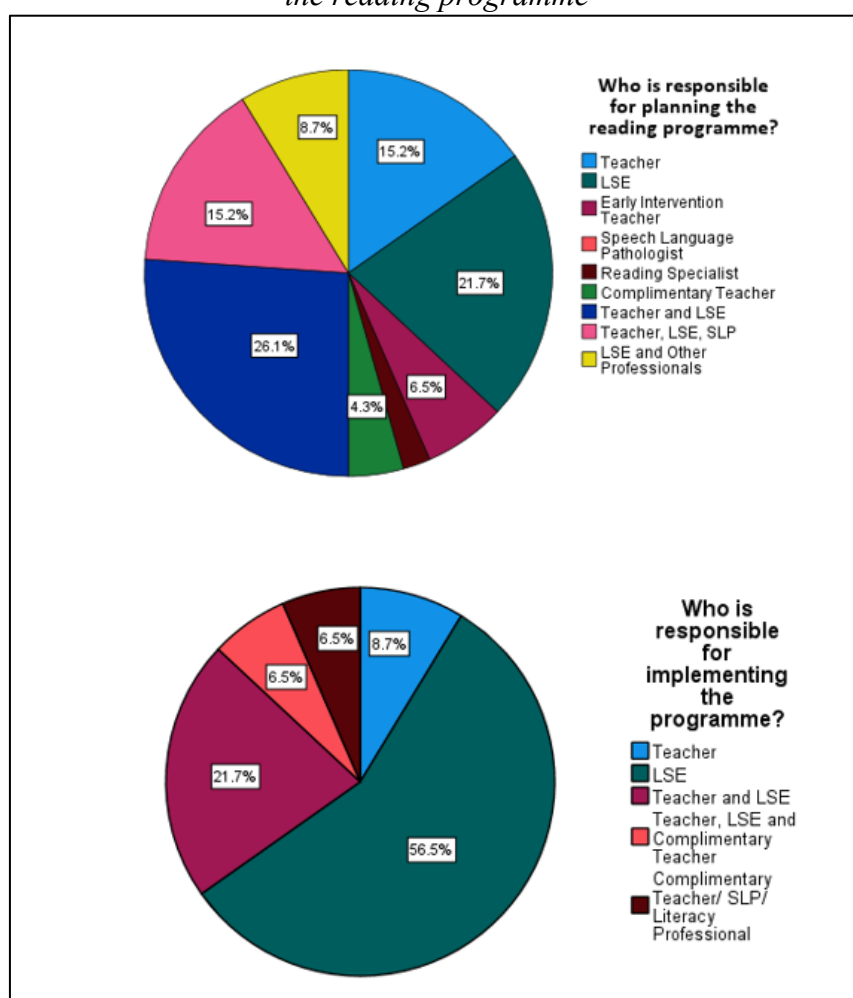
It is common practice in Maltese schools to assign books for home reading; educators in this study report that 48.3% of the students with DS were rarely given reading books at home. Educators reported that 48.3% of the students did not follow an alternative reading programme when investigating the type of reading instruction; however, 43.1% did (see Table 11).

Table 11: Home Reading and Alternative Reading Programme results

Does your student take reading books home from school for home practice?			Does the student follow an alternative reading programme?		
	<i>N</i>	Percentage		<i>N</i>	Percentage
Never/rarely	28	48.3%	Yes	25	43.1%
Occasionally	12	20.7%	No	28	48.3%
Once a week	8	13.8%	Total	53	91.4%
Several times a week	5	8.6%	<i>Missing</i>	5	8.6%
<i>Missing</i>	5	8.6%			

Results investigating the planning and implementation of reading instruction identify that the teachers and LSEs cooperate mostly and are responsible for planning reading instruction. Other professionals, such as SLPs, are also actively involved in planning. On the other hand, the implementation of reading instruction was primarily the responsibility of the students' LSEs (see Figure 3).

Figure 3: Professionals who are responsible for the planning and implementation of the reading programme



The type of reading methods was also investigated. Results are represented in Table 12.

Table 12: Educators' responses on the methods of reading instruction

What method of reading instruction is used with the student?			In your opinion, what is the best method for reading instruction for students with Down Syndrome?		
	N	%		N	%
Phonic Method	10	17.2%	Phonic Method	6	10.3%
Look and Say (using flashcards)	12	20.7%	Look and Say (using flashcards)	15	25.9%
Both Methods	29	50.0%	Both Methods	33	56.9%
Missing	7	12%	Missing	4	6.9%

Questions related to writing instruction identified that the highest proportion (29.3%) of students Never or Rarely participated in writing activities, and between 1 to 2 hrs per week (37.9%) is mostly spent on writing instruction. Most educators also reported that students do not participate actively in writing activities (53.4%), (see Table 13).

Table 13: Educators' responses on Writing Instruction

Does your student participate in activities relating to writing activities in the classroom?			How much time is spent on writing activities?		
	N	%		N	%
Never/rarely	17	29.3%	Less than 30 min a week	13	22.4%
Occasionally	10	17.2%	Between 1-2 hrs a week	22	37.9%
Weekly	9	15.5%	3-4 hrs a week	11	19.0%
Several times a week	6	10.3%	More than 4 hrs a week	6	10.3%
Daily / Several times a day	10	17.2%	Missing	6	10.3%
Missing	6	10.33%			

A *Chi-Square analysis* tested whether the responses to questions within the Reading and Writing Instruction section were influenced by either the school setting or the school level. Following post-hoc testing, results showed that two questions were affected by the school year but had no effect on the responses by the school setting (see Table 14).

Table 14: Questions identifying a significant Effect of School year variable on Reading and Writing instruction

Question	Chi-Square Value	p-value
Are there activities related to reading instruction your student does not participate in?	10.975	.027 ¹
In your opinion, what is the best method for reading instruction for students with Down Syndrome?	21.674	.006 ²

Note: ¹ Bonferroni Corrected $p = .0002$: the group of students within a primary level of education were exposed to a significantly larger number of literacy hours

² Bonferroni Corrected $p = .0001$: the group of educators within the Early years level of education maintained that the Phonics Method was the best in their opinion

Technology

The use of technology in reading and writing was examined. The educators maintained that only 44.8% of the students use the computer for literacy training; however, 65.5% of the educators reported using the device for other educational activities. See Table 15 for full results. *Chi-Square analysis* revealed no effect on the responses by either the school setting or school level.

Table 15: Educators' responses on the use of technology in the classroom

	Does the student have a computer in class? ¹		Does the student use the computer for literacy training? ²		Does the student use a tablet in class? ³		Is the computer used for other educational activities? ⁴	
	N	%	N	%	N	%	N	%
Yes	36	62.1%	26	44.8%	21	36.2%	38	65.5%
No	21	36.2%	29	50%	36	62.1%	15	25.9%
Missing	1	1.7%	3	5.2%	1	1.7%	5	8.6%

Note: **Chi-Square Evaluation School Setting** ¹ $\chi^2 (1) = 1.442$; $p = .696$; ² $\chi^2 (1) = 2.993$; $p = .393$, ³ $\chi^2 (1) = 2.588$; $p = .460$, ⁴ $\chi^2 (1) = .580$; $p = .901$

Chi-Square Evaluation School Level ¹ $\chi^2 (1) = .572$; $p = .966$; ² $\chi^2 (1) = 1.670$; $p = .796$, ³ $\chi^2 (1) = 5.836$; $p = .212$, ⁴ $\chi^2 (1) = 3.162$; $p = .531$

Discussion

The initial questions in the questionnaire allowed the researcher to understand better the literacy levels achieved by students with DS and placement within the Maltese educational system. An investigation of the students' reading abilities showed that students with DS could complete various reading skills. Many students recognise letters, blend complex words, read words, and read sentences. The ability of students to read paragraphs is also reported; however, a decline in the proportion can be observed. This shows great variability and agrees with the literature (Burgoyne, 2009; Bird and Chapman, 2011; Robles-Bello et al., 2020). It has been reported that variability can vary according to intrinsic student characteristics and the method and frequency of reading instruction (Goetz et al., 2008, Robles-Bello et al., 2020, King et al., 2020). Albeit the complexity involved in independent book reading, students with DS were also reported to engage in this type of reading. This shows that many students with DS can develop complex reading abilities.

Large variability was also reported concerning reading comprehension. Most educators reported that students could comprehend the meaning of written single words. However, comprehension abilities declined as the complexity of the texts increased, which supports previous research (Cupples & Iacono, 2000). Refer to Table 6. An interpretation from the Simple View of Reading perspective allows the researcher to assert that a proportion of the population of students have appropriate abilities in the two main components of the reading framework, where students can develop both word recognition and reading comprehension. The RQs are specifically evaluated next.

Research Question 1: What Are the Literacy Practices Used With Children and Adolescents With Down Syndrome in a Maltese School Setting?

The educator must be aware of the student's abilities to ensure that a student is provided with an individualised literacy experience. Unfortunately, this investigation revealed that not all educators know the students' skills. 7% were unaware of the language used in the student's home, 13.8% do not know the student's hearing abilities, 31% were unaware whether a literacy professional/s had formally assessed the student, and 12.1% did not know the level of reading comprehension of the student with DS in their class. While it has been reported that several educators are aware of the students' abilities, it is worrying that such a proportion of educators does not. This is not conducive to preparing an individualised literacy programme for the student. The lack of knowledge about the abilities of students with additional needs has often been reported in the literature, with teachers reporting being frustrated as this lack of knowledge does not help them to support the students successfully (McFadden, 2014; Giel-Romo, 2014; Fannan, 2017).

56.9% of the students were reported to be given additional help during literacy activities. However, only 43.1% are provided with an alternative literacy programme. This could be because many students can cope well with the mainstream literacy curriculum. However, only 12.1% are reported to follow a full mainstream curriculum. Variability between students was observed again; hence, individualised educational services for students with DS are extremely important. On an international level, it has been reported that including students with DS in a mainstream setting is increasingly standard practice in middle and high-income countries (Faragher & Clarke, 2014). This is concurrently reported in the Maltese school setting. The majority of students with DS attend mainstream education. However, some individuals move to Resource Centres in the secondary years of schooling. Secondary schools in Malta are highly

geared towards academic subjects, and students with learning difficulties often find it difficult to cope and have their needs adequately addressed.

Educators were asked what type of literacy instruction was mostly used with the students (see Table 10). A substantial number of educators still favoured the look-and-say method; however, this was not the majority of cases. Most educators reported that a balance between a *visual approach* to reading and a *phonic approach* is mostly implemented. Such a finding complements suggested practices, favouring a mixed modality approach over one specific approach (Burgoyne, 2009; Burgoyne et al., 2012). This study shows the importance of training to educators, which can help educators identify each student's strengths and work around the student's abilities.

The teacher should be the primary educator responsible for a student's educational journey and be assisted by a Learning Support Educator (LSE) (National Minimum Curriculum Framework, 2016; Faragher et al., 2020). However, results from this study highlight that the LSE was the primary educator for students with DS. It has been reported that the Teacher and LSE work together to plan and implement a reading programme (21%). However, since most students spend a proportion of time outside the mainstream setting, it is the responsibility of the LSE to implement any individualised intervention outside the classroom. This has been similarly reported in the literature (Lorenz, 1998; Faragher et al., 2020). It has also been reported that this practice might lead students with learning difficulties to receive training and explanations more from an LSE than from a teacher (Faragher et al., 2020).

The overt reliance on additional adult support apart from the teacher can also have social ramifications. The proximity of the adult can prevent peers from integrating the student within a peer group relationship while also preventing the student with difficulties from relying on the peers themselves (McFadden, 2014). This has been reported as an increased barrier between students with DS and peers due to the increased detachment from peer groups (McFadden, 2014).

The researchers inquired about what happens when the LSE is absent during the day and how the students perform. The amplified reliance on the LSE removes the student from the classroom experience, promoting increased reliance, even when unnecessary. This has been associated with a declining willingness to engage in problem-solving activities (Wishart, 2000). If LSEs are given a big part of the educational responsibilities, are they adequately trained to deliver these services? Unfortunately, the answer to this question goes beyond the scope of this research.

Research Question 2: Can a Difference in Practices Be Identified Between Different School Settings and School Levels?

A *Chi-square* analysis identified that no questions were affected by the school setting (state/church/independent schools). Agius (2012) maintained that the school setting does not affect the literacy attainment of Maltese TD students. The current study adds to Agius (2012) by claiming that the school setting does not affect literacy attainment and literacy practices with Maltese students with DS. These results also imply that uniform services are offered to students across different settings. The National School Support Services provide the same services to all students with LD across Malta, irrespective of the school setting. This ensures that all students are provided with the same support opportunities. Such services could have contributed to uniformity across school settings.

It was also explored whether responses varied across school levels. Two significant findings were identified. Students with DS within a primary school setting have spent significantly more time on literacy training. During the early years of schooling, educators collaborate with other professionals to support the students in developing the building blocks of language, motor development, and other fundamental skills. Hence, as identified through this questionnaire, the focus is not on literacy in most cases. The importance of literacy training is then felt more during the primary years. Such a decision might be taken as a matter of priority, where educators and other professionals might decide that literacy training is not a priority during the early years or due to the students' abilities. Martin et al. (2009) also support this by maintaining that educators must prioritise intervention services; for example, early communication skills should be prioritised over word-identification skills. However, one might indirectly strengthen the other.

The importance of professional development has been a recurrent point of importance put forward by educators themselves to help them implement better teaching strategies (McFadden, 2014). The National Literacy Strategy (2014) encompasses that students with learning difficulties should be provided with multi-sensory learning strategies and that educators should be encouraged to follow continuous professional development courses to support students with learning difficulties. Unfortunately, the national strategy offers very broad guidelines, and hence it finally depends on the Heads of Schools and educators to follow the recommended training.

Research Question 3: How Does the Bilingual Context Affect the School Literacy Environment and Literacy Practices When Working With Maltese Children and Adolescents With Down Syndrome?

It has often been reported that individuals with DS have been limited and encouraged to use a single language by parents and professionals (Edgin et al., 2011; Bird et al., 2005). The uniqueness of the language scenario in Malta lends itself to a needed investigation of the ways the bilingual aspect affects literacy training and literacy acquisition of students with DS. The researcher's personal experience and results from all studies of this research show that Maltese individuals with DS can use two languages to varying degrees both at home and achieve a level of biliteracy.

A sizeable proportion of students has been reported to use both Maltese and English during school hours (33%); however, the majority were reported to use the English language (40%) more predominantly in the school setting when compared to Maltese (28%). The language proportion of the language used at school does not match the language used at home as reported by the educators. 47% of the students are reported to have Maltese as a home language, 37% English, and 10% use both. Such a finding supports Vella's (2013) study, where a similar pattern of language use was reported in TD children. On the other hand, when the language used during literacy instruction was investigated, educators reported that 41% of the students were exposed to predominantly English literacy training. In comparison, 41% were exposed to Maltese and English. Such a finding confirms that although different degrees of Maltese/English use and exposure is apparent at home and school, the National Minimum Curriculum, which emphasises teaching the two official languages, is being implemented for many students with DS.

Although a shift towards literacy training in English is observed, this is not greater than literacy training in both Maltese and English. Research about the language use in bilingual communities

of individuals with DS is lacking locally and internationally. Scriha (2001) reported a sentiment that English is more important than Maltese within the educational system was reported among TD children and is similarly reported here within the Maltese community of students with DS. However, the value of bilingualism is still as strong. Camilleri Grima (2013) reports that educators use a substantial amount of code-switching in the classroom. This is also confirmed in this study as different degrees of both Maltese and English are used with students with DS. No distinction between the school setting was reported by Camilleri Grima (2013) and confirmed in this study.

A second important finding is that all educators reported that all students were bilingual at school. Varying degrees were reported, with a greater proportion of English use being reported among the students.

Conclusion and Significant Findings

This study revealed significant findings about the school literacy environment of Maltese students with DS. It has been reported that Maltese students with DS are predominantly educated within a mainstream setting. The LSE primarily meets the needs of students with DS, and the implications of such a finding have been discussed. Maltese students with DS are exposed to Maltese and English within the bilingual school setting. Results indicated that students with DS follow the National Minimum Curriculum recommendations. Biliteracy has been reported within the population of Maltese students with DS. Varying levels according to the individuals' abilities have been shown. This showcases the aspect of bilingualism in DS and the skills of students with DS to develop language and literacy abilities in both languages. A preference for the use of spoken Maltese in the home has been reported; however, English is favoured during school hours. Finally, it has been highlighted that a substantial proportion of students use a visual method of literacy training. However, a large proportion uses both a visual and phonic method concurrently.

This study provides novel data about bilingualism and biliteracy in Down Syndrome. This study is also the first to investigate literacy education for students with Down Syndrome within the Maltese educational system. Finally, this study calls for further training for educators. A student with Down Syndrome needs professional support to help them achieve the best of their abilities. This calls for educators to be updated with the latest research to ascertain that students are supported in the best possible way. Stakeholders need to invest in further training for all educators.

Limitations of the Study

Some limitations to the study have been identified.

- Both teachers and LSEs were invited to respond to the questionnaire, and LSEs responded in greater proportion. This response could have contributed to an imbalance as the teachers' perspectives and LSEs were not proportional.
- Few respondents from Resource Centres were identified. An in-depth study within this setting could provide the researcher with additional novel findings since the educational interventions within resource centres are relatively unexplored.
- In-depth case studies could have yielded more detailed information about specific practices that are currently taking place in schools.

- The educators' level of education has not been explored. Such a finding could have contributed to better evaluate the results and their experience in teaching students with DS.
- A larger sample size could have contributed to better data generalisation.

Funding

This research has been partially funded by the ENDEAVOUR Scholarship Scheme 2015 (Contract No. MEDE 606/2015/7).

Appendix A

School Literacy Environments Questionnaire.

Section A

1. Consent to use this questionnaire for research purposes
 - Yes
 - No

2. What is your role with the student?
 - Class Teacher
 - Learning Support Educator

3. In what school setting do you teach?
 - Public School
 - Church School
 - Independent School
 - Resource Centre

4. Which school year does the student attend?
 - Early Years (KG2- Year1)
 - Primary Years (Year 2- Year 6)
 - Middle School (Year 7-8)
 - Senior School (Year 9-11)
 - Resource Centre

5. How old is the student?
 - Enter Age

6. Does the student have difficulties with Hearing?
 - Yes
 - No
 - I am not aware of the hearing abilities of the student

7. Has the student been assessed for **reading/writing difficulties** by and Educational Psychologist or Literacy Specialist?
 - Yes
 - No
 - I am not aware of the assessment

8. Does your student participate in a mainstream classroom /school setting?
 - Yes
 - No

9. If yes, approximately what proportion of the average school day does this occur
 - 100%
 - 80%
 - 60%
 - 40%
 - 20%
 - <20%

10. Does your student attend a resource centre?
 - Yes
 - No
 - Attends Part-time

11. If none of these options appropriately apply to your student, please describe their situation here (e.g complimentary class for reading, reduced timetable) _____

12. What language does your student use?
 - Maltese
 - English
 - Both

13. What language does the student use at home?
 - Maltese
 - English
 - Both

14. In what language is literacy instruction carried out?
 - Maltese
 - English
 - Both

15. How was the language of instruction decided?
 - During an IEP
 - By the Teacher
 - By the Parents
 - Other: Specify _____

**Section B: Towards Independent Reading
(reading by the child)**

16. Does your student participate in activities relating to reading instruction in the classroom?
1. Never/rarely
 2. Occasionally
 3. Weekly
 4. Several times/week
 5. Daily Several times/day

17. If yes, please describe what activities he/she participates in and the length of time he/she remains engaged.
-
-

18. How many lessons a week are dedicated to these activities?

- 1
- 2
- 3
- 4 or more

19. If yes, what is the format of these activities relating to reading instruction? (circle all those that apply)

- Individual
- small group
- large group

20. Are there activities related to reading instruction your student does not participate in?

- Yes
- No

21. If yes, please list them here.
-
-

22. Why doesn't the student follow this type of reading instruction?

23. Does your student read books independently?

1. Never/rarely
2. Occasionally
3. Weekly
4. Several times/week
5. Daily Several times/day

24. Does your student pretend to read the story in a book, such as sitting with a book and producing speech that is similar to the actual story in the book?

1. Not yet
2. Has but rarely Occasionally
3. A few times/story
4. Often during story Usually

26. Does your student take reading books home from school for home practice?

1. Never/rarely
2. Occasionally
3. Weekly
4. Several times/week
5. Daily Several times/day

27. Does your student receive extra help with his/her reading at school?

1. Never/rarely
2. Occasionally
3. Weekly
4. Several times/week
5. Daily Several times/day

28. If yes, what sort of help does she/he receive?
-
-

29. If yes, who provides this support?
-
-

30. List some resources that are used for reading instruction?
-

31. Are there challenges providing reading instruction for this student?

- Yes
- No

32. If yes, please describe what the challenges are, as well as ways you find to manage them.
-
-

33. Does your student ask you how to spell words?

1. Never/rarely
2. Occasionally
3. Weekly
4. Several times/week
5. Daily Several times/day

34. Are there challenges providing spelling instruction for this student?

- Yes
- No

35. If yes, please describe what the challenges are as well as ways you find to manage them. _____

36. Does the student follow an alternative programme for reading instruction?

- Yes
- No

37. Who is responsible for planning the reading programme?

- Teacher
- LSE
- Early Intervention Teacher
- Speech-Language Pathologist
- Other: Specify _____

38. Who is responsible for implementing the programme?

- Teacher
- LSE
- Complimentary Teacher
- Other: Specify _____

39. What method of reading instruction is used with your student?

- Phonic Method (for example sounding out the letter sounds)
- Look and Say (using flashcards)
- Both Methods

40. In your opinion, what is the best method for reading instruction for students with DS?

1. Phonic Method (for example sounding out the letter sounds)
2. Look and Say (using flashcards)
3. Both Methods

41. Does your student recognise letters of the alphabet? (such as pointing to the letter "A" when you ask him/her to?)

1. Not yet
2. Has but rarely
3. Occasionally
4. Often
5. Usually Always

42. Do you attempt to teach the names of letter in the alphabet and/or alphabet sounds when reading?

1. Not yet
2. Have but rarely
3. Occasionally A few times/story
4. Often during story Usually

• during other activities?

1. Not yet
2. Have but rarely
3. Occasionally
4. Few times/story
5. Often during story
6. Usually

Section C: Writing

43. Does your student participate in activities relating to writing activities in the classroom?

1. Never/rarely
2. Occasionally
3. Weekly
4. Several times/week
5. Daily Several times/day

44. If yes, please describe what activities he/she participates in and the length of time he/she remains engaged.

45. If yes, on average, how many hours per week?

46. Are there activities related to writing instruction your student does not participate in?

- Yes
- No

47. If yes, please list them here.

Section D: Technology

48. Do you have a computer in the classroom?

- Yes
- No

49. If so, does your student use it?

- Yes
- No

50. Average number of hours per week?

51. What computer programmes does he/she enjoy?

Section E: Conclusion

52. If you have any further comments you would like to make, please do so here.

References

- Agius, R. (2012). *The development of a literacy assessment battery for Maltese children* [Doctoral dissertation, University of Malta]. UoM Campus Repository. <https://www.um.edu.mt/library/oar/handle/123456789/35312>
- Baylis, P., & Snowling, M. J. (2012). Evaluation of a phonological reading programme for children with Down syndrome. *Child Language teaching and therapy*, 28(1), 39–56. <https://doi.org/10.1177/0265659011414277>
- Bird, E. K. R., & Chapman, R. S. (2011). Literacy development in childhood, adolescence, and young adulthood in persons with Down syndrome. In *The Oxford handbook of intellectual disability and development* (pp. 184-199). Oxford University Press Toronto, Canada.
- Buckley, S. (2003). Literacy and language. *Speech and language intervention in Down syndrome*, 132-153.
- Bird, E. K. R., Cleave, P., Trudeau, N., Thordardottir, E., Sutton, A., & Thorpe, A. (2005). The language abilities of bilingual children with Down syndrome. *American Journal of speech-language pathology*, 14(3), 187–199. [https://doi.org/10.1044/1058-0360\(2005/019\)](https://doi.org/10.1044/1058-0360(2005/019))
- Burgoyne, K. (2009). Reading interventions for children with Down syndrome. *Down Syndrome Research and Practice*.
- Camilleri Grima, A. (2013). A select review of bilingualism in education in Malta. *International Journal of Bilingual Education and Bilingualism*, 16, 553–569. <https://doi.org/10.1080/13670050.2012.716813>
- Cossu, G., Rossini F., & Marshall, J. C. (1993). When reading is acquired but phonemic awareness is not: A study of literacy in Down's Syndrome. *Cognition*, 46(2), 129–138. [https://doi.org/10.1016/0010-0277\(93\)90016-O](https://doi.org/10.1016/0010-0277(93)90016-O)
- Cupples, L., & Iacono, T. (2000). Phonological awareness and oral reading skill in children with Down syndrome. *Journal of Speech, Language, and Hearing Research*, 43(3), 595–608. <https://doi.org/10.1044/jslhr.4303.595>
- Edgin, J., Spanō, G., & Nadel, L. (2011). Advances in clinical endpoints for neurocognitive rehabilitation in Down syndrome. In J. Rondal, J. Perera, & D. Spiker (Eds.), *Neurocognitive rehabilitation of Down syndrome* (pp. 36-51). Cambridge University Press.
- Fannan, C. M. (2017). Teaching Strategies for Students with Exceptionalities in the Secondary Art Classroom with a Focus on Students with Autism, Down Syndrome, and Visual Impairment. [Undergraduate Dissertation]. University of Central Florida.
- Faragher, R., & Clarke, B. (2014). *Educating learners with Down syndrome*. New York: Routledge.

- Faragher, R., Robertson, P., & Bird, G. (2020). International guidelines for the education of learners with Down syndrome. *DSI*.
- Giel-Romo, J. (2014). Primary Education Teachers' Perceptions of Effective Inclusion of Students With Down Syndrome [Doctoral dissertation]. Walden University.
- Goetz, K., Hulme, C., Brigstocke, S., Carroll, J. M., Nasir, L., & Snowling, M. (2008). Training reading and phoneme awareness skills in children with Down syndrome. *Reading and Writing*, 21, 395-412. <https://doi.org/10.1007/s11145-007-9089-3>
- King, S., Rodgers, D., & Lemons, C. J. (2022). The Effect of Supplemental Reading Instruction on Fluency Outcomes for Children With Down Syndrome: A Closer Look at Curriculum-Based Measures. *Exceptional Children*, 88(4), 421-441. <https://doi.org/10.1177/00144029221081006>
- Lemons, J., & Fuchs, D. (2010). Phonological awareness of children with Down syndrome: Its role in learning to read and the effectiveness of related interventions. *Research in Developmental Disabilities*, 31,(2), 316–330. <https://doi.org/10.1016/j.ridd.2009.11.002>
- Lemons, C. J., King, S. A., Davidson, K. A., Puranik, C. S., Fulmer, D., Mrachko, A. A., ... & Fidler, D. J. (2015). Adapting phonological awareness interventions for children with Down syndrome based on the behavioral phenotype: A promising approach?. *Intellectual and Developmental Disabilities*, 53(4), 271-288. <https://doi.org/10.1352/1934-9556-53.4.271>
- Lemons, C. J., King, S. A., Davidson, K. A., Puranik, C. S., Al Otaiba, S., Fulmer, D., ... & Fidler, D. J. (2017). Developing an early reading intervention aligned with the Down syndrome behavioral phenotype. *Focus on Autism and Other Developmental Disabilities*, 32(3), 176-187. <https://doi.org/10.1177/1088357615618941>
- Lemons, C. J., King, S. A., Davidson, K. A., Puranik, C. S., Al Otaiba, S., & Fidler, D. J. (2018). Personalised reading intervention for children with Down syndrome. *Journal of School Psychology*, 66, 67-84. <https://doi.org/10.1016/j.jsp.2017.07.006>
- Lorenz, S. (1998). *Children with Down's Syndrome. A guide for teachers and support assistants in mainstream primary and secondary schools*. David Fulton Publishers.
- Loveall, S. J., Hawthorne, K., & Gaines, M. (2021). A meta-analysis of prosody in autism, Williams syndrome, and Down syndrome. *Journal of Communication Disorders*, 89, 106055. <https://doi.org/10.1055/s-0041-1730991>
- Martin, G. E., Klusek, J., Estigarribia, B., & Roberts, J. E. (2009). Language characteristics of individuals with Down syndrome. *Topics in language disorders*, 29(2), 112. <https://doi.org/10.1097/TLD.0b013e3181a71fe1>
- McFadden, A. T. (2014). *The experiences of teachers teaching children with down syndrome in the early years of schooling* [Doctoral dissertation]. Queensland University of Technology.

- Ministry of Education and Employment. (2016). *A National Curriculum for all*. Salesian Press.
- Muscat, L. & Grech, H. (2023). Nonword reading and other reading-related skills in Down syndrome. *Journal of Research in Special Educational Needs*, 00, 1– 19. <https://doi.org/10.1111/1471-3802.12604>
- Næss, K. B., Melby-Lervåg, M., Hulme, C., & Lyster, S. H. (2012). Reading skills in children with Down syndrome: A meta-analytic review. *Research in Developmental Disabilities*, 33(2), 737–747. <https://doi.org/10.1016/j.ridd.2011.09.019>
- Næss, K. A. B., Lervåg, A., Lyster, S. A. H., & Hulme, C. (2015). Longitudinal relationships between language and verbal short-term memory skills in children with Down syndrome. *Journal of Experimental Child Psychology*, 135, 43-55. <https://doi.org/10.1016/j.jecp.2015.02.004>
- Robles-Bello M. A., Sánchez-Teruel D., & Camacho-Conde J. A. (2020). Variables that predict the potential efficacy of early intervention in reading in Down syndrome. *Psicología Educativa*, 26(2), 95–100. 10.5093/psed2020a1.
- Scriha, L. (2001). Trilingualism in Malta: Social and educational perspectives. –*International Journal of Bilingual Education and Bilingualism*, 4(1), 23–37. <https://doi.org/10.1080/13670050108667716>
- Vella, A. (2013). Languages and language varieties in Malta. *International Journal of Bilingual Education and Bilingualism*, 16(5), 532–552. <https://doi.org/10.1080/13670050.2012.716812>
- Wishart, J. (2000). Motivation and learning styles of children with Down syndrome. *Down Syndrome Research and Practice*, 7(2), 47–51. doi:10.3104/reports.113

Towards the Design and Implementation of a Blended Learning Framework for Student-Centredness

Munienge Mbodila, Walter Sisulu University, South Africa

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

In the 21st century, the use of the internet and technology become essential in every facet of a life. The outbreaks of the Covid-19 pandemic, prevent direct human contact but increase the usage of digital technology for numerous services. Traditional teaching methods called also face-to-face in educational environments have changed in order to conform to a new norm that incorporates technology into all curricula, including how faculty plan and perform tuition. The use of learning management systems (LMSs), which offer technological tools for learning and teaching, is widespread among higher education institutions (HEIs) worldwide, particularly in South Africa (SA). The design and implementation of a blended learning framework for student-centeredness (BL4SC) by one of the South African rural universities are presented in this study. The design and implementation of the BL4SC by one of South Africa's rural universities are presented in this study. The paper describes integrating online learning components with other delivery techniques already in use at the university. The goal was to expand the flexible learning mode already in place, develop a learning environment that is more student-centered, and increase both staff and student participation. Furthermore, it examines some of the possible benefits of integrating online components into flexible delivery methods that heavily utilize a technologically infused strategy. These include opportunities to create students' educational experiences and foster their collaboration as they develop and increase their independence, self-reliance, and other skills they need for lifelong learning that they may use in a variety of academic fields and across various disciplines.

Keywords: Blended-Learning, E-learning, Student-Centered Approach, Educational Technology, Higher Education

iafor

The International Academic Forum
www.iafor.org

Introduction

The Covid-19 pandemic outbreaks prevent direct human contact while increasing the use of digital technology for a variety of services (Monaghesh & Hajizadeh, 2020). Traditional teaching strategies, also known as face-to-face instruction, have evolved to fit into a new norm that integrates technology into all curricula, including how faculty plan and deliver tuition. Higher education institutions (HEIs) all over the world, but especially in South Africa (SA), use learning management systems (LMSs), which provide technological tools for teaching and learning. Technology has advanced significantly over the last decades (El-Khalili & El-Ghalayini, 2014). The explosion of technology has an impact on almost every aspect of daily life. The effects these technological advancements have on education, however, appear to be more recent. Schools all over the world are gaining access to technology, and this availability has come a shift toward integrating that technology into education (Singh et al., 2021). One of the biggest changes brought about by technology access in the classroom has been a shift away from traditional learning and toward blended learning, which (Schaber et al., 2010) describe as being disruptive to learning as it has previously been known. In the majority of cases, the term “traditional learning” refers to in-person instruction that takes place in a setting with four walls, where both teachers and students are present in the same location at the same time (Ndebele & Mbodila, 2022). Contrarily, online learning is most often defined as instruction delivered entirely through web-based platforms, regardless of the student’s preferred location, time of day, or rate of learning (Ndebele & Mbodila, 2022). Therefore, a combination of traditional and online learning is the most straightforward way to define blended learning (Singh et al., 2021) (Songca et al., 2021; Alijani et al., 2014; Dangwal, 2017). By extending this definition of blended learning, (dan Dangwal, 2017) include indirect instruction and collaborative teaching in addition to face-to-face instruction and online learning.

In order to create a learning environment that combines the most beneficial elements of (Singh et al., 2021) in-person and online learning, (Al Musawi, 2011) expands on this definition by stating that blended learning combines three key factors: student needs, access to technology, and preference for traditional instruction. According to (Hajjian et al., 2011), blended learning combines the best elements of traditional and online as well as incorporates a variety of learning theories to increase the effectiveness of instruction. In order to create a more student-centered learning environment and increase both staff and student participation, this paper will examine the flexible learning mode already in use at one of the South African rural Universities. Additionally, it looks at some of the potential advantages of incorporating online components into adaptable delivery techniques that heavily depend on the technological-infused approach to teaching.

The following section of this paper will review the literature from the historical perspective underlying the theoretical framework of blended learning to better understand how and why these changes occurred. Furthermore, it will explain the concept of students-centredness environment, the benefits of integrating online components into teaching, as well as the WSU blended learning framework for student-centredness (BL4SC) is presented. Finally, the components of WSU blended learning framework for student-centredness and the BL4SC implementation Framework is presented.

Literature Review

Blended Learning Historical Perceptive

Over the past few decades, the education system worldwide had undergone significant changes due to the quick advancement in technological developments. Traditional learning known as face-to-face was the most common classroom structure up until very recently (Schaber et al., 2010; Mbodila et al., 2019; Nortvig et al., 2018), traditional learning refers to a classroom structure where teaching and learning take place in a physical space with both teachers and students present. Online learning first became popular in the 1990s (Schaber et al., 2010). Online learning, in a contrast to traditional learning, refers to a course that is entirely conducted online; there is no physical classroom present, and both teachers and students can participate synchronously or asynchronously (Nortvig et al., 2018; Songca et al., 2021; Ndebele & Mbodila, 2022). When online learning first became available, it was widely believed that it could support an indefinite number of students and was therefore the most cost-effective option for education (Schaber et al., 2010). Administrators across the country started pursuing teachers to turn their courses into online platforms as early as the mid-1990s due to the economic viability of online learning (Schaber et al., 2010). Shortly after, it started become a common misconception that online learning would completely replace traditional learning (Haijian et al., 2011). Although lecturers were now available online, learning was still largely a passive activity, which is why this push to online learning did not prove as successful as anticipated (Schaber et al., 2010). Consequently, despite offering various learning and teaching flexibility and being cost-effective, the implementation and adoption of online learning have had many challenges (Mbodila & Leendertz, 2020).

Blended Learning Overview

A third method of teaching emerged and is known as blended learning as a result of combining traditional and online learning practices. The benefits of various technologies and applications were thus combined to create blended learning (Haijian et al., 2011). According to the literature, blended learning is the blending of various pedagogical or instructional approaches, such as self-paces, collaborative, tutor-supported learning, or traditional classroom instruction. When we talk about blended learning, we frequently mean the use of or access to materials that combine e-learning with other educational resources (Songca et al., 2021). Since blended learning became popular, there has been a lot of debate and research comparing traditional, online, and blended learning to see which is the most efficient method.

The idea of the researchers was to determine which of these approaches will produce the best learning outcomes, the highest level of student satisfaction, and the highest level of credit completion (Alijani et al., 2014; Anthony et al., 2022; Al Musawi, 2011). However, once the data is combined, it tends to show that there are a variety of factors that affect how effective a program of study is, one of these is the proportion of coursework that is completed online as opposed to in a traditional classroom. Even though it may seem that using both online and offline activities at once is preferable to using only one or the other, developments in blended learning over the past years have resulted in an increase in students' participation, a change in the way that learning is structured, and a change in the way that students are motivated (Haijian et al., 2011). As it has been observed over the past few years, blended learning has the potential to be a tool for this restructuring because it does not only naturally increase the number of opportunities for students to receive individualized, one-on-one instruction on a regular basis but it expands the number of opportunities for Student-Centredness.

Students-Centredness Environment

The concept of student-centredness is used to describe curricula and instructional settings that put a heavy emphasis on students' learning activities. There are various variations of environments that are student centered. Even though the structures and objectives of a student-centered learning environment vary, they also have some interesting similarities. Learners are presented with an authentic task in most so-called student-centered learning environments in order to foster relevant learning experiences (Grabinger, 1996). According to the literature, authentic learning requires students to make use of various technological skills, which enable them to learn by doing and visualize teaching which influences their learning outcomes (Mbodila et al., 2020). For instance, if students are asked to write a report on the energy consumption in their own area rather than receiving information about energy usage in a text-based format. Most student-centered learning environments make an effort to replace a test culture with an assessment culture. By contrasting them with other forms of instruction, different authors have tried to systematically describe the characteristics of student-centered learning environments.

A student-centered learning environment is designed specifically to encourage students to engage in active and collaborative learning that involves various learning approaches which allow students to engage and be active. student-centered is an approach that creates an active learning environment and gives students a stimulus to reflect on the activity. in this approach, the teacher serves as coaches and scaffolders, stepping in, when necessary, without interfering, responding to any questions that students may have while working on a task, and comparing the results of the various groups after each activity. This approach can be practical when implementing blended learning into learning and teaching. However, the flexibility that blended learning naturally offers, makes it clear that catering to the unique needs of each student is no longer an impossible task. (Béres et al., 2012) outline several models that have been created to improve the practice of e-learning in addition to the numerous theoretical frameworks for learning styles and preferences that have been linked to blended learning. One such model is Anderson's Online Learning Model (Béres et al., 2012), which combines community-based learning, inquiry, and collaboration. Another model created for the implementation of blended learning is (Bidder et al., 2016) Flexible Learning Approach, which is described by (Béres et al., 2012). This model links the various aspects of flexibility, such as time, course content, entry requirements, instructional approaches/resources, and delivery/logistics, to the two fundamental categories of acquisition and contribution.

Benefits of Integrating Online Components Into Teaching

For the development of a successful blended learning strategy, it is crucial to combine traditional ways of teaching and learning with online resources. There are many different online teaching and learning resources available. Nearly every component of classroom instruction can be improved upon by integrating some situations with online technology. According to the literature, the classroom environment can be divided into four components: administration, assessment, content distribution, and community (Schmidt, 2004). Many internet resources and web applications technology are available to assist in integrating these components in the classroom. However, the right choice of these online resources will depend on the quality of those that are offered, the technical proficiency of teaching and students, as well as the educational content (Schmidt, 2004). According to research, using online teaching and learning platforms increases student interest and participation. Online tools enable students to use the knowledge in a way that is suitable and adequate for them because their learning abilities and

styles differ from one another. This also improves the learning process and experience of students and equip them with a variety of skills (Pappas, 2018; Mbodila et al., 2019). In order to meet the demands of more students accessing higher education that we are currently unable to provide in face-to-face modality, governments and HEIs around the world, and in South Africa in particular, are anticipating to develop more online courses (Department of Higher Education and Training, 2013, Department of Education, 2007). Additionally, the use of online components in learning and teaching encourages students' retention and allow synchronous and asynchronous interaction between students and lecturers via their computers, mobiles devices, and the Internet (Bates, 2005; Mbodila et al., 2020; Songca et al., 2021). Flexibility is the most frequently mentioned advantage of online learning as it allows students to communicate at anytime and anywhere by improving their communication skills and enhancing their learning experiences (Mbodila et al., 2019; Bates, 2005; Mbodila et al., 2020; Songca et al., 2021). Many of the above- mentioned benefits offered by some online components were identified-as some of the features in achieving the BL4SC at WSU.

The Setting of the Study

In the South African context, geographically, and history some universities are “previously disadvantaged” and is still underfunded. Most of these institutions physical located in rural area, and this has an impact on their capacity to recruit and retain academic staff, which in turn has an impact on the quality of teaching (Songca et al., 2021). The university under the case study is located in a rural area and offers an opportunity to use online formats for teaching and learning to make up for geographic isolation as well as the challenge of finding technical and professional support for the efficient operation of online platforms (Ndebele et al., 2016; Mollenkopf, 2009). The institution has four campuses spread across four dispersed locations in the Eastern Cape province of South Africa, namely in Mthatha, Butterworth, Buffalo City, and Komani formerly Queenstown (Songca et al., 2021). The university established its new strategic plan for 2020 – 2030 which is in line with its value-driven to become a technologically-infused African university (Songca et al., 2021). Considering this, the university developed its position statement on blended learning (BL) that aims to provide an institutional understanding of blended learning and to encourage institutional relevance and adoption.

WSU Blended Learning Framework for Student-Centredness (BL4SC)

According to the institutional teaching and learning Policy, blended learning (BL) is defined as the transformation of the student learning experience through the integration of educational technologies with face-to-face instruction (WSU Teaching and Learning policy, 2020). This definition is in line with a study done by the U.S. Department of Education in 2008, which defines BL as “a combination of online and in-class instruction (Parsad et al., 2008). Following the above definitions, the aim of the BL4SC is to promote the use of various emerging technologies in learning and teaching as a supplement to traditional face-to-face to improve student learning experiences. The accepted teaching philosophy at the university under this case study is student-centeredness. Hence, blended learning for student-centeredness, or BL4SC, is how it refers to it. To achieve student-centeredness, BL4SC at WSU aims to (WSU Statement on Blended Learning, 2021):

- Increase the flexibility of access and participation in all formal and non-formal educational offerings.)
- Promote inclusiveness and self-directed learning.

- Encourage student collaboration, interaction, engagement, and communication with both the lecturer and other students.
- Promoting the use of digital technologies in all programs and incorporating emerging technologies into the planning and creation of curricula.

The Components of WSU Blended Learning Framework for Student-Centredness

Depending on the need of the students, the learning objectives, the discipline, and the makeup of knowledge construction and application in that field, need different educational technologies to be incorporated into the program and course. According to the institution's Teaching and Learning Policy (2020), this strategy is appropriate. However, the incorporation of face-to-face teaching and learning within this framework is to expand the flexible learning mode of teaching and learning already in place and increase both staff and student participation. The WSU BL4SC uses various traditional teaching and learning practices in the curriculum. However, it infuses technology to enhance these existing approaches and their delivery space. Figure 1 below displays the components of the WSU Technology Infused BL4SC.

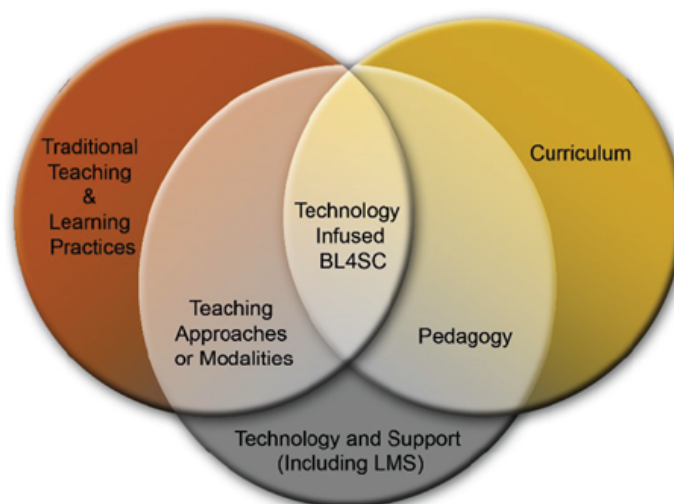


Figure 1: WSU Technology Infused BL4SC (WSU Statement on Blended Learning, 2021)

Following the above, the WSU Technology Infused BL4SC comprised of components such as: the curriculum, pedagogy, traditional teaching and learning practices, teaching approached or modalities, technology infused and technology support which include the LMS. These components, interact with each other's. However, the infusion of technology makes the framework to be more authentic in implementation and application because it introduces a portion of digital technology that changes the curriculum, the pedagogy, the teaching delivery, as well as the teaching and learning platform. The BL4SC provides students with various opportunities such as effective learning design, online communication, effective knowledge construction, and a platform to engage with other students in a synchronous and asynchronous. Being inspired by the University of the Sunshine Coast Blended Learning Continuum (2012), Figure 2, explains and describes the WSU BL4SC framework in detail.

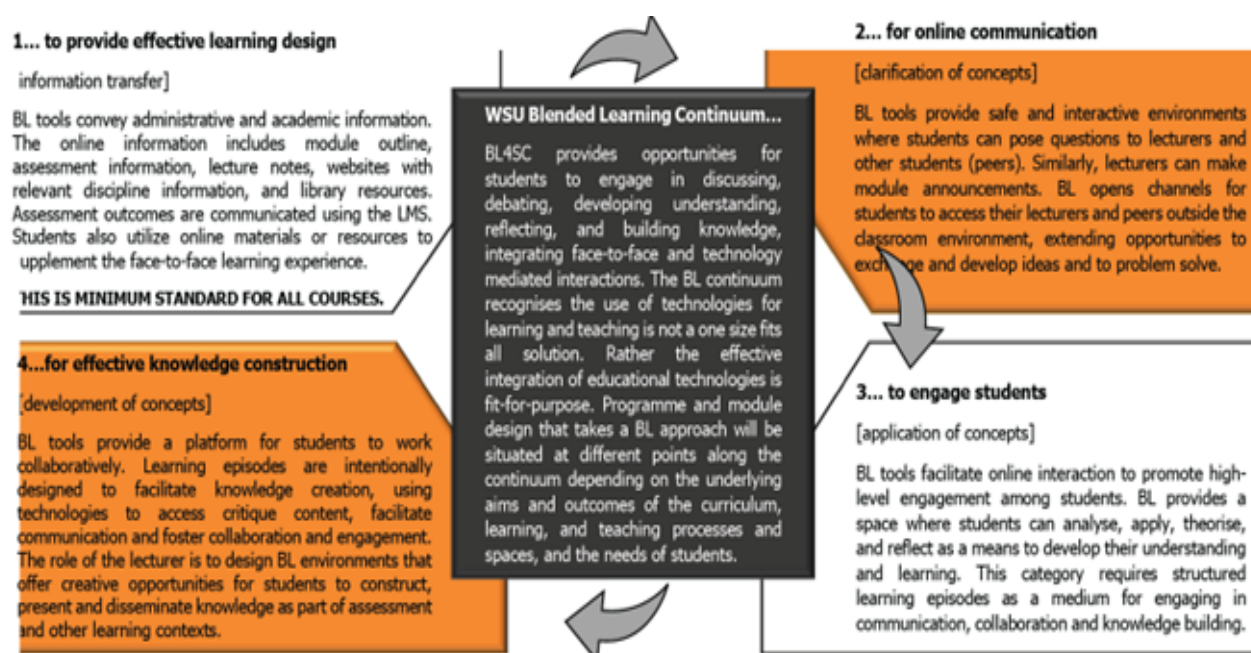


Figure 2: WSU BL4SL Framework Description (WSU Statement on Blended Learning, 2021)

BL4SC Implementation Framework

In learner-centredness-approach put students in center of learning activities as opposed to the teacher. This approach promotes active learning whereby the student is treated as a partner and the teacher as a coach to assist in the learning process. These approaches allow students to be involved and make a meaningful contribution to teaching and learning. In the student-centeredness learning environment, active learning approach is one of the approaches that is expected to promote students' collaboration in an online platform. Through the integration of face-to-face and technology-infused, BL4SC offers students the opportunity to share teaching and learning content and facilitate inquiry-based learning (IBL). Using various approaches students can construct knowledge and be given feedback from various assessments and learning activities timeously. These sequences of activity can be tracked and monitored in order to put interventions in place for students and modules underperformance. The illustration in figure 3, explain in detail the BL4SC implementation framework process, that need to be taken into consideration when blending during face-to-face sessions and well as online session being synchronous or asynchronous.

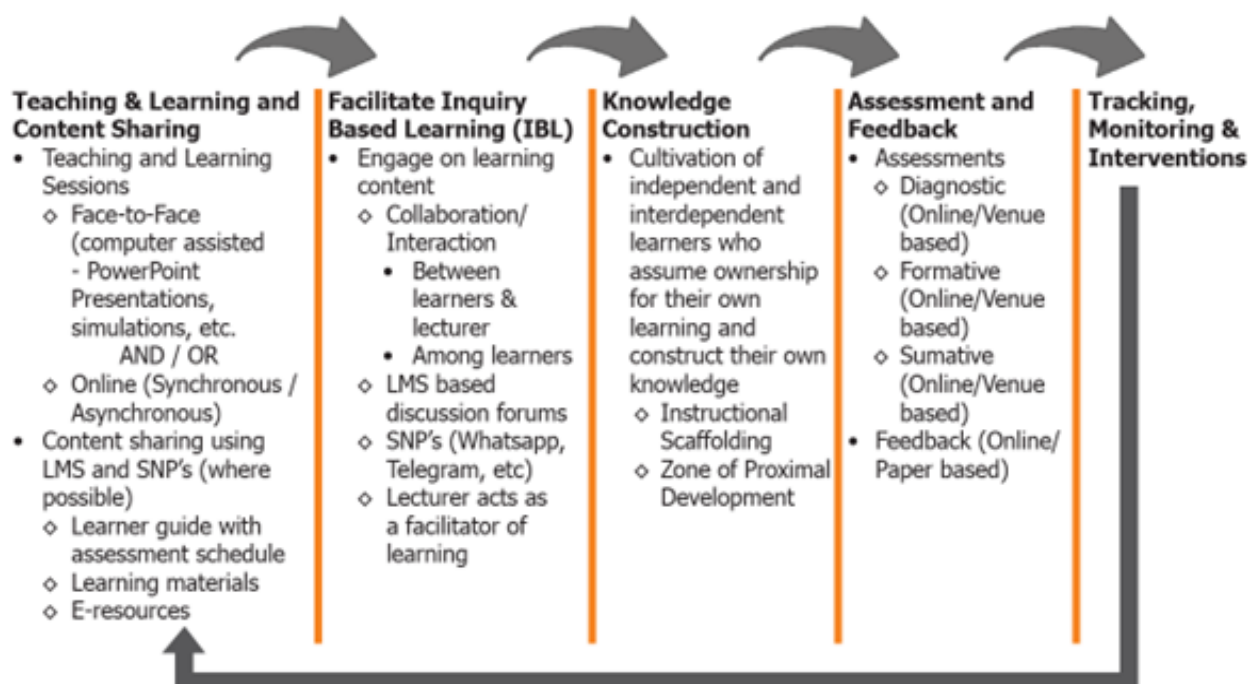


Figure 3: BL4SC Implementation Framework Process (WSU Statement on Blended Learning, 2021)

Discussion

Blended learning combines traditional face-to-face instruction with online learning components, aiming to provide a flexible and personalized learning experience for students. The design and implementation of a blended learning framework for student-centredness incorporate face-to-face teaching and learning components to expand flexibility and increase both staff and student participation. The framework focuses on using infusing technologies in various teaching approaches, pedagogies, teaching practices, and modalities that place students at the center of the learning process, tailoring instruction to their individual needs, and promoting active engagement. One of the key advantages of this framework is its ability to cater-for diverse learning styles and preferences by infusing technology into the curriculum and incorporating online components. Such online can be pedagogies, multimedia resources, and various teaching modalities using the LMS to create interactive environments and activities for students to be able to engage with the material in a variety of ways and enhancing their understanding and retention. This flexibility allows students to take ownership of their learning, as they can choose the pace, time, and place that works best for them. In addition, it gives students the opportunity to share teaching and learning content and facilitate inquiry-based learning (IBL). Using various approaches students can construct knowledge and be given feedback from various assessments and learning activities timeously. It also encourages self-directed learning skills and fosters a sense of responsibility and independence. Another important aspect of this framework is the integration of technology. The use of online platforms, learning management systems, and educational tools provides opportunities for collaborative learning, real-time feedback, and assessment. Students can actively participate in discussions, collaborate on projects, and receive immediate feedback on their progress if the BL4SC is properly used. This does not only enhances their learning experience but It also prepares them for the digital age and develops their digital literacy skills, which are increasingly important in today's society. Additionally, using the BL4SC process in the student-centered approach fosters a supportive and inclusive learning environment. By considering

students' interests, abilities, and prior knowledge, using BL4SC educators can design learning experiences that are relevant and meaningful. They can incorporate real-world examples, authentic tasks, and problem-solving activities that promote critical thinking and application of knowledge. Furthermore, the framework encourages peer interaction and collaboration, as students can engage in online discussions, group projects, and peer feedback. This collaborative aspect enhances social learning and helps students develop communication and teamwork skills.

However, there are difficulties in implementing a framework for blended learning that is student-centered. For implementation to be successful, there must be a sufficient level of technological infrastructure, as well as access to devices and the Internet. The learning process could be uneven since not all students may have equal access to these resources. Institutions and educators must take these differences into account and work to close the digital divide. However, there are challenges in implementing BL4C that vary from person to resource. For a successful implementation of BL4C, there must be a sufficient level of technological infrastructure, academic adoption, skills as well as access to devices and the internet. The learning process could be uneven since not all students may have equal access to these resources. Institutions and educators must take these differences into account and work to close the digital divide.

Conclusion

In conclusion, the design and implementation of BL4SC offer many advantages to both teachers and students. This paradigm encourages flexibility, customization, and active engagement by including both face-to-face training and online components. It supports a variety of learning preferences and types while encouraging digital literacy and self-directed learning techniques. Technology integration offers real-time feedback, assessment, and collaboration learning. Additionally, the student-centered approach fosters social interaction, critical thinking, and application of the information in a welcoming and inclusive learning environment. Despite difficulties like technical inequalities, these barriers can be addressed with the right preparation and assistance. To guarantee that all students have fair access to resources and opportunities, the institution, educators, administrations, and policymakers must work together to enforce full implementation of the blended learning framework for student centered. By embracing this framework, educational institutions can enhance the learning experience, empower students, and prepare them for success in the digital age.

Acknowledgment

The author, acknowledge the contributions of the WSU e-learning expert for their effort and support in the development of the WSU Blended Learning Statement. In addition, the author would like to give thanks also to the directorate of research and innovation at WSU for their financial support in the publication of this article.

References

- Al Musawi, A. S. (2011). Blended learning. *Journal of Turkish Science Education*, 8(2), 3-8.
- Alijani, G. S., Kwun, O., & Yu, Y. (2014). Effectiveness Of Blended Learning In Kipp New Orleans'schools. *Academy Of Educational Leadership Journal*, 18(2), 125.
- Anthony, B., Kamaludin, A., Romli, A., Raffei, A. F. M., Phon, D. N. A. E., Abdullah, A., & Ming, G. L. (2022). Blended learning adoption and implementation in higher education: A theoretical and systematic review. *Technology, Knowledge and Learning*, 1-48.
- Béres, I., Magyar, T., & Turcsányi-Szabó, M. (2012). Towards a personalised, learning style based collaborative blended learning model with individual assessment. *Informatics in Education*, 11(1), 1-28.
- Bidder, C., Mogindol, S. H., Saibin, T. C., Andrew, S. A., & Naharu, N. (2016). Students' perceptions of blended learning and achievement. *Envisioning the Future of Online Learning: Selected Papers from the International Conference on e-Learning 2015*.
- dan Dangwal, L. (2017). Blended Learning: An Innovative Approach. *Universal Journal of Education Research*.
- Dangwal, K. L. (2017). Blended learning: An innovative approach. *Universal Journal of Educational Research*, 5(1), 129-136.
- El-Khalili, N. H., & El-Ghalayini, H. (2014). Comparison of Effectiveness of Different Learning Technologies. *International Journal of Emerging Technologies in Learning*, 9.
- Grabinger, R. S. (1996). Active Learning in the Higher Education Classroom. *Constructivist learning environments: Case studies in instructional design*, 65.
- Haijian, C., Hexiao, H., Lei, W., Weiping, C., & Kunru, J. (2011). Research and application of blended learning in distance education and teaching reform. *International Journal of Education and Management Engineering*, 1(3), 67-72.
- Mbodila, M., & Leendertz, V. (2020). Blackboard or WhatsApp: Which space South African rural students access and engage with more? *EdMedia+ Innovate Learning*.
- Mbodila, M., Marongwe, N., & Kwahene, F. (2020). The use of social media as a knowledge sharing platform during Covid-19 among students in a rural university: A comparison of email and WhatsApp. *ICERI2020 Proceedings*.
- Mbodila, M., Ndebele, C., & Mbodila, M. (2019). Assessing options for ICTs integration in the classroom at a rural based South African University. *African Journal of Gender, Society & Development*, 8(2), 37.

- Mbodila, Mkabile & Ndebele (2019). Critical Success Factors for the Effective Implementation of e-Learning in South African Higher Education Institutions, / *JGIDA* Volume 8 Number 3, December 2019 pp. 229-249.
- Mollenkopf, D. L. (2009). Creating highly qualified teachers: Maximizing university resources to provide professional development in rural areas. *Rural Educator*, 30(3), 34-39.
- Monaghesh, E., & Hajizadeh, A. (2020). The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence. *BMC public health*, 20, 1-9.
- Ndebele, C., & Mbodila, M. (2022). Examining Technology Acceptance in Learning and Teaching at a Historically Disadvantaged University in South Africa through the Technology Acceptance Model. *Education Sciences*, 12(1), 54.
- Ndebele, C., Muhuro, P., & Nkonki, V. (2016). Rurality and the professional development of university teachers. *South African Journal of Higher Education*, 30(6), 127-145.
- Nortvig, A.-M., Petersen, A. K., & Balle, S. H. (2018). A literature review of the factors influencing e-learning and blended learning in relation to learning outcome, student satisfaction and engagement. *Electronic Journal of E-learning*, 16(1), pp46-55-pp46-55.
- Parsad, B., Lewis, L., & Tice, P. (2008). *Distance education at degree-granting postsecondary institutions: 2006-2007*. National Center for Education Statistics, Institute of Education Sciences.
- Schaber, P., Wilcox, K. J., Whiteside, A. L., Marsh, L., & Brooks, D. C. (2010). Designing learning environments to foster affective learning: Comparison of classroom to blended learning. *International Journal for the Scholarship of Teaching and Learning*, 4(2), n2.
- Schmidt, K., (2004). A Model to Integrate Online Teaching and Learning Tools into the Classroom. *Journal of Technology Studies*, 30(2), pp.86-92.
- Singh, J., Steele, K., & Singh, L. (2021). Combining the best of online and face-to-face learning: Hybrid and blended learning approach for COVID-19, post vaccine, & post-pandemic world. *Journal of Educational Technology Systems*, 50(2), 140-171.
- Songca, R. N., Ndebele, C., & Mbodila, M. (2021). Mitigating the implications of covid-19 on the academic project at Walter Sisulu University in South Africa: A proposed framework for emergency remote teaching and learning. *Journal of Student Affairs in Africa*, 9(1), 41-60.

***Inculcating Creativity:
A Study on the Creative Abilities of Educators in the Field of Design***

Chiranjeevi Reddy Gudimetla, National Institute of Fashion Technology, India

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The study aims to evaluate the range of creative abilities of design educators in Indian colleges and universities. A total of 149 participants, including 49 males and 100 females, were surveyed using a questionnaire from the Leadership Assessment Tools. The study finds that only 2% of educators are classified as 'very creative,' and none are 'exceptionally creative,' with around 60% of educators being 'above average' in their creative ability scores. The study also suggests that educators with more experience or higher designation have higher creative ability scores. The findings of this study can be used to improve the curriculum, pedagogy, assignments, and evaluation criteria in educational institutions to promote creativity among educators and students.

Keywords: Creative Ability, Creative Thinking, Design Education, Higher Education, Inculcation of Creativity

iafor

The International Academic Forum
www.iafor.org

1. INTRODUCTION

Creativity is not limited to artistic skills but can be developed to generate innovative solutions for challenging and unforeseen tasks. Based on existing research, it is widely acknowledged that creative thinking has been overlooked at all educational levels, while critical thinking has been excessively emphasized.

Guilford (1950), one of the founders of the creativity theory, states that the six parameters of creativity are: 1) the ability to identify and state problems, 2) generating a large number of ideas, 3) quickly producing a variety of ideas, 4) creating remote associations and non-standard solutions, 5) the ability to improve by adding details, and 6) new ways of its application. Torrance (1979), known as the father of creativity, comprehended four characteristics of creativity: 1) fluency: a great number of ideas in a short time, 2) flexibility: simultaneously proposing a variety of ideas, 3) originality: the ability to produce new, original and unique ideas, and 4) elaboration; ability to systematize and organize the details of an idea. Creativeness is a facet of self-actualization, the highest level, as described by Maslow (1968). In order of importance, the five levels are as follows: physiological, safety, love and belonging, esteem, and self-actualization.

According to a study by Matraeva, et al. (2020) in the context of higher education, creativity is considered an integrative property, the key characteristics of which are the ability to produce original ideas, result-orientation, solution of practical problems, originality and speed of thinking, openness to new experience and, tolerance for uncertainty. Especially in economic contexts, brain-based skills such as emotional intelligence, creativity, cognitive flexibility, self-control or system thinking matter more than manual skills. (Smith. et al. 2021). Various researchers (Lima and Alencar, 2014; Hosseini, 2011; Alencar and Fleith, 2010; Csikszentmihalyi et al., 2007; Jackson, 2006, Fryer, 2007; Wisdom, 2007; Martizen, 2002) recognized that many educators do not know how to foster creativity in the educational setups. Actions speak louder than words; educators' creative abilities and performance are crucial for fostering students' creativity.

Given the aforementioned context and the research gap in this field, this study aims to evaluate the creative abilities of educators who work in Indian colleges and institutions. Consequently, the study sets forth the following objectives.

- 1) To assess the creative ability scores of design educators in India.
- 2) To compare the creative ability levels by gender, total years of experience, designation, and specialization categories.
- 3) To compare design educators' traits with creative persons' traits.
- 4) Identifying the creative ability aspects that have more scope for improvement for design educators.

Based on the objectives of the study, the research methodology adopted is described in the following sections.

2. RESEARCH METHODOLOGY

It is a descriptive quantitative study, based on the survey administered through an online questionnaire.

2.1. Survey Tool Used

To evaluate the creative ability of educators, this study utilized a questionnaire from the Leadership Assessment Tools. The questionnaire was developed by Btain Uzzi, who conducted extensive research on the characteristics of creative individuals across various fields and professions. According to Uzzi, the questionnaire assesses an individual's traits, attitudes, values, motivations, and interests that are indicative of creativity. The questionnaire consists of 39 items that use a three-point Likert scale (agree, undecided or don't know, and disagree) and an additional section where participants choose the ten best terms to describe their personality out of 54 given terms. Each question is assigned a score ranging from -2 to 4, depending on the response. The total scores range from -10 to 116, and different ranges correspond to various levels of creative ability. Specifically, total scores between 95-116 are considered exceptionally creative, between 65-94 are very creative, between 40-64 are above average, between 20-39 are average, between 10-19 are below average, and below 10 are non-creative.

The questionnaire was administered before the closing ceremony of the national-level online faculty development program (FDP).

2.2. Data Analysis

The information from educators was collected through Google Forms. MS Excel was used to conduct descriptive statistical analysis, and a free online application called "Free Wordcloud Generator" was employed to perform the word cloud analysis.

3. FINDINGS AND INTERPRETATION

The study's results are presented in various sections, including total scores, mean scores of selected categories, a word cloud image, and creative ability aspects that have a greater potential for improvement.

3.1. Demography and Objective Indicators of the Participants

A total of 149 participants responded completely out of the 200 registered for the national-level, five-day online Faculty Development Program (FDP) titled "Inculcating Creativity: Tools for Effective Thinking." conducted in July 2021 by the National Institute of Fashion Technology. The FDP was granted and funded by AICTE Training and Learning (ATAL) Academy, Department of Higher Education, Ministry of Education, India. 49 male and 100 female members having designations of Assistant Professors, Lecturers, Faculty, PGT Teachers, Ph.D. Scholars, Associate Professors, Senior Lecturers, Professors, and Librarians were part of this study. Their experience ranged from 0 to 30 years, with an average experience of 10 years. All participants are associated with the design activities and are interested in fostering creativity.

The participants are from the following design specializations: Accessory Design, Architecture, Communication Design, Education, Engineering, Fashion Design, Textile Design, Fine Arts, Design Management, Media, Product Design, Human resources, Journalism, Languages, and Sciences. They are from around 30 different institutions covering almost all the states of India. The list of educational institutions includes NIFTs, NIDs, Amity

University, Chandigarh University, Public Colleges, Manipal University, University of Madras, Engineering Colleges, IITs, etc.

3.2. Creative Ability Scores Among Educators

The individual total score of an educator is computed by summing up the scores for each answer they selected. By examining the frequency of each descriptive rating based on the individual total scores, it was determined that there are six levels of descriptive ratings. The highest possible score an individual could obtain is '+166,' while the lowest is '-17.' The research group's average total score is '+42.89.'

The frequency of total scores obtained by the participants is tabulated below in Table 1.

Table 1: Frequency of total scores obtained as descriptive ratings

Descriptive ratings	Range of total score	Frequency
1. Exceptionally creative	95-116	0
2. Very creative	65-94	3 (2.01%)
3. Above average	40-64	91 (61.07%)
4. Average	20-39	54 (36.24%)
5. Below average	10-19	1 (0.67%)
6. Non-creative	Below 10	0
Total		149

The frequency of individual total scores is presented above, with 91 (61.07%) falling in the above-average category and 54 (36.24%) in the average category. Only 3 (2.01%) were categorized as very creative, and 1 (0.67%) as below average. These results indicate that there is potential for improvement, as the majority of scores fall within the above-average rating.

3.3. Mean Scores of Creative Ability Based on the 'Gender'

The mean scores and the frequencies of the ratings are presented in the following table 2.

Table 2: Mean scores based on gender categories

Gender	No of participants (%)	Average Score	Frequency of descriptive ratings (%)
1. Male	49 (32.8%)	43.59	Average (37%), Above-average (63%)
2. Female	100 (67.2%)	59.60	Below-average (1%), Average (36%), Above-average (61%), Very- creative (2%)
Total	149		

From the descriptive ratings, there is no significant difference between male and female members. About 1/3 and 2/3 under the average and above average ratings respectively. There are a few very-creative ratings only in the female category. Then, there is a significant difference between the average scores of male and female members (16.01). It shows that female members have higher scores in various ratings, but the frequency of total descriptive ratings is similar to that of male members.

3.4. Mean Scores of Creative Ability Based on the ‘Experience’

The total years of experience have been divided into four groups. The average scores and frequencies of each group are presented in the following table 3.

Table 3: Mean scores based on experience categories

Total years of experience	No of participants (%)	Average score	Frequency of ratings (%)
1. 5 & below	40 (26.84%)	42.35	Below-average (2.5%), Average (35%), Above-average (60%), Very-creative (2.5%)
2. 6-10	47 (31.54%)	42.34	Below-average (0%), Average (38.5%), Above-average (59.5%), Very-creative (2%)
3. 11-15	28 (18.79%)	42.10	Below-average (0%), Average (46.5%), Above-average (53.5%), Very-creative (0%)
4. 16 & above	34 (22.81%)	44.88	Below-average (0%), Average (26.5%), Above-average (70.5%), Very-creative (3%)
Total	149		

The table above indicates that there is no clear correlation between mean scores and total years of experience across different categories. Among the categories, teachers with 16 years of experience or more have the highest mean score of 44.88. The same trend is observed in relation to age, as age and experience are positively correlated.

3.5. Mean Scores of Creative Ability Based on the ‘Designation’

Designations are classified into six types. The mean scores for each designation have been presented in the following table 4.

Table 4: Mean scores based on designation categories

Designation	Total no of participants (%)	Average score	Frequency of ratings
1. Assistant Professors	74 (49.66%)	42.72	Below-average (0%), Average (41%), Above-average (59.5%), Very-creative (1.5%)
2. Associate Professors	12 (08.05%)	47.58	Below-average (0%), Average (17.5%), Above-average (75%), Very-creative (8.5%)
3. Professors	08 (05.36%)	43.87	Below-average (0%), Average (37.5%), Above-average (62.5%), Very-creative (0%)
4. PGT Teachers	46 (30.87%)	40.98	Below-average (2%), Average (37%), Above-average (61%), Very-creative (0%)
5. Ph. D. Scholars	07 (04.69%)	48.14	Below-average (0%), Average (28.5%), Above-average (57%), Very-creative (14.5%)
6. Librarians	02 (01.34%)	42.00	Below-average (0%), Average (50%), Above-average (50%), Very-creative (0%)
Total	149		

From the above table, it is found that within the categories of designation, no clear variation was observed to correlate with average scores. Ph.D. scholars and associate professors had higher scores, 48.14 and 47.58, respectively, compared to the remaining designations. It is derived from the above table that educators who have middle positions in the education setup have more creative abilities compared to lower and higher positions.

3.6. Mean Scores of Creative Ability Based on the ‘Specialization’

Within the categories of ‘specialization,’ no specific variation was observed to correlate with mean scores. There was a total of 17 specializations which include; Accessory Design, Architecture, Communication Design, Education, Engineering, Fashion Design, Fine Arts, Human resources, Journalism, Languages, Library Sciences, Design Management, Media, Product Design, Sciences, and Textile Design. The educators from specializations of Human Resources, Journalism, and Management have relatively higher scores, 50.75, 49.75, and 49, respectively, whereas the total average score is 42.89.

3.7. Word Cloud Image of the Educators Collective Personality

The word cloud image, which displays the combined ten terms selected by each educator in the survey out of 52 terms given, is presented below. The word cloud image highlights the twelve common traits of creative individuals that are identified in the literature, and these traits are numbered from 1 to 12 in order of importance. Figure 1 below shows the word cloud that represents the personality of educators in India and the twelve common traits of creative individuals.



Fig 1: Word cloud portraying the personality of Indian educators and 12 common traits of creative individuals

The word cloud above reveals that the educators most commonly chose twelve personality traits in descending order: energetic, self-confident, observant, sensible, helpful, curious, organized, dedicated, independent, good-natured, open-minded, and risk-taking. However, when compared to the twelve common traits of creative individuals, there are some differences. The twelve common traits of creative individuals, ordered by importance, are:

curiosity, playful, open-minded, flexibility, sensitivity, independent, risk-taking, intuitive, thorough (attention to detail), ambitious, objective, and energetic. These common traits were identified in previous studies, including Indeed Educational team (2022), Karpova, Marcketti & Kamm (2013), Rudowicz & Yue (2002), Davis (1999), and Guastello & Shissler (1994).

The study found a difference between the perceived collective personality of educators and the personality of creative individuals. This difference may be attributed to the major drawbacks of modern vocational pedagogical education, which has a weak influence on developing creative potential and creativity in future teachers, as noted by Movchan and Yakovleva (2019) and Martinez and Tadeu (2018). Studies of teacher professional development have identified the significance of creative thinking in enabling efficient transformations within the framework of pedagogical activity (Borodina, Sibgatullina & Gizatullina, 2019).

The National Education Policy of India (2020) emphasizes the need for institutions and faculty to have the freedom to be innovative in their curriculum, teaching methods, and assessments while adhering to a standardized framework for higher education qualifications. In practice, creativity requires exploring tools and approaches such as iterative learning, diverse perspectives, and risk management. Cultural trait diversity has perhaps the largest potential to empower creativity because it increases the recombinatorial possibilities (UNDP report 2021/2022). However, the word cloud indicates that educators in India primarily associate themselves with traits such as organized, good-natured, practical, efficient, and determined, which are important for their profession but not necessarily indicative of creative ability. On the other hand, creative qualities such as playfulness, intuition, ambition, attention to detail, objectivity, and risk-taking must be nurtured and developed.

3.8. Less-Scored Items

Upon examining the scores for each item individually, it became clear that certain items are particularly important based on their lower scores. After analyzing the responses in detail, it was discovered that the following fifteen items were areas in which educators needed improvement.

The table lists these low-scored items in descending order based on their average scores, with a negative score indicating that most educators provided an incorrect response.

Table 5: Less average scored 15 Items of creative ability test by the educators

S. No	Item	Average scores	Right expression
1	I feel that a logical step-by-step method is best for solving problems.	-40%	Disagree
2	I like people who are sure of their conclusions.	-22%	Disagree
3	When problem-solving, I work faster when analyzing the problem and slower when synthesizing the information, I have gathered.	-10%	Disagree
4	In evaluating information, the source is more important to me than the content.	-0.9%	Disagree

5	When I am in an argument, my greatest pleasure would be for the person who disagrees with me to become a friend, even at the price of sacrificing my point of view.	0.67%	Disagree
6	I always work with a great deal of certainty that I am following the correct procedure for solving a particular problem.	14.8%	Disagree
7	I like people who are objective and rational and try to win the approval of others.	15.1%	Disagree
8	It is important for me to have a place for everything and everything in its place.	19.8%	Disagree
9	I prefer to work with others in a team effort rather than solo.	21.5%	Disagree
10	I would enjoy spending an entire day alone, just "chewing the mental cud."	26.2%	Agree
11	I like hobbies that involve collecting things.	28.5%	Disagree
12	Writers who use strange and unusual words merely want to show off.	29.5%	Disagree
13	I am driven to achieve high status and power in life.	32.6%	Disagree
14	I know how to keep my inner impulses in check.	33.6%	Disagree
15	In groups, I occasionally voice opinions that seem to turn people off.	37.2%	Agree

The items that received negative scores offer the greatest opportunity for improvement because many educators have incorrect perceptions or understandings of these items. This means that there is significant potential for growth and development in these areas.

4. DISCUSSION AND CONCLUSIONS

Creativity is placed at the highest level of learning in Bloom's taxonomy, creativity is more than any other aspect of learning; remember, understand, apply, analyze and evaluate (Bloom, 1956). Creativity is one of the four motivating principles highlighted in the UNDP 2021/2022, along with flexibility, solidarity, and inclusion. According to this report cultivating these principles can reinforce one another and will go a long way in making policies and institutions more fit for purpose.

The attitude of students and their involvement in the educational process is correlated with the personal and professional qualities of the teacher (Matraeva, et al., 2020). According to Lima and Alencar (2014), the factors that hinder the promotion of creative expression in graduate courses relating to professors are lack of time and excessive workload, lack of knowledge on creativity, how to nurture it in the students, fear of innovation, lack of incentive by the university system and bureaucracy.

This study found that the creative abilities of educators in India are at a moderate level. The majority of educators (61.07%) have above-average scores. Female educators, on average, scored higher than male educators, with a difference of 16.01 points. A small percentage (2%) of female educators were classified as "very creative."

The study found no significant variations in creative abilities based on gender, total years of experience, designation, or specialization categories. However, it was observed that educators with 16 or more years of experience had a higher mean score of 44.88 compared to those with fewer years of experience. Among different designations, Ph.D. scholars and Associate Professors had the highest scores of 48.14 and 47.58, respectively, compared to the remaining designations. In terms of specializations, educators in Human Resources, Journalism, and Management had relatively higher scores of 50.75, 49.75, and 49, respectively, compared to the total average score of the research group, which was 42.89.

The study showed that educators perceive themselves as having qualities such as being organized, good-natured, helpful, practical, realistic, efficient, and determined as part of their personality. However, developing creative ability requires qualities such as being playful, intuitive, ambitious, thorough, objective, and risk-taking.

Educators should know when to use creative thinking and when to use critical thinking. The Double Diamond design model has four stages: Discovery, Definition, Development, and Delivery. Creative ability is crucial during the Discovery and Development stages as innovative ideas are explored and developed. The degree of innovation is largely dependent on these stages. Critical thinking takes precedence during the Definition and Delivery stages. NEP India (2020) stresses the importance of promoting creativity and critical thinking in the education system to encourage logical decision-making and innovation.

The study recommends that creativity should be an inherent quality in all teachings. Educators should assess their current creative ability and work on improving it. Institutions and universities should conduct workshops and training programs to enhance the creative ability of educators. Education must prioritize teaching students how to ask insightful questions instead of just giving them answers, as this skill fosters critical and creative thinking, independent learning, and the ability to evaluate and analyze information. To foster a creative environment, curricular, co-curricular, and extracurricular activities should include openness to new experiences, risk-taking, empathy, interdisciplinary and collaborative activities, self and peer assessments, tolerance for uncertainty and failure, cultural trait diversity, and celebrating creativity. Educators should develop, practice, and exhibit these traits to create a culture of creativity in institutions and universities.

Acknowledgments

The author expresses deep gratitude to the National Institute of Fashion Technology for approving the Faculty Development Programme (FDP) on Creativity Tools, particularly the DG and Dean (Academics). He is especially grateful to the Campus Director, Sri Vijay Kumar Mantri IAS, for placing trust and confidence in the author's abilities, even though it was the institution's first time undertaking such an initiative with AICTE. The author would also like to thank the AICTE Training and Learning (ATAL) Academy, Department of Higher Education, Ministry of Education, India, for providing financial support for the FDP. Additionally, the author would like to express appreciation to all the participants who supported this research by actively providing the necessary data. Their extended support was instrumental in the successful completion of this research work.

References

- Alencar, E. M. L. S. D., & Fleith, D. D. S. (2010). Criatividade na educação superior: fatores inibidores (Creativity in higher education: Inhibiting factors). *Avaliação: Revista da Avaliação da Educação Superior (Campinas)*, 15, 201-206.
- Bloom, B. S. (Ed.). (1956). *Taxonomy of educational objectives, Handbook 1: Cognitive domain* (2nd ed.). Addison-Wesley Longman Ltd.
- Borodina, T., Sibgatullina, A., & Gizatullina, A. (2019). Developing creative thinking in future teachers as a topical issue of higher education. *Journal of Social Studies Education Research*, 10(4), 226-245.
- Csikszentmihalyi, N. Jackson, M. Oliver, M. Shaw, & J. Wisdom (Eds.). (2007), *Developing creativity in higher education* (pp. xviii-xx). London: Routledge.
- Davis, G. A. (1999). Barriers to creativity and creative attitudes. *Encyclopedia of creativity*, 1, 165-174.
- Free Wordcloud Generator. <https://www.freewordcloudgenerator.com/generatewordcloud> extracted on 19.12.2022.
- Fryer, M. (2006). Facilitating creativity in higher education: A brief account of National Teaching Fellows' views. In *Developing creativity in higher education* (pp. 94-108). Routledge.
- Guastello, S. J., & Shissler, J. E. (1994). A Two Factor Taxonomy of Creative Behavior. *The Journal of Creative Behavior*, 28(3), 211-221.
- Guilford, J. (1950). "Creativity", *American Psychologist*, 5(9), pp.444–454.
- Hosseini, A. S. (2011). University student's evaluation of creative education in universities and their impact on their learning. *Procedia-social and behavioral sciences*, 15, 1806-1812.
- Hwang, S. Y. (2017). Rethinking creativity: Present in expression in creative learning communities. *Educational Philosophy and Theory*, 49(3), 220-230.
- Indeed Educational team. (2022). 12 Traits of Creative People. <https://www.indeed.com/career-advice/finding-a-job/traits-of-creative-people> extracted on 15.12.2022.
- Jackson, N. (2006). Creativity in higher education. *SCEPTR Scholarly Paper*, 3, 1-25.
- Karpova, E., Marcketti, S., & Kamm, C. (2013). Fashion industry professionals' viewpoints on creative traits and, strategies for creativity development. *Thinking Skills and Creativity*, 10, 159-167.
- Kettler, T., Lamb, K. N., Willerson, A., & Mullet, D. R. (2018). Teachers' perceptions of creativity in the classroom. *Creativity Research Journal*, 30(2), 164-171.

- Lima, V. B. F., & Alencar, E. M. (2014). Criatividade em programas de pós-graduação em educação: práticas pedagógicas e fatores inibidores [Creativity in graduate programs in education: Pedagogical practices and inhibiting factors]. *Psico-USF*, 19, 61-72.
- Martinez, A. M. (2002). A criatividade na escola: três direções de trabalho. *Linhas críticas*, 8(15), 189-206.
- Martinez, I., & Tadeu, P. (2018). The impact of pedagogical leadership on pedagogical coordination in secondary schools. *Research in Social Sciences and Technology*, 3(3), 1-15. Retrieved from <http://ressat.org/index.php/ressat/article/view/373>
- Maslow, A. H. (1958). *A Dynamic Theory of Human Motivation*.
- Matraeva, A. D., Rybakova, M. V., Vinichenko, M. V., Oseev, A. A., & Ljapunova, N. V. (2020). Development of creativity of students in higher educational institutions: assessment of students and experts. *Universal Journal of Educational Research*, 8(1), 8-16.
- Movchan, I. B., & Yakovleva, A. A. (2019). Wave analogies for generalized description of geodynamic zones. *International Journal of Innovative Technology and Exploring Engineering*, 8(6), 863-868.
- NIP India (2020), National Education Policy India. Online from https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf Accessed on 31.12.2022.
- Rudowicz, E., & Yue, X. D. (2002). Compatibility of Chinese and creative personalities. *Creativity Research Journal*, 14(3-4), 387-394.
- Smith, E., Ali, D., Wilkerson, B., Dawson, W. D., Sobowale, K., Reynolds, C., ... & Eyre, H. A. (2021). A brain capital grand strategy: toward economic reimagination. *Molecular psychiatry*, 26(1), 3-22.
- Torrance, P. (1979). *The search for satori and creativity*. Buffalo, N.Y.: Creative Education.
- UNDP (2022). Human Development Report 2021-22, Uncertain Times, Unsettled Lives: Shaping our Future in a Transforming World. Online from <https://www.undp.org/egypt/publications/human-development-report-2021-22-uncertain-times-unsettled-lives-shaping-our-future-transforming-world>. Accessed on 31.12.2022 extracted on 30.12.2022
- Wisdom, J. (2006). Developing higher education teachers to teach creatively. In *Developing creativity in higher education* (pp. 203-216). Routledge.

Effectiveness of Incorporating Mindfulness Programs for Corporate Executives: The IMC Case Study

Kenneth Tan, Octave Institute, Singapore

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Mindfulness is bringing one's complete attention to the experiences occurring in the present moment, in a non-judgmental or accepting way (Brown & Ryan, 2003; Kabat-Zinn, 1990; Linehan, 1993a; Marlatt & Kristeller, 1999) and can be developed through meditation and deep breathing activities. The impact or results demonstrated through research are that it increases awareness, insight, wisdom, compassion, and equanimity (Goldstein, 2002; Kabat-Zinn, 2000). Other organisational impact include employee well-being, resilience, engagement, stress management and job satisfaction (Baer, Smith, Hopkins, Krietemeyer and Toney, 2008). This study measures the effectiveness of a Mindfulness Program, organised for 125 mid to senior executives of a global conglomerate from over 10 different nationalities, conducted over three program runs in one year. The study will show how the program impacted their long-term behaviours, lifestyle, work productivity and relationships using an experimental research design, through pre and post testing, involving physiological variables and behavioural indicators. The results and findings show that there is sustainable and positive behavioural change and long-term physical health improvements for majority of the participants as a direct result of the mindfulness program. And the implication of this study is that this same program can be implemented for other corporate executives to improve physical well-being, organisational satisfaction, performance, and work, relational and family well-being.

Keywords: Mindfulness, Well-Being, Organisational Performance, Engagement, Job Satisfaction

iafor

The International Academic Forum
www.iafor.org

Introduction

The concept of mindfulness has gained increasing attention in recent years, as research has demonstrated its potential to improve various aspects of well-being, including increased awareness, insight, wisdom, compassion, and equanimity (Goldstein, 2002; Kabat-Zinn, 2000). In addition to these personal benefits, mindfulness has also been found to have positive impacts on organizational outcomes, such as employee well-being, resilience, engagement, stress management, and job satisfaction (Baer et al., 2008).

Objective

This study aims to measure the effectiveness of a mindfulness program for 125 mid to senior level executives of a global conglomerate, with participants from over 10 different nationalities. The program was conducted over four runs in one year, and the study uses an experimental research design, with pre and post testing, to measure the program's impact on the executives' long-term behaviours, lifestyles, work productivity, and relationships. The study will show how the program impacted their long-term behaviours, lifestyle, work productivity and relationships using an experimental research design, through pre and post testing, involving physiological variables and behavioural indicators.

Methods

The mindfulness program consisted of meditation and deep breathing activities and was designed to develop mindfulness as defined by Brown and Ryan (2003), Kabat-Zinn (1990), Linehan (1993a), and Marlatt and Kristeller (1999), as the practice of bringing one's complete attention to the experiences occurring in the present moment, in a non-judgmental or accepting way. The study used both physiological variables and behavioural indicators to measure the program's effectiveness. A total of 3 runs of the program was conducted and 125 participants took part in the Pre and Post Testing. The instruments and questions provided insights into several areas:

- General Well-Being
- Energy, Vitality and Spirit
- Sleep and rest
- Tension, Anxiety and Pressure
- Worry, Depression and Melancholy
- Happy, Optimistic and Joyful
- Curiosity, Interest and Fun
- Focus and Efficiency
- Being relaxed and at ease

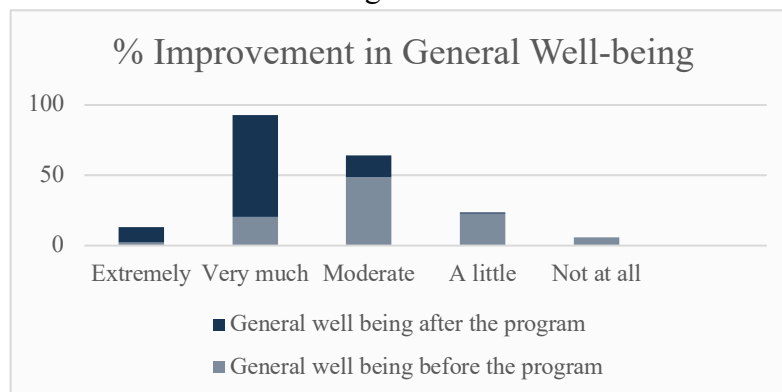
Results and Findings

The data analysis from the Pre and Post surveys shows positive results in all components of physiological, physical, cognitive, and affective domains of health and well-being.

1. General Well-Being

Over 60% of participants reported improvement (Extremely & Very Much ratings) in General Well-being as a result of the mindfulness living program.

Figure 1



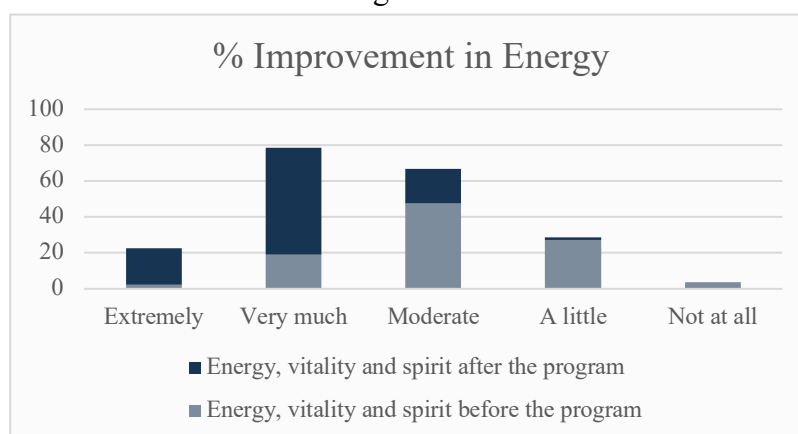
Quotes:

A15: *“Before the program I have found myself being too selfish. After the program, I find that through mindful living, it has improved not only my physical health, but also my spiritual and mental health.”*

2. Energy, Vitality and Spirit

Over 58% of all participants reported an improvement (Extremely & Very Much ratings) in energy levels.

Figure 2



Quotes:

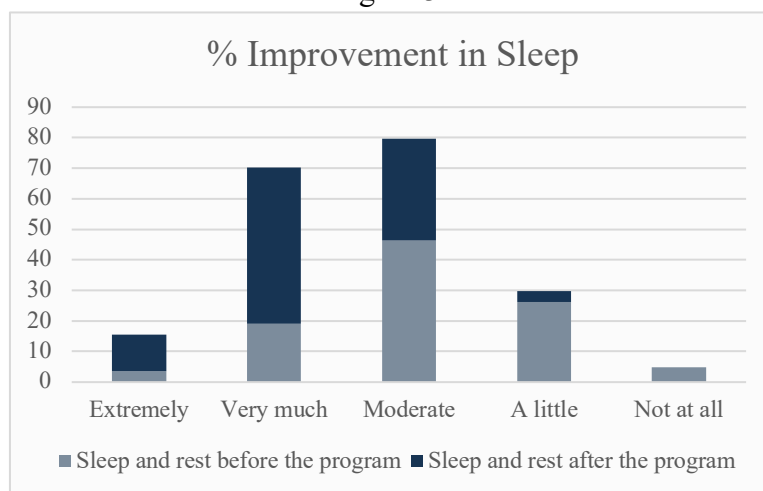
A51: *“A self that wants to incorporate more exercises in my otherwise non-active lifestyle.”*

A34: *“I have strengthened myself physically and mentally.”*

3. *Sleep and Rest*

Saw over 40% improvement (Extremely & Very Much ratings) in sleep.

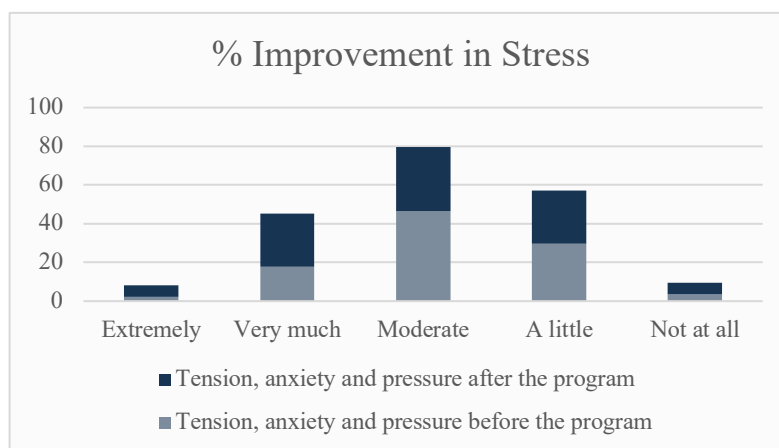
Figure 3



4. *Tension, Anxiety and Pressure*

Over 13% reported improvement (Extremely & Very Much ratings) in reduced tension and anxiety.

Figure 4



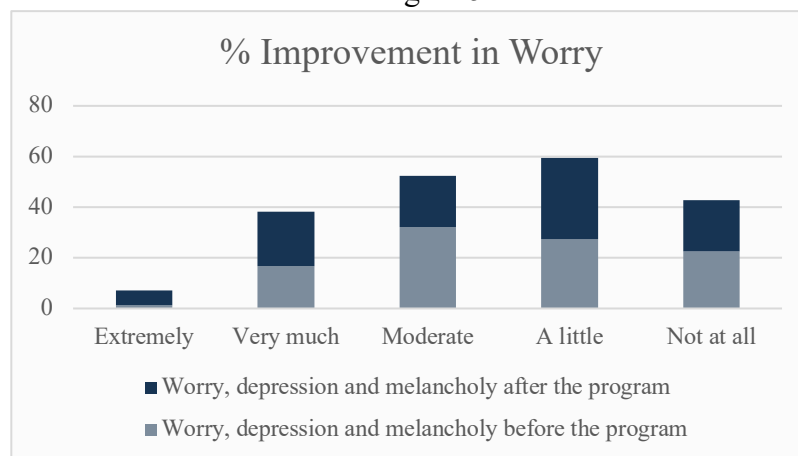
Quotes:

A22: *"I entered in a pretty stressful state and left more peaceful. I learnt how not to be judgemental on myself and to take it easy in the future. It doesn't help constantly planning about every possible scenario since we can't control it. I used to overthink a lot. I think I find myself 10% happier now and I have some tools and more motivation to continue the work."*

5. *Worry, Depression and Melancholy*

Close to 10% improvement in decreased state of worry reported by participants.

Figure 5



Quote:

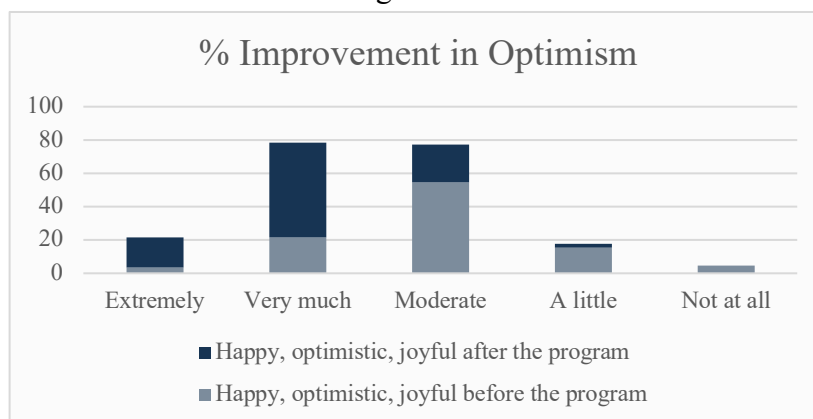
A75: *"An improved and confident person."*

A7: *"Happy, optimistic and joyful."*

6. *Optimism*

Over 50% of participants reported High and Extremely high levels of optimism.

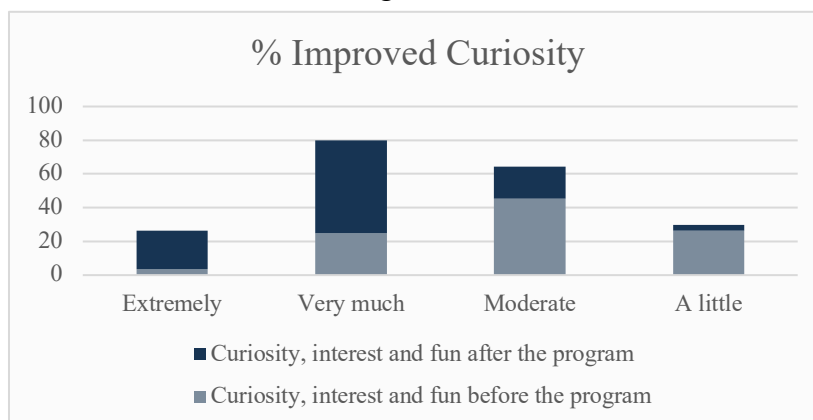
Figure 6



7. Curiosity, Interest and Fun

Over 48% saw an improvement in consciousness and curiosity.

Figure 7



Quotes:

A19: *“Increased self-consciousness and open mindedness.”*

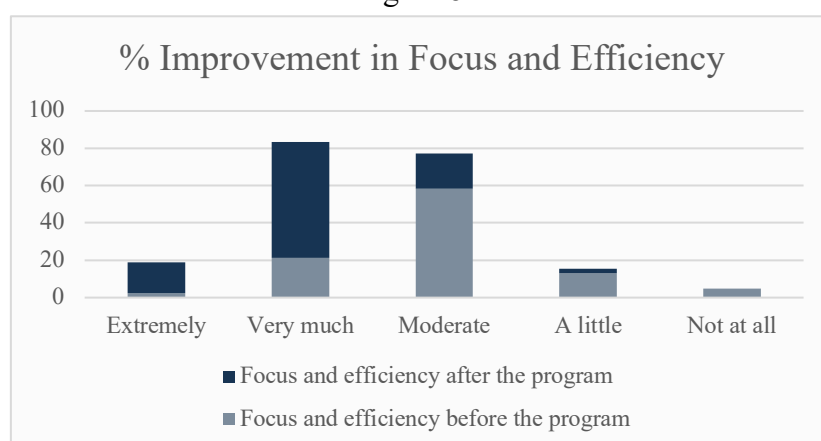
A80: *“More aware and confident of myself.”*

A38: *“Greater consciousness of inner self, resilience in facing and managing pain, release of unconscious residual emotions.”*

8. Focus and Efficiency

Second highest improvement figures were for areas linked to productivity, with reported levels of improvement of over 54% for levels of focus and efficiency.

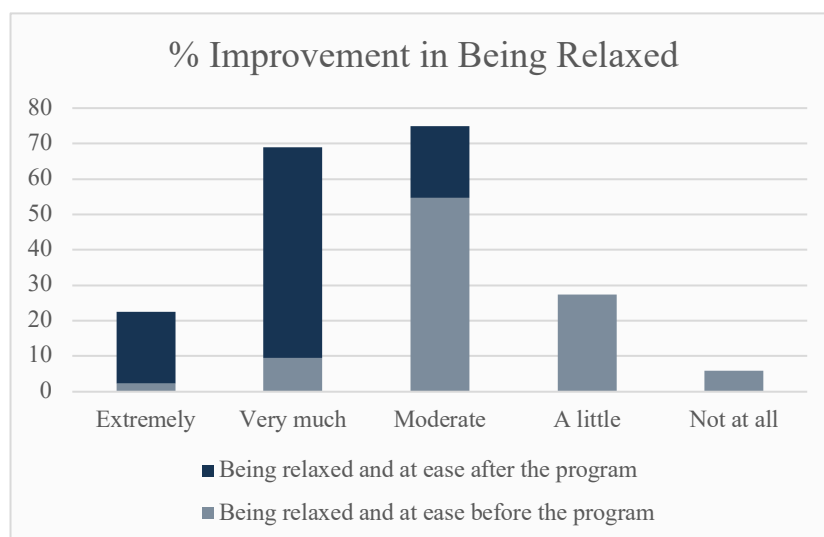
Figure 8



9. Being Relaxed and at Ease

Largest areas of improvement of over 68% reported being more relaxed after the program.

Figure 9



Quote:

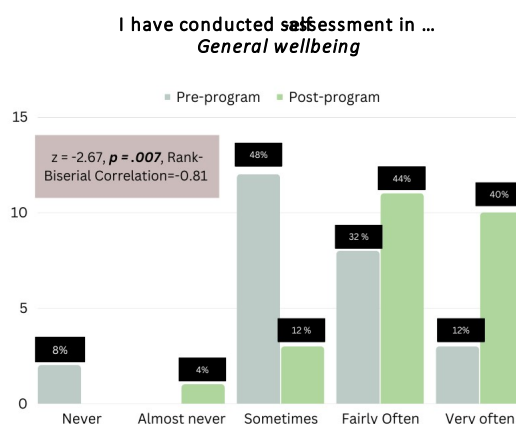
A5: *“More relaxed and focused, and also higher levels of resilience.”*

Another MLP was conducted in April 2023 for over 40 more participants. In contrast to the previous MLPs, significant improvements in self-assessment can be observed in all the 10 domains.

Specifically in two domains, the results show a significantly higher proportion of participants had reported higher general well-being and being relaxed after the program ($z = -2.67, p = .007$ and $z = -3.25, p = .001$).

Figure 10

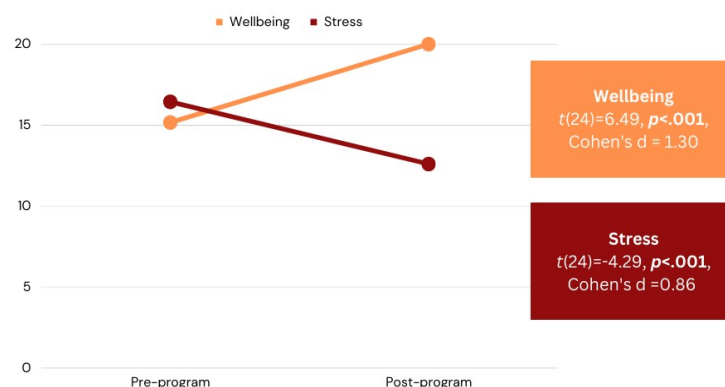
Significantly higher proportion of participants rated that they did self-assessment in their general wellbeing after the program



Additional measures of wellbeing, World Health Organisation - Five Well-Being Index (WHO, 1998) and the Perceived Stress Scale, PSS-10, (Cohen, Karmarck & Mermelstein, 1983) were also incorporated to the pre and post instruments. And the results revealed that participants' wellbeing significantly improved from pre-program to post-program, and participants' levels of stress significantly reduced from pre-program to post-program.

Figure 11

Participants reported significantly higher wellbeing and lower levels of stress post-program



Shift in Consciousness

Qualitative Results from participants indicated and reported improved levels of consciousness.

Some of the quotes on being more conscious are:

“Being conscious and present in every part of our lives.”

“Being conscious and aware is very core. It extends to how our spiritual, mental, physical and emotions integrate and collaborate within ourselves and beyond ourselves to our community.”

“Consciousness, awareness, and clarity of thoughts and the surrounding environment and people in everything we do.”

“Maintaining an internalized consciousness of one's thoughts and actions.”

“To be conscious of our bodies, feelings and things happening around us.”

Results of greater consciousness translates to living habits and other aspects of health and wellness, as well as reported positive change of behaviors.

“Having awareness and being conscious about physical and mental wellness of oneself.”

“Conscious of the present moment. Mindful of action, words and living in the present moment and not living in the past shadows.”

“Being conscious of every action that I take to any stimulus. Being conscious in every activity that I undertake.”

The results of the study showed that the mindfulness program had a positive impact on the majority of the participants, with sustainable and positive behavioural change and long-term physical health improvements observed as a direct result of the program. From the qualitative evidence provided, it was evident that the program also impacted their reported behaviours, lifestyle, work productivity and relationships.

Outcomes from across all 4 programmes indicate the efficacy of the MLP, especially in improving self-consciousness on different wellbeing indicators. The current MLP's efficacy is slightly higher than the past programmes in areas of self-assessment results in the post-program data, and specific measures of well-being and stress administered in MLP4 showed significant improvements in participants.

Conclusion and Implications

The findings of this study suggest that mindfulness programs can be effectively implemented in corporate settings to improve physical well-being, organizational satisfaction, performance, and work, relational, and family well-being.

The impact of the results demonstrated validates the fact that mindfulness programs increase awareness, insight, wisdom, compassion, and equanimity (Goldstein, 2002; Kabat-Zinn, 2000). Other organisational impact, resulting from the benefits of becoming more mindful, thus translates to higher focus, efficiency and productivity at work, which improves employee well-being, resilience, engagement, stress management and job satisfaction (Baer, Smith, Hopkins, Krietemeyer and Toney, 2008).

The study's implication is that this program can be replicated for other corporate executives to achieve similar positive outcomes.

Future research could involve a longitudinal study, looking into areas of sustained benefits to the individual as well as their organisation. And how this will impact their organisation and business results in areas of better decision-making and improved operational efficiencies, as a direct result of achieving improved mindfulness, better well-being, relaxation and focus from this MLP program.

References

- Baer, Smith, Hopkins, Krietemeyer and Toney. (2008). Using Self-Report Assessment Methods to Explore Facets of Mindfulness. *Assessment*, 13(1):27-45.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84(4), 822–848.
- Cohen, S., Karmarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behaviour*, 24, 385-396.
- Goldstein, (2002). The Mindful Self: A Mindfulness-Enlightened Self-view. Hypothesis and Theory article, *Front. Psychol., Sec. Personality and Social Psychology*, Vol. 8 – 2017.
- Kabat-Zinn, J. (2000). Indra's net at work: The mainstreaming of Dharma practice in society. In G. Watson, S. Batchelor, & G. Claxton (Eds.), *The psychology of awakening: Buddhism, science, and our day-to-day lives* (pp. 225–249).
- Kabat-Zinn, J. (1990). Full catastrophe living: Using the wisdom of your body and mind to face stress, pain and illness. New York, NY: Delacorte.
- Linehan, M. M. (1993). Cognitive-behavioral treatment of borderline personality disorder. New York, NY: Guilford Press.
- Marlatt, G. A., & Kristeller, J. L. (1999). Mindfulness and meditation. In W. R. Miller (Ed.), *Integrating spirituality into treatment: Resources for practitioners* (pp. 67–84). American Psychological Association.
- WHO. (1998). Wellbeing Measures in Primary Health Care/The Depcare Project. WHO Regional Office for Europe: Copenhagen.

IIIPE - A Laboratory for the Development of Stem Teaching Competencies Through Computational Thinking and Artificial Intelligence

Marcela Georgina Gómez-Zermeño, Instituto de Investigación, Innovación y Estudios de Posgrado para la Educación del Estado de Nuevo León, México

Lorena Alemán de la Garza, Instituto de Investigación, Innovación y Estudios de Posgrado para la Educación del Estado de Nuevo León, México

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This article presents a teacher training strategy based on the design of an educational innovation laboratory that promotes the development of STEM teaching competencies through computational thinking and artificial intelligence in public schools in the State of Nuevo León, Mexico. Today, the development of computational thinking is a core teaching competency, which reveals the importance of integrating new strategies in teacher training programs mediated by artificial intelligence. According to the recommendations of the Beijing Consensus, AI can meet the challenges of developing innovative practices that contribute to the achievement of Sustainable Development Goal (SDG) 4, and its implementation has already begun to alter the traditional foundations of teaching and learning and raises profound questions related to professional teacher development. In this context, the Instituto de Investigación, Innovación y Posgrado para la Educación del Estado de Nuevo León in Mexico (IIIPE) is designing the "Yancuic Mitzli" (new lion in Nahuatl) laboratory, an educational innovation laboratory for teacher training that promotes active learning through generative artificial intelligence. IIIPE aims to improve practices through teacher development, focusing on educational innovation. This laboratory is based on the collaborative work carried out by IIIPE researchers with the research group of the multidisciplinary project IE-CARE, supported by the French National Research Agency (ANR), and focused on the design, implementation, and evaluation of pedagogical scenarios and digital educational resources.

Keywords: STEM Competencies, Teacher Training, Artificial Intelligence, Computational Thinking

iafor

The International Academic Forum
www.iafor.org

Introduction

In all societies, capacity building in science, technology, art, engineering, and mathematics (STEAM) is crucial to promote sustainable development. To achieve the goals posed by the 2030 Agenda, STEAM Education provides an approach to cultivate critical thinking and develop transformative, innovative, and creative skills, in addition to forging the skills to turn students into empowered citizens who participate in addressing the problems that today affect localities, countries and regions across the globe (UNESCO, 2019).

The STEAM approach has become popular in various countries because it can combine arts with science, technology, mathematics, and engineering. STEAM teaching competencies generate innovation and motivation, besides associating logical thinking with creativity, making science more attractive to students (Meza & Duarte, 2020). In Mexico, the STEAM approach has been recognized as a valuable educational strategy for the implementation of the New Mexican School (NEM), a new educational model based on a set of educational policies and reforms that seek to transform the Mexican educational system and thus improve the inclusion, equity, and quality of education.

In this perspective, the STEAM approach aligns with the objectives of the NEM to promote an inclusive, participatory, comprehensive, and student-centered educational approach. By developing critical thinking, creativity, technological skills, and problem-solving, it seeks to prepare students to meet the challenges of the 21st century and develop the competencies necessary for their academic and personal success. Some of the ways this has been integrated include technology and teacher training.

This partial research report presents a strategy for the development of STEAM competencies in public school teachers in the State of Nuevo Leon in Mexico, based on the design of a laboratory that promotes computational thinking through Scratch programming and generative artificial intelligence to integrate technology into their educational practices in a meaningful way to enrich the learning of young students. It is based on collaborative research conducted by IIIPE researchers with the working group of the multidisciplinary project IE-CARE, supported by the French National Research Agency (ANR), focusing on the design, implementation, and evaluation of pedagogical scenarios and educational resources for the development of computational thinking (ANR, 2023).

STEAM Teaching Competencies

In the New Mexican School, the integration of the STEAM approach seeks to foster a more inclusive, participatory, interdisciplinary educational approach oriented to the integral development of students. By promoting critical thinking, creativity, technological skills, and problem-solving, it seeks to prepare students to face the challenges of the 21st century. To achieve this, STEAM methodologies promote integrating and developing scientific-technical and artistic subjects in a single interdisciplinary framework (Yackman, 2008).

Through active learning strategies, complex problems are worked on from different disciplines giving creative and innovative solutions using technologies (Sevilla & Solano, 2020). To achieve this, teacher training strategies focus on improving educational stakeholders' skills and abilities to solve problems and awakening students' motivation towards interest in science and technology, adaptable to educational scenarios at all levels of primary education (Santillán et al., 2019).

In this regard, UNESCO recognizes that the prevalence of ICT is crucial in education, so it has developed the UNESCO Competency Framework for Teachers (UNESCO-ICTCFT), which offers a valuable tool to guide the initial training and search for teachers in education. With this toolkit, UNESCO seeks to provide a basis for up-to-date policy development and capacity building in the dynamic field of ICT. As shown in Table 1, developing teachers' pedagogical skills promotes the integration of technologies and complex problem-solving with complex tools (UNESCO, 2018).

Table 1. UNESCO's ICT Competency Framework for Teachers

	DIGITAL LITERACY	KNOWLEDGE ENHANCEMENT	KNOWLEDGE CREATION
PLACE OF ICT IN EDUCATION	Knowledge of policies	Description of directives	Policy innovation
CURRICULUM AND EVALUATION	Basic knowledge	Knowledge translation	Competencies in the knowledge society
PEDAGOGY	Technology integration	Solving complex problems	Self-management
ICT	Basic tools	Complex tools	Dissemination tools
ORGANIZATION AND ADMINISTRATION	Standard classes	Collaborative work	Learning organizations
TEACHER TRAINING	Digital literacy	Managing and guiding	The teacher as a learning model

Used by countries worldwide, the UNESCO-ICTCFT frames the role that technology can play in supporting six key areas of education through three phases of learning. It provides a reference for recent technological and pedagogical developments in ICT and education. It emphasizes the importance of teachers fostering students' skills for collaboration, problem-solving, and creativity in using digital technologies. In the digital era, these competencies become integral to their initial training (Montiel & Gómez-Zermeño, 2022).

Computational Thinking

One of the teachers' great challenges is meeting the digital transformation processes contemporary society faces. Teachers do not have the technical or pedagogical skills to develop computational thinking in their students (Alemán de la Garza et al., 2019). One of the main reasons is the lack of formal programs or curricula for this teacher qualification. Wing (2006) reports that Computational Thinking (CT) integrates the thinking processes in formulating problems and their solutions. It comprises four pillars: decomposition, pattern recognition, abstraction, and algorithms.

In 2011 the International Society for Technology in Education (ISTE) and the Computer Science Teachers Association (CSTA) developed an operational definition of CT with the goal that teachers can introduce it to classrooms through a set of steps:

1. Formulate problems in a way that allows to use a computer and other tools to help solve them.
2. Organize and logically analyze data. Represent data through abstractions, such as models and simulations.
3. Automate solutions through algorithmic thinking (a series of ordered steps).
4. Identify, analyze, and implement possible solutions to achieve the most efficient and effective combination of steps and resources.
5. Generalize and transfer this process of solving a wide variety of problems.

Under this approach, strategies to develop STEAM teaching competencies through CT should not be limited to a specific subject within the teacher training curriculum since they should be viewed as a transversal axis in the curriculum that contributes to the construction of citizenship in equity that eliminates digital divides and allows problem-solving based on understanding and reasoning (Bucci, 2017).



Figure 1. ISTE Standards in Teacher Education

Scratch Programming

In 2003, the Scratch Project was initiated by a group of researchers at MIT Media Lab's Lifelong Kindergarten, under the direction and leadership of Dr. Michael Resnick, to provide an accessible programming environment for young students. This project received support from the National Science Foundation, Intel Foundation, Microsoft, MacArthur Foundation, LEGO Foundation, Code-to-Learn Foundation, Google, Dell, Fastly, Inversoft, and the MIT Media Lab research consortium.

As stated by Resnick et al. (2009), the original goal of Scratch was to develop a programming approach that would engage people, regardless of age, social or educational background, in developing algorithmic solutions without the complexities of syntax and semantics of traditional programming languages. This requires making Scratch a language for programming interactive stories, games, animations, and simulations easy for all its users, who can also share their creations with others.

In this way, the main goal of Scratch is not to prepare people for professional or technical programming careers but to nurture a new generation of creative and systematic thinkers using programming to express their ideas. Papert advocated that programming languages should have a "low floor" (easy to start programming) and a "high ceiling" (opportunities to create more complex projects over time). Escribano & Montoya (2012) corroborate that programming languages need "wide walls" (the ability to encompass different types of projects so that people with very diverse interests and styles are encouraged to program). To make these objectives possible, the creators of Scratch have introduced three basic principles or features in the design of this programming language:

1. The programming language must be playful.
2. The experience of using the programming language should be meaningful.
3. Using the programming language should be conducive to social interaction.

Nowadays, experience shows that Scratch is a good tool for the development of computational thinking in children in primary education since it offers an environment in which students are motivated and participate in the proposal of solutions without fear of error, enables the analysis of problems and the proposal, development, and application of logical and algorithmic solutions, which can be tested and improved (Montiel and Gomez-Zermeño. 2021).

Artificial Intelligence

Currently, competencies in computational thinking and its application and the development of Artificial Intelligence (AI) are changing teaching, learning, and ways of living and learning. Undoubtedly, AI has the potential to benefit and solve various social problems widely. AI is expected to significantly impact education and transform teaching practices with new teaching materials. It could revolutionize how students learn through personalized learning, increase access to knowledge, and facilitate more inclusive education (Chen et al., 2020).

In this context, UNESCO is currently developing an AI readiness self-assessment framework to assess the readiness and capacity to embrace and integrate AI technologies in all areas of education at the national level. In this way, it seeks to contribute to the readiness and capability of key stakeholders in national education systems to take advantage of the potential of AI to ensure inclusive, equitable, and quality education, as well as to provide new lifelong learning opportunities for all (Pedro et al., 2019).

Within this field of study, generative artificial intelligence (GAI) focuses on developing models and algorithms capable of generating original and creative content, such as images, music, text, or even videos, mimicking or surpassing human capacity in creativity and content production. To do so, generative artificial intelligence systems use machine learning and neural networks to learn from existing data sets and generate new creations based on that acquired knowledge. These models are trained on large amounts of data to capture specific patterns and features and can then generate unique content from that learned information (Baidoo-Anu et Ansah, 2023). Currently, generative artificial intelligence (GAI) has several potential applications in teacher education, and some of them are:

- Educational content generation
- Virtual tutoring
- Automated feedback
- Personalization of learning
- Creation of simulations and virtual learning environments

Method

This research sought to answer the question: *What elements are recommended to be integrated in the design of a laboratory to develop STEM teaching competencies through computational thinking and artificial intelligence?* Based on the research question, a method based on an exploratory study was adopted to make a first approach to this specific topic before addressing it in more in-depth research (Hernandez-Sampieri, 2018).

The design of the "AI-Xólotl" laboratory establishes its basis in the collaborative research conducted by IIIPE researchers with the working group of the multidisciplinary project IE-CARE, supported by the French National Research Agency (ANR), and focused on the

design, implementation, and evaluation of pedagogical scenarios and educational resources that promote the development of STEAM teaching competencies in computational thinking.

Research Context

The research context is situated in the *New Mexican School* (NEM), an educational model proposed to transform the country's educational system. NEM seeks to promote inclusive, equitable, and quality education that fosters the integral development of students, encouraging their formation as responsible, critical citizens committed to their environment (SEP, 2022). With an emphasis on equity, NEM promotes differentiated structures and facilities that compensate for school inequalities. In the pedagogical principles and guidelines, the NEM associates students' ability to use ICT with the timely provision of technological infrastructure (hardware and software) and the development of STEM teaching skills in computational thinking.

Nuevo León has 546,714 children between the ages of 0 and 5 years. Of this population, the coverage of 3, 4, and 5-year-olds in the education system for the 2020-2021 cycle was 43.2%, 96.4%, and 103.3%, respectively. For the 2020-2021 school year, preschool education had coverage of 7.0% and preschool education of 70.0%. Girls and boys enrolled in the initial level were 8,963, 17.7% less than in the 2019-2020 cycle. On the other hand, preschool enrollment in the 2020-2021 cycle was 192,705 children, 7.9% less than in the 2019-2020 cycle. In the 2020-2021 school year, 3.4% of children between 3 and 5 years of age attending preschool presented some barrier to learning in the various formative fields (Gobierno del Estado de Nuevo León, 2022).

This study focused on exploring the Robotix program, implemented by the RobotiX Foundation with FIRST® LEGO® League, in alliance with the Nuevo León Secretary of Education (SENL), to promote the development of STEAM skills in preschool children. Through Robotix, the SENL emphasizes the importance of strengthening science, engineering, arts, and mathematics through play, creativity, and inventiveness. Fifty-three scholarships were awarded, including the delivery of educational materials to the directors of the beneficiary schools, of which 48 of the 53 scholarships are granted by the international educational program FIRST LEGO League and 5 scholarships are from the RobotiX in the Box program.

This program also proposed offering teacher training and various manuals to the beneficiary schools, designed to implement its methodological proposal. The program aims to have a direct impact on children in the regions of Sabinas Hidalgo, Salinas Victoria, Monterrey, San Nicolás, Santa Catarina, Cadereyta Jiménez, and Montemorelos, who will develop skills for problem-solving, collaborative and teamwork, improve their communication and interaction processes and, above all, to approach science and technology in a creative, playful and critical way.

Analysis of Results

Currently, the RobotiX program for STEAM skills development has been implemented in a total of 26 schools in the municipalities of Monterrey, San Nicolas de los Garza, Guadalupe, Apodaca, Juarez, Sabinas Hidalgo, Salinas Victoria, General Escobedo, and Cienega De Flores. During the exploratory study, 4 preschools were visited, which were selected by the

SENL. Interviews were conducted with principals and teachers, and observation guides were applied to generate information through three axes of analysis.

Pedagogical Methodology for the Development of Steam Skills in Preschool Students.

Results show that the RobotiX program seeks to provide students with a practical and playful experience, fostering creativity, critical thinking, and teamwork. Through activities, students develop essential skills such as logic, communication, and collaboration for problem-solving.

Its methodological proposal offers didactic materials and manuals to facilitate the development of students' STEAM skills. Some of the manuals provided are 1) Robot construction manual, 2) Programming manual,) Activities and challenges manual, and 4) Facilitator's or teacher's guides.

In the preschools visited, the young students use the "Six Bricks" manual, a learning tool that promotes the development of skills in the following formative fields:

- *Language*: describing in detail, giving clear instructions, explaining and justifying their reasoning, and telling stories so that children develop their language, communicate, and express their ideas.
- *Problem-solving*: Keeping their attention and remembering the task or challenge, setting goals and planning, coming up with creative ideas, and thinking about how to accomplish them.
- *Collaboration*: Working in pairs and teams involves taking turns, sharing material, learning from peers and their ideas, and giving everyone roles and responsibilities.

Participating schools had to finance the printing of the "Engineering Notebook" for each of their students, which the RobotiX Foundation designed in collaboration with FIRST® LEGO® League and the LEGO Foundation, for them to use the Lego kit that was given to them in activities on energy sources. The teachers received the "Team Meeting Guide" manual, which introduces the program's funding organizations and specifies the STEM skills the students will develop:

- *Science*: cause and effect, gravity, force, motion, and simple machines.
- *Technology*: tools and investigating how things work.
- *Engineering*: creating designs, building solutions, and problem-solving.
- *Mathematics*: abstract and quantitative reasoning, object attributes, and shape identification

Didactic Materials and Their Integration in the Teaching of the Formative Fields.

Upon analyzing the observation guides, evidence was obtained that each of the schools visited received the following materials:

- STEAM Park
- Discover SET
- Discover More
- Discover Engineering Notebook
- Discover Engineering Guide

Integrating these materials into the teaching plans depends on the teaching team of each school. It should be noted that none of the teaching materials specify the formative fields in which learning is promoted.

In the framework of preschool education in Mexico, the formative fields are thematic or learning areas that are considered fundamental for the comprehensive development of children:

- Knowledge and Scientific Thinking
- Ethics, Nature and Societies
- Human and Community
- Languages

These formative fields are interrelated and are addressed in an integrated manner in the preschool education curriculum in Mexico. Therefore, teachers design activities and learning experiences that allow children to explore and develop competencies in these fields throughout their preschool education.

Although the RobotiX program seeks to promote the development of STEAM skills through Educational Robotics and programming, only LEGO materials were found in the preschools, which, although they encourage learning in the formative fields, teachers must integrate this methodology in their teaching plans properly.

Of the four preschools visited, the preschool in the municipality of Juárez adequately integrates the materials in its teaching plans, thus linking the formative fields with the methodology. This preschool also stands out for offering a Scratch Programming Club, which also integrates parents. Although its success depends on the commitment of its director, teachers, and parents, it is evidence of the importance of integrating the entire school community in designing educational programs that seek to develop STEM skills.



Figure 2. RobotiX Program in Nuevo León

Teacher Training in STEAM Mediated by Generative Artificial Intelligence

The interviews with principals and teachers and the observation guides allowed us to generate information about the teacher training offered by the program. It is reported that only some teachers participated in a face-to-face training session. Subsequently, they have received some e-mail messages inviting them to Zoom sessions in which only the use of didactic materials, manuals, and especially the "Guide for Team Meetings" is addressed, which seeks that the girls and boys develop skills to:

- Use and apply FIRST Core Values, learning habits, and the engineering design process to create solutions.
- Explore the theme of the season and their ideas through collaboration, construction, and playful learning.
- Create and test their ideas and solutions.
- Share and communicate what they have learned with each other and with others.

The focus of the Robotix Foundation is to promote, from the curriculum, the implementation of STEAM educational methodologies for children and young people, as well as playful pedagogies for teachers in Mexico. However, the analysis of the manuals and interviews revealed the need to strengthen the training offered to teachers to integrate the didactic materials and manuals into their lesson plans.

No evidence was found on how the methodology promotes the formative fields and critical learning at the preschool level. In the interviews with educational stakeholders, it was reported that implementing a program that seeks to encourage the development of STEAM skills in preschool children also requires offering a training program to develop STEAM teaching competencies in computational thinking.

Given the lack of teacher training programs or formal curricula that develop this teaching qualification, the use of the tools currently offered by generative artificial intelligence was explored with the educational stakeholders. ChatGPT was used as a teacher training strategy in exercises focused on strengthening STEM teaching competencies and developing computational thinking. Both the acceptance of teachers and the potential offered by generative artificial intelligence (GAI) in teacher training were observed.

Conclusions

This explanatory study corroborates the need to apply the STEAM approach from preschool education to develop critical skills such as computational thinking for problem-solving, creativity, collaboration, and technological skills, preparing students to succeed in today's and tomorrow's world. Global organizations such as UNESCO and UNICEF report that the most important stages of children's lives occur before they enter elementary school for the first time. By age five, a child's brain has reached 90 percent of its development, and the foundations for success in school and the rest of life are already in place.

Through the analysis of the results, relevant information was obtained for designing the "Yancuic Miztli" laboratory, a strategy for developing STEAM teaching skills in computational thinking through Scratch programming and artificial intelligence. Applying the STEAM approach through Scratch programming and artificial intelligence promotes the development of knowledge in which the content of each of these branches is worked in an interdisciplinary way to ensure meaningful learning. To achieve this, it is necessary to design

new training strategies that promote the development of STEAM teaching skills in computational thinking.

Although GAI has the potential to improve teacher training, the role of the teacher as facilitator and guide in the educational process remains fundamental. GAI should be a complementary tool to support and enrich teaching rather than replace it altogether. Today, the GAI has exciting potential in teacher training due to its ability to provide real-time answers and assistance on various educational topics. It can provide ideas and suggestions for teacher planning, pedagogical strategies, activities, or new teaching approaches.

Acknowledgment

This initial report results from the research work carried out in the General Directorate of Research and the General Directorate of Innovation Technology and Postgraduate Studies for Education of the State of Nuevo León, Mexico (IIIEPE). We appreciate all the support given to us by Dr. Lorena Gurrola, Rector of IIIEPE, and we express recognition to all its high-level academic community made up of education professionals: trainers, researchers, and technologists committed to improving the Educational quality. We also acknowledge the support given by Dr. Jesús Homero Trujillo Flores and Dra. Norma Leticia Castilleja Gámez from the Directorate of Preschool of the State of Nuevo Leon our manifest our recognition for his committed educational work.

References

- Agence nationale de la recherche (ANR). (2023). *Computer sciences at school: conceptualizations, accompanying, resources – IECARE*. Paris. Available: <https://anr.fr/Project-ANR-18-CE38-0008>
- Alemán de la Garza, L., Bruillard, E., Gómez-Zermeño, M., et al. (2019). *Rethinking pedagogy: Exploring the potential of digital technology in achieving quality education*. UNESCO-UNESCO Mahatma Gandhi Institute of Education for Peace and Sustainable Development (MGIEP). Available: <https://unesdoc.unesco.org/ark:/48223/pf0000372786>
- Baidoo-Anu, D., & Owusu Ansah, L. (2023). *Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning*. Available at SSRN 4337484.
- Bravo, F.A., & Forero, A. (2012). La robótica como un recurso para facilitar el aprendizaje y desarrollo de competencias generales. *Teoría de la Educación*, 13(2), 120-136. <https://bit.ly/2EtOVnJ>
- Bucci, T. T., Cherup, S., Cunningham, A., & Petrosino, A. J. (2003). ISTE standards in teacher education: A collection of practical examples. *The Teacher Educator*, 39(2), 95-114.
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *Ieee Access*, 8, 75264-75278.
- Escribano, C. L., & Sánchez-Montoya, R. (2012). Scratch y necesidades educativas especiales: Programación para todos. *Revista de educación a distancia (RED)*, (34).
- Gobierno del Estado de Nuevo León. (2022). Plan Estatal de Desarrollo (PED) 2022-2027. Gobierno de Nuevo León. Available: <https://www.nl.gob.mx/plan-estatal-de-desarrollo-2022-2027>
- Meza, H. & Duarte, E. (2020). La metodología STEAM en el desarrollo de competencias y la resolución de problemas. [Conference]. II Congreso Internacional de Educación: UNA nueva mirada en la mediación pedagógica. Costa Rica. Available: <https://bit.ly/3foQulz>
- Montiel, H., & Gomez-Zermeño, M. G. (2021). Educational challenges for computational thinking in k–12 education: A systematic literature review of “scratch” as an innovative programming tool. *Computers*, 10(6), 69.
- Montiel, H., & Gomez-Zermeño, M. G. (2022, January). Rock the Boat! Shaken by the COVID-19 Crisis: A Review on Teachers’ Competencies in ICT. In *Frontiers in Education* (Vol. 6, p. 558). Frontiers.

- Moro, M., Agatolio, F., & Menegatti, E. (2018). The RoboESL Project: Development, evaluation, and outcomes regarding the proposed robotic enhanced curricula. *International Journal of Smart Education and Urban Society*, 9(1), 48-60. <https://doi.org/10.4018/ijseus.2018010105>
- Muñoz-Repiso, A. G. V., & González, Y. A. C. (2019). Robótica para desarrollar el pensamiento computacional en Educación Infantil. *Comunicar: Revista científica iberoamericana de comunicación y educación*, (59), 63-72.
- Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). *Artificial intelligence in education: Challenges and opportunities for sustainable development*.
- Resnick, M., Maloney, J., Monroy-Hernández, A., Rusk, N., Eastmond, E., Brennan, K., Millner, A., Rosenbaum, E., Siver, J., Silverman, B., y Kafay, Y. (2009). Scratch: Programming for all. *Communications of the ACM*, 52(1), 60-67.
- Santillán, J.P., Cadena, V.del C., & Cadena, M. (2019). Educación Steam: Entrada a la sociedad del conocimiento. *Ciencia Digital*, 3(3.4.), 212-227. <https://doi.org/10.33262/cienciadigital.v3i3.4.847>.
- Secretaría de Educación Pública. (2022). La Nueva Escuela Mexicana. Mexico. Available: <https://dfa.edomex.gob.mx/sites/dfa.edomex.gob.mx/files/files/NEM%20principios%20y%20orientacio%C3%ADn%20pedago%C3%ADgica.pdf>
- Sevilla, S., Solano, N., (2020). Supervisión 21. *Revista de Educación e Inspección*, 55, 1-24. <https://bit.ly/3j3x3B1>
- UNESCO (2018). *Référentiel UNESCO de compétences TIC pour les enseignants*. Paris: NESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000368966>
- UNESCO. (2019). *Necesaria la educación STEAM+H para cultivar un pensamiento y habilidades transformadoras, innovadoras y creativas para avanzar hacia un desarrollo sostenible*. Paris. Available: <https://www.unesco.org/es/articles/necesaria-la-educacion-steamh-para-cultivar-un-pensamiento-y-habilidades-transformadoras-innovadoras>
- UNESCO. (2019). *Artificial Intelligence*. Available: <https://www.unesco.org/es/artificial-intelligence>
- Wing, J. M. (2006). Computational thinking. *Communications of the ACM*, 49(3), 33-35.
- Yakman, G. (2008). STEAM education: An overview of creating a model of integrative education. [Conference]. En *Pupils' Attitudes Towards Technology (PATT-15)*. Salt Lake City, USA.

Can Artificial Intelligence Be Used as a Tutor to Improve Student Performance in a Technical Writing Class?

Samuel Horine, Embry-Riddle Aeronautical University, United States

George Pozek, Embry-Riddle Aeronautical University, United States

Brian Butka, Embry-Riddle Aeronautical University, United States

The Paris Conference on Education 2023

Official Conference Proceedings

Abstract

The utilization of artificial intelligence in language modeling has seen a significant rise in recent years, particularly in the area of text generation. One of the most prominent models in this field is ChatGPT3. This study aims to assess ChatGPT's ability to provide feedback on college-level technical reports. The research tested three different control groups, one was ChatGPT, the other was a student who barely worked with ChatGPT, and one who took it step by step with ChatGPT. Several different technical report writing assignments and projects were assigned to ChatGPT to evaluate its ability to guide a student through their completion and help them improve the quality of their writing. The merit of each component and final product was evaluated using the instructor's grading rubrics. Several types of reports were tested such as resumes and cover letters, argumentative essays, position papers, critical approach analyses, and high level technical lab reports. This study demonstrates the potential of ChatGPT as an AI tutor for technical writing tasks. The results of the study show that ChatGPT has the ability to provide insightful feedback on college-level technical reports. The findings of this research provide valuable insights into the effectiveness of using AI in language modeling to support student learning in a practical and efficient manner. The implications of this study could have a significant impact on the education field and the future use of AI as a tool for language modeling and teaching.

Keywords: Artificial Intelligence (AI), ChatGPT, Tutor, Technical Report

iafor

The International Academic Forum

www.iafor.org

Introduction

The Socratic method, which has been revered for its effectiveness as a personalized form of tutoring for thousands of years, is still highly sought after in today's education landscape. In ancient times, only the privileged few, such as Aristotle, had the ability to be tutored using this method. However, with the modern-day education system failing to cater to the diverse learning styles of students. The demand for personalized tutoring has surged tremendously. Unfortunately, the high cost of such tutoring makes it out of reach for most students.

Recent advancements in artificial intelligence have provided a glimmer of hope for students looking for affordable, personalized tutoring. ChatGPT is one such advancement that holds significant potential to revolutionize the tutoring industry. As an AI language model based on the GPT-3.5 architecture. ChatGPT is designed to interact with users using natural language and provide tailored responses to their queries. ChatGPT is able to describe any concept to anybody exactly how they want it, and in a way that helps the user understand the concept that they happen to be struggling with. ChatGPT might be able to help people understand complex processes such as surgery (Tel et al., 2023). Which poses the question what is ChatGPT, that question is pondered by Gordijn, and Have in their paper "ChatGPT: Evolution or Revolution" where these questions are looked at in depth.

ChatGPT is new, having only come out in November of 2022, so there's a lot of different tests being used on it, where some use it to write a college application (Tremblay, 2023). It's being asked to solve physics questions (Wang, 2023). ChatGPT's responses have been compared with many real human written articles (Ariyaratne et al., 2023), some of the responses from ChatGPT are so detailed, written abstracts are able to even fool scientists (Else, 2023). However, with how detailed many of ChatGPT's answers are, the question arises if ChatGPT is a valid author (Teixeira da Silva, 2023). Some cite plagiarism as a reason for why it can't be an author, "A violation of these policies will constitute scientific misconduct no different from altered images or plagiarism of existing works" (Thorp, H. H. 2023). However, this study does not look at the validity of ChatGPT as an author but looks at it as a tutor.

In traditional classroom settings, students may feel hesitant to ask questions due to the fear of being judged or embarrassed in front of their teachers and peers. This can lead to students missing out on valuable learning opportunities and struggling to keep up with their peers. However, ChatGPT's non-judgement nature can provide a more inclusive learning environment where students feel comfortable asking questions without fear of judgment.

This research study seeks to explore the extent to which ChatGPT can serve as a low-cost personalized tutor. Specifically, it will investigate the efficacy of ChatGPT in assisting students with the challenging tasks of helping students write their resumes and cover letters, as well as helping them navigate the intricacies of writing academic papers with the guidance of their respective rubrics and assignments descriptions. To determine how valuable ChatGPT's advice is, it was asked to regrade papers after grading them. To figure out if its own self-evaluation is accurate, and its abilities to write assignments are to the college level, the assignments that ChatGPT made, as well as helped students write were graded by a technical report writing teacher.

The main goal was not to see if ChatGPT could complete the assignments for the student, but to instead see if it could judge the quality of the work submitted by the student and then

accurately help them improve it. The aim was to gauge ChatGPT's ability to serve as a reliable tool for evaluating and refining the students' assignments rather than just be another way to cheat.

This research aims to bridge the gap between traditional personalized Socratic tutoring and modern-day technology by evaluating the ability of ChatGPT to provide personalized, low-cost tutoring services to students. The findings of this study could potentially pave the way for a new era of accessible, affordable, and effective personalized tutoring, with the potential to level the playing field for students from all walks of life. ChatGPT's capabilities were evaluated, then a student who only worked with ChatGPT briefly who will be known as student A, and finally a student who took everything step by step with ChatGPT who will be known as Student B.

Methodology

This research serves as a pilot study aimed at assessing the effectiveness of utilizing ChatGPT as a Socratic method tutor in a technical report writing class. Due to the rapidly evolving technology the study was limited to a small number of subjects. Whenever ChatGPT was used, it was given the following prompt, "In this dialogue you will act as a socratic tutor, that will constantly guide the student (the user) to the correct answer after you tell them their grade based on the assignment description." First, ChatGPT's own capabilities were tested on how well these reports could be written by it. Next, Student A wrote a single paper with guidance from ChatGPT. Finally, Student B wrote as many drafts needed for ChatGPT to deem the quality of the paper as 90% or greater. All grades used in the research come from the researchers using the professor's grading rubric.

This research looks at five major assignments. The first assignment is a job application in which a student had to find a job listing that they wanted to apply for. They had to tailor their resume for this job, as well as write a cover letter for said job listing. Next, was the argumentative essay that took a clear and arguable stance on a tightly focused and specific topic. Then, the position assignment where the students had to craft a paper that responds to a current social issue. The students primarily had to take a stance on a current issue within society, with their intended audience being any stranger wondering about the issue at hand. Next, for the critique assignment, Students are expected to use critical theory to reanalyze any media of their choice and develop a critique and a new way to look at that piece of media. Students are allowed to choose any topics like the idea of marxism being represented in "The Lion King." Finally, the chatbot was tested for its ability to aid with high level technical projects in engineering experiments.

ChatGPT is known for its ability to chat with any user using regular interhuman dialogue, meaning its functionality as a tutor and a mentor is already present. The first scenario that was tested was a job application in which a student had to find a job listing that they wanted to apply for. They had to tailor their resume for this job, as well as write a cover letter for said job listing. When meeting with Student B was instructed to interact with ChatGPT and go through each detail, from the job they specifically want, along with the skills that are needed for that job. The student even realized they wanted to change their job choice from a UX researcher to a content writer. The student even changed where they wanted to apply to different software companies that have different objectives. ChatGPT was able to adapt to these changes and guide the content of the assignments based on these changes.

After this interaction the tutor naturally transitioned into guiding the student to the cover letter. Where the tutor consistently asked the student what should be included on a cover letter, giving an outline at the end of the dialogue. After creating the templates for each section of the cover letter as shown in Figure 1, the student wrote their cover letter and a resume to accompany it.

Dear Hiring Manager,

I am excited to apply for the Content Writer position at Cocobolo Group. As an experienced writer with a passion for creating engaging content, I am confident that I have the skills and experience needed to succeed in this role.

My name is [Your Name], and I have [Number of years of experience] of experience in [Industry/Field]. During this time, I have honed my skills in [specific skills or areas of expertise], and have a proven track record of producing high-quality content that engages and informs audiences.

In my previous roles, I have gained valuable experience in writing, problem solving, communication, and brainstorming. As a content writer at [Previous Company], I was responsible for creating engaging and informative content for a variety of audiences. Through this experience, I learned how to research and analyze information, collaborate with other team members to develop ideas, and write clear and concise copy that effectively communicates key messages.

In addition to my writing experience, I also have strong problem-solving skills that enable me to tackle complex issues and find creative solutions. Whether working on a difficult writing assignment or collaborating with colleagues on a team project, I am able to bring a strategic and analytical approach to problem solving that helps to achieve successful outcomes.

Furthermore, I am highly skilled in communication and brainstorming. Throughout my career, I have developed a reputation for being an excellent communicator, both in writing and in person. I am able to clearly and effectively convey ideas, listen actively to feedback, and collaborate with others to develop innovative solutions.

Thank you for considering my application for the Content Writer position at Cocobolo Group. I am excited about the opportunity to bring my skills and experience to your talented team, and to contribute to your company's success.

If you require any additional information or have any questions, please do not hesitate to contact me at [Your Phone Number] or [Your Email Address]. I look forward to the opportunity to speak with you further about my qualifications for the position.

Thank you again for your time and consideration.

Best regards,
[Your Name]

Figure 1: ChatGPT Guided Template for a Cover Letter

However, the student made changes to the template to suit their actual experience and skills that student B has. All changes and the difference found in the cover letter can be found within figure 2.

Student B

Student B's Contact Info.

Date

Cocobolo Group

C/O Steven Sponder

6531 Park of Commer Blvd

Student B's Address

Re: Application for Marketing Content Writer

Dear Steven Sponder,

I am writing to apply for the position of content writer for your new restaurant app for Cocobolo Group. I came across this opportunity on handshake and I am thrilled to express my interest in this. As a sophomore studying Communications, I am very interested in becoming a content writer as I have strong writing and problem-solving skills.

As a current student studying communications, I have gained strong writing and research experience. Within my news writing class, I wrote stories that captured stories that are significant to specific audiences and provided information. I also currently work as a writing tutor and have demonstrated clear communication skills to converse ideas with my tutees and brainstorming for a solution to their needs. I can apply these same skills to create engaging material for your restaurant app and work towards it with my peers through effective communication.

I am very interested in the role of a content writer and would like to learn more, and I hope you will contact me for an interview to discuss more about the position. You can reach me StudentB@gmail.com or via phone anytime at (111)-111-1111. Thank you for taking the time to review my cover letter and resume.

Sincerely,

Student B

Figure 2: Student B's Cover Letter

Next, the students were tasked with working on the argument assignment. First, ChatGPT was given the assignment description and asked to complete the assignment. Next, the students were provided with the detailed assignment description, which the students were tasked to read through before starting the assignment. Student A wrote their paper with partial guidance from ChatGPT, while student B took their time, taking input and direction from ChatGPT. Student A would ask things of ChatGPT like what would be an appropriate topic for these assignments. Student B's initial draft was given a low grade by ChatGPT. ChatGPT sited that Student B's initial draft was 60% because it wasn't "coherent" and it was "informal." Student B's initial draft that was submitted to ChatGPT can be seen in Figure 3.

Technology is coming fast and AI is its partner in crime. We have self driving cars and Siri is smarter which is cool. With that, we can see AI basically everywhere in our lives. In school we also see it with this new program called ChatGPT. However, the program has worried the general public because of its privacy is uncertain, potential to domestic attacks, and finally because it can put humanity in danger. The ethical problems surrounding AI in general has been a problem for as it puts education at risk. I will be talking about why ChatGPT is good and why it should be introduced to education.

In the United States, we have minorities and they don't have easy access to education. School teachers are also facing unemployment at a high rate because of bad wages. This will put kids at risk. And the future of the United States. However, by promoting ChatGPT, kids can get general knowledge in a good way because the program chats while giving information. This should be incorporated and encouraged because then it could be installed in computers. Computers are found in libraries and their libraries can rise in popularity. If it rises in popularity, it will get more funds, overall this program can be groundbreaking for the future of the country.

Figure 3: Student B's Initial Argument Draft

With this response, ChatGPT's aptitude of providing proper feedback can be tested. However, the real test is determining if ChatGPT's feedback is actually beneficial for the student. After seeing the feedback that ChatGPT gave, the student then began drafting their next attempt keeping in mind the feedback that was given to them by ChatGPT. Student B finished their second draft and was given a higher grade by ChatGPT. The intermediate draft was given an 80%.

After Student B received feedback on their intermediate draft, Student B revised their paper and resubmitted it to ChatGPT to evaluate it. ChatGPT deemed that the final draft was worthy enough for a 95% on their essay. Student B's final essay can be seen in figure 4. ChatGPT believes the paper is "clear and concise" believing Student B argued their topic well.

With the emergence of technology in society, AI (Artificial Intelligence) strides alongside it and makes their presence unknown. From self-driving cars to an even smarter Siri, AI can be seen making its appearance throughout essentially everywhere in our normalcy. Even in education, there is a rise in AI with a program called ChatGPT. However, this has raised concerns of privacy, terrorism, and ultimately the safety of humanity's future. The ethical issues surrounding AI have been a major concern for everyone and the validity of education is being questioned if they are to integrate ChatGPT within. Within this essay, ChatGPT will be argued on why it is beneficial and should be welcomed as it allows marginalized groups to readily access it making them gain a foundation to concepts, bridge gaps of knowledge, and is an overall better alternative to cheating.

Education is not accessible to everyone throughout the United States as marginalized groups and minorities suffers from lack of access to education. Schools are facing teacher unemployment at a high rate due to low wages and putting children at risk for their future and the country as a whole. Communities that are poor are at higher risks of this. However, by promoting ChatGPT, children can access it to gain general knowledge in a healthy manner. ChatGPT maintains a conversational tone while giving information, making it unbiased and easy to understand for users. This AI should be incorporated into libraries and onto computers, making it accessible to the public. Also, by encouraging people to go to the library for this program, more people will get a library card and garner more attention to libraries. This will finally lead to an increase of funds as libraries are in higher demand and making education more accessible for all. By gatekeeping what could lay a foundation education and general knowledge, the country as a whole will never progress and therefore needs ChatGPT to be accessible to all.

Figure 4: Student B's Final Argument Draft

Next, the position assignment was analyzed. Where the same order occurred, that being ChatGPT was given the assignment description and wrote about gun control, student A wrote about climate change because ChatGPT instructed it that it was a good topic choice, and student B wrote about education funding. Just like the last assignment student B kept resubmitting to ChatGPT to get its evaluation of the paper.

Figure 5 displays the initial draft Student B wrote for the position paper. ChatGPT gave the draft a tentative grade of 80%. ChatGPT gave student B the feedback that they need to improve the areas of "organization, clarity, and evidence."

The United States is notorious for its massive fundings toward its military interests, but what about education? Education serves as a foundation for the country and its future as it provides everyone with knowledge and strengthens the future generation. By increasing funding, more money will go toward school supplies, teacher wages, and improving libraries; all gaining more attention and encouraging the use of it. By doing so, students will get quality education in and out of school as they are more likely to go to libraries. This paper will argue for the great societal benefit from increased education funding as both students and teachers will have higher incentives to learn.

By increasing funding, it will affect the school directly as it improves school technology, supplies, and increase teacher wages. By having better school technology, students can learn effectively and can be exposed to technology fairly. Those in less fortunate communities are at constant risk of having education diminished as they get less attention toward their experience as opposed to the students in the upper class. Having more supplies available will mean teachers will not have to pay out of their pocket for these supplies, further cutting their pay. Overall, having more supplies will allow teachers to use tools that were once unavailable, making the educational experience stronger. By increasing education funding, they can increase their wages by making an incentive to work better. This can also counter the increasing unemployment of teachers throughout the nation.

By increasing education funds, libraries are also affected as they have more attention as they improve. Similar to schools, they can gain better technology and supplies, ultimately providing people with a higher quality of education when they seek books or to research. Again, those in less fortunate communities will benefit greatly from this as they can seek further education out of school.

Figure 5: Student B's Initial Position Draft

Student B noted the feedback given by ChatGPT, and began work on their next draft. The student constantly kept referring to the advice given by ChatGPT. As a result, the student only had to make one more draft, their final draft was submitted to ChatGPT. Figure 6 shows student B's final draft. ChatGPT graded the paper and gave it a 90%. ChatGPT gives praise to the paper's work where it says, "It flows better, and your points are more organized and clearer." But it still gives some suggestions on how to make the essay stronger, "However, your essay can be improved by providing more statistical evidence to support your claims."

The United States is notorious for its massive fundings toward its military interests, but what about education? In the age of the rising technology, the need for education is rising at a rate in which the government cannot keep up currently. The education system is outdated and because the internet is ever-growing, which at times serves as a better resource than what is offered at institutions, the government too must do their part in providing for students. The decline in quality of education can be noticeable at the higher levels of high school and college with the income gaps and places of poverty, not serving all students equally in education in which in turn violates a basic right to education and a better future which is vital to everyone and for society. Education serves as a foundation for the country and its future as it provides everyone with knowledge and strengthens the future generation. By increasing funding, more money will go toward school supplies, teacher wages, and improving libraries; all gaining more attention and encouraging the use of it. By doing so, students and minority communities will get quality education in school and out of school as libraries are of higher quality. The United States should have increased funding for education because it will benefit society overall as both students and teachers have incentive or access to education nationwide even in minority or marginalized communities.

By increasing funding, it will affect the school directly as it improves school technology, supplies, and increase teacher wages. By having better school technology, students can learn effectively and can be exposed to technology fairly. Those in less fortunate communities are at constant risk of having their education diminished as they get less attention and funding toward their experience as opposed to the students in the upper class. These less fortunate communities tend to have minorities and marginalized groups who already suffer financially and affect the quality of education experienced. In the future, these students will come out of school with skills that were once not able to be gained which makes them able to compete in the job market. Having more supplies available will mean teachers will not have to pay out of their pocket for these supplies, further cutting their pay. Overall, having more supplies will allow teachers to use tools that were once unavailable, making the educational experience stronger. By increasing education funding, they can increase their wages by making an incentive to work better. This can also counter the increasing unemployment of teachers throughout the nation. Having a lack of teachers will put students at risk and the future of the country. By increasing funding for the United States, it increases accessibility for marginalized groups and minorities which decreases gaps between classes making equality closer to be achieved.

By increasing education funds, libraries are also affected as they get more attention as they improve. Similar to schools, they can gain better technology and supplies, ultimately providing people with a higher quality of education when they seek books or to research. By having access to technology, minority or marginalized groups can use them freely and be exposed to knowledge which they were not before. Again, minority or marginalized communities will benefit from this as they can seek further education outside of school. Libraries serve for the community as free education and therefore should not be neglected. Improving the library will allow access to education freely along with the technology within the building.

Figure 6: Student B's Final Position Draft

Next, the students worked on the critique assignment. ChatGPT chose feminist theory within Harry Potter. Student A chose poststructuralism and the religious experience of hindus and christians. ChatGPT told student A that the topic would be great for the assignment and would work in context with the assignment. Finally, student B decided on the topic of gender identity within the novel, "The Brief Wondrous Life of Oscar Wao" by Junot Diaz. With their topics picked, each of the students then began writing their drafts. After finishing their first draft, student B uploaded it to ChatGPT. Student B's initial draft as seen in figure 7 was

given 89%. Where ChatGPT noted the areas of improvement, “Firstly, it would be helpful to provide more context on the concept of patriarchy and its historical and cultural significance in the Dominican Republic. This would help to provide a more in-depth understanding of how patriarchy operates in the novel. Additionally, while your analysis of the characters Oscar, Yunior, Lola, and Belicia is effective, it would be helpful to provide more specific examples from the novel to support your arguments.”

This essay examines how the novel “The Brief Wondrous Life of Oscar Wao” by Junot Diaz engages with patriarchy during the time of Trujillo, a Dominican Republic dictator, from the mid to late 20th century. This novel takes place in the Dominican Republic under the Dictator Trujillo and in New Jersey. Patriarchy is a system of male dominance which establishes men at the top of the hierarchy in society, which creates a gender inequality between men and women, valuing masculine traits and undervaluing femininity. Furthermore, it creates a divide amongst men as masculine traits are more valued than women which makes men that are less masculine as less valued. Covering three generations, each character take the center of the story: 1944-1946(Abelard), 1955-1962(Belicia), and 1974-1995(Oscar). Rafael Leonidas Trujillo's dictatorship (1930-1961) is a time of extreme censorship, brutality, and intimidation which allowed for complete control of the country. Trujillo serves as an entity within the story as a man with no regard for all as he upholds toxic culture of machismo. This essay discusses how the damaging and sometimes toxic patriarchal culture of machismo affects gender identity within the Dominican Society through a feminist and cultural lens. Specifically, this study examines how characters such as Oscar, Yunior, Lola, and Belicia conform to or challenge traditional gender roles.

Oscar is the main character within this novel who can be described as emotional, soft, introverted, and nerdy. These traits do not fall under the category of masculinity, which makes him inferior to most men throughout the novel and ruins the image for himself. However, another character, Yunior, who is referred to as the epitome of masculinity can be seen aggressive, independent, unemotional, and sexually driven; effectively embodying the culture of machismo. Within the novel though, he can be seen struggling internally as he wants to help Oscar but cannot as it makes him vulnerable, which is something he as a man cannot do. Oscar, through his failure to conform, falls into a deep depression as he was ostracized and bullied. He serves as an antithesis to men as he refuses to conform later in the novel which allows him to find his identity.

Belicia is Oscar and Lola's mother and can be described as a hard-working mother who is strict as she upholds traditional sense of being a woman. Lola can be seen as a rebellious with a punk style as she shaved her head, challenging the traditional woman. By not reaching the feminine ideals of subservience and physical attractiveness, women are taught they are not valuable as they will not attract men. Furthermore, this will prevent them from creating a family, which women are objectified for as they're main goal in life. By not conforming to the standards of gender roles later in her life, Lola can be in a relationship and family that is fulfilling as she has a voice of her own.

Within this novel, through the contrast of Yunior and Oscar, Belicia, and Lola along with the many peeks into the different lives and perspectives of the characters, a power structure is established under the effect of patriarchy and with that how the lives are affected by it. As the tragic story unfolds, identities are questioned by characters as they are figuring out who they are and their place within the system or their desire to be away from the system and as themselves. The gender roles and expectations of abiding the traits of masculinity and femininity are seen within this novel as the members of the family and the characters throughout reject these roles or comply with them. These themes offer a deep commentary of a society that is heavily affected by the culture of machismo and the reliance of the structure of patriarchy, which affects the lives of the characters throughout.

Figure 7: Student B's Initial Critique Draft

Through the student's constant writing of assignments, the student can be seen showing improvement between each assignment. Figure 8 shows Student B's final critique draft, which ChatGPT gave a 90%. ChatGPT believes the strength of the paper is its structure, "The essay provides a clear and coherent structure, covering three generations, with each character taking the center of the story."

Finally, ChatGPT was tested for its ability to tutor the writing of technical reports containing advanced engineering topics. The topic of subsonic experimental aerodynamics was chosen. Experimental aerodynamics is a branch of aerodynamics that deals with the study of fluid dynamics around various objects through experimental methods. This subject is an advanced topic taught to Aerospace Engineering students that requires a firm understanding of incompressible aerodynamics and fluid mechanics to be able to understand the experiments. This particular subject was identified as many students struggled writing lab reports that correctly analyzed the results of the experiments.

The chatbot was presented with technical terminology related to the concept of laminar and turbulent flow, which can often pose challenges for students trying to understand these advanced topics. To assess ChatGPT's ability to explain these concepts effectively, a specific prompt was given requesting an explanation suitable for a five-year-old audience.

Imagine you are in a bathtub filled with water and you are making waves with your hands. If you move your hands slowly, the water will move smoothly and quietly, like a calm river. This is called laminar flow.

But if you start moving your hands very fast, the water will become very messy and chaotic, with waves and bubbles going in all directions. This is called turbulent flow.

Turbulent flow is like when you mix up all the toys in your toy box and they get jumbled together. It's very messy and hard to control. Laminar flow is like when you put your toys away neatly in their own compartments. It's very organized and easy to control.

In real life, turbulent flow can happen when air or water moves very fast, such as in a river rapid or in the wake of an airplane. Laminar flow can happen when air or water moves slowly and smoothly, such as in a calm river or in a pipe with low

Figure 8: ChatGpt's explanation of different flow types

Experiments related to these engineering topics are usually performed in subsonic wind tunnels. Students would need to understand this information before completing the experiment, but after completing the experiment, they would need to be able to analyze the raw data and to be able to explain the trends.

For a very basic example experiment, ChatGPT was asked what would happen if a ping pong ball and a golf ball were placed separately into a wind tunnel and the drag directly behind the object was recorded. The chatbot was able to correctly identify and explain what is in Figure 9.

If the ping pong ball and the golf ball were identical in size and shape, had the same Reynolds number, and the only difference was the ridges on the golf ball's surface, the ping pong would be expected to have higher drag.

The ridges on the golf ball's surface create turbulence in the boundary layer of the flow, which is the thin layer of air directly adjacent to the surface of the ball. This turbulent boundary layer reduces the pressure difference between the front and back sides of the golf ball, resulting in less drag compared to the smooth surface

Figure 9: ChatGPT's prediction of experiment

Results

First, the job report assignment was analyzed. After taking student B's rubric given from the professor and comparing the grades ChatGPT gave against the Professor's grades, ChatGPT's grades were harsher than the Professor. ChatGPT gave student B's cover letter a 95%, when the professor graded the student with a 100%.

Second, the argumentative assignment demonstrated varying degrees of proficiency between ChatGPT's responses and the professor's evaluation. All five drafts of the assignment were diligently submitted to the professor for assessment. While ChatGPT's own response to the essay received a grade of 65%, the professor's evaluation revealed a less favorable outlook, stating, "This essay may be categorized as a 60, but it is perilously close to failing. It predominantly reads as explanatory rather than presenting a debatable topic and substantiating the argument's stance. Moreover, there are perplexingly disjointed paragraphs towards the end of the essay that do not align with the overall piece. "Student A, however, displayed some improvement in their draft, receiving a commendable 80% from the professor. The professor commented, "This work would place in the lower range of the 80s or upper 70s for me. Although it presents a foundational argument, it remains rudimentary and inadequately developed. The essay adopts a formulaic approach, lacking an attempt to create a stylistic design that appeals to a distinct and specific audience." These contrasting outcomes between a paper written solely by ChatGPT and a paper guided by ChatGPT indicate a discernible trend where ChatGPT's expertise lies in assisting students in their work rather than executing it on their behalf.

Next, student B's initial draft received a satisfactory grade of 75%, surpassing ChatGPT's initial assessment. The professor explained the reasoning behind this score, stating, "This essay exhibits moments of insightful thoughts but remains underdeveloped, requiring further contextualization of ideas. Additional support is needed to elevate this essay to the 80/90 range for me." In this case, ChatGPT's guidance appears to be more stringent, as evident in the job report assignment and the students' grades. However, student B's final draft received a diminished grade of 65%. This demonstrates that ChatGPT may struggle to provide appropriate grading or valuable advice for more intricate assignments.

Moving on to the position assignment, ChatGPT's independent endeavor received a modest grade of 75% indicating its ability to produce average-quality papers on its own. Regrettably, student A's paper, despite ChatGPT's guidance, only garnered a grade of 65% from the professor. Despite the assistance provided by ChatGPT, student A was unable to reach the desired 70% or higher. Similarly, student B's performance revealed a lack of improvement, with their initial draft earning a score of 60%, which remained constant in the professor's

evaluation of their final draft. Thus, it is apparent that ChatGPT's capabilities may fall short when assisting students with more complex assignments.

Lastly, the critique assignment underscored the significant disparity between ChatGPT's performance and that of the professor's evaluation. ChatGPT's attempt at the assignment received a respectable grade of 75%. However, student A's paper received the lowest grade of all, with the professor noting that the chosen topic failed to adhere to the assignment guidelines, resulting in a score of 50%. The professor stated, "This paper would receive a failing grade as it does not fulfill the assignment's purpose. Students were expected to apply the framework of a critical theory to a context of their choice, preferably an artifact, and religion does not fit within this category." This predicament arose from ChatGPT providing erroneous guidance to student A, affirming the acceptability of their chosen topic despite it clearly diverging from the assignment guidelines. In contrast, student B's initial draft received a grade of 75%, coinciding with ChatGPT's initial attempt. This indicates that ChatGPT can offer rudimentary assistance. Remarkably, student B's final draft received an improved grade of 85%. Consequently, it can be inferred that ChatGPT's guidance is more effective in facilitating improvements with less complex assignments.

For the high level technical report, the chatbot was able to explain engineering topics in a way that would be able to help an outsider complete the experiments. Figure 8 showcases ChatGPT's response to this prompt which successfully transformed the complex subject matter into an easily comprehensible explanation. The generated response struck a balance between simplicity and comprehensiveness, ensuring that the fundamental differences between laminar and turbulent flow were conveyed accurately.

Experiments using topics such as these are not usually performed in a classroom setting until a college student is at least an upperclassman. The simplicity and clarity of ChatGPT's explanation make it suitable for students who need a basic understanding of the distinction between laminar and turbulent flow before engaging in experiments or further exploration of the topic. By providing a sensible explanation, ChatGPT has the potential to enhance students' comprehension and ensure a solid foundation for their participation in experimental activities related to fluid dynamics.

ChatGPT's prediction in figure 9 was correct. It was able to come to the conclusion in figure 9 purely based on its knowledge of what was expected to happen and did not need to have any raw data from the actual experiment. This means that the student could easily ask ChatGPT what the expected result of the experiment is and be given an answer and a justification. The student could then easily cross check their experimental results with the expected results in order to see if they matched. This could also help the student provide a deeper analysis of what the data means and give a deeper conclusion to the experiment.

Overall, ChatGPT had a deep understanding of this technical engineering topic being experimented on. It could explain the concept in very simple terms so that anyone could understand it going into the experiment. Based on these concepts, it could then predict what it thought would happen in the experiment. This would help the student have a deeper understanding of their data and provide them with a resource to understand what was happening.

Conclusion

In conclusion, ChatGPT has demonstrated its efficacy in enhancing students' academic performance and offering valuable insights and guidance, particularly in assignments of lesser complexity such as the job report and critical theory tasks. Its contribution can often be the differentiating factor between a passing and failing grade in these types of assignments. However, the limitations of ChatGPT become apparent when tackling more intricate tasks, such as the position paper and argumentative assignment. In these cases, both its own scores and the quality of advice provided are average at best.

It is crucial for students to exercise caution when relying on ChatGPT for assistance with complex assignments, as it may even have a detrimental effect on their potential grade, as evidenced by student B's final argumentative draft receiving a 10% lower score than their initial draft. Notably, a significant flaw observed in ChatGPT's functionality is its inability to accurately identify appropriate topics for students, as exemplified by student A's critical theory assignment, where they failed due to ChatGPT's assurance that their chosen topic was suitable. Furthermore, ChatGPT's tendency to offer similar or identical advice throughout different assignments suggests a limitation in its ability to provide diverse and nuanced feedback. Therefore, while ChatGPT can be a valuable tool in aiding students with simpler assignments, it is prudent for students to seek additional guidance from professors or other reliable sources when tackling more complex academic tasks. This ensures a comprehensive and well-rounded approach to their assignments, leveraging the strengths of both human expertise and AI assistance.

It is important to highlight that ChatGPT's grading approach appears to be more stringent in simpler assignments, such as the job application. However, it exhibits greater generosity when assessing more complex assignments, aligning with the findings of a previous study that stated, "Application and interpretation of knowledge with more complex analysis is not well processed by ChatGPT" (Fergus et al., 2023). While ChatGPT proves beneficial in providing general advice, it may encounter limitations when dealing with advanced assignments. Nevertheless, successful implementations of ChatGPT have been observed in a Java programming class, as evidenced by the paper "The Development and Evaluation of an Artificial Intelligence (A.I.) Tutor for a Java Programming Class" (Butka et al., n.d.), wherein it effectively supports students in enhancing their understanding of the object-oriented paradigm. This is supported by the results from the high level technical report where the chatbot was able to provide technical knowledge as well as its (correct) prediction on the results of an experiment.

Despite the promising outcomes, ongoing debates persist regarding the merits and drawbacks of ChatGPT ("ChatGPT: friend or foe?"; 2023). As ChatGPT is a relatively new technology, discussions regarding its ethical implications are still ongoing (Graf & Bernardi, 2023). However, due to the increasing prevalence of ChatGPT, educators are faced with the challenge of incorporating it into their teaching methodologies (Yang, 2023). Various perspectives exist on the advantages and disadvantages of ChatGPT (Chavez, 2023), and while this research study concludes that ChatGPT can or cannot be used as a technical report writing tutor, it is important to note that many individuals perceive the use of ChatGPT as a potential threat to academic authority ("ChatGPT and usurping academic authority"; 2023). Nonetheless, there are also proponents who outline strategies for ethically integrating ChatGPT into educational practices ("Tools such as ChatGPT..."; 2023). It is crucial to acknowledge that the issue of technology's impact on academic integrity predates ChatGPT,

as students who seek to cheat have long utilized tools like Google to find answers. However, relying solely on ChatGPT as a cheating tool without developing a deeper understanding of the subject matter may result in generic and superficial writing lacking in depth and originality.

References

- Ariyaratne, S., Iyengar, K. P., Nischal, N., Chitti Babu, N., & Botchu, R. (2023). A comparison of ChatGPT-generated articles with human-written articles. *Skeletal Radiology*. <https://doi.org/10.1007/s00256-023-04340-5>
- Butka, Elder, & Tripaldelli. (n.d.). *he Development and Evaluation of an Artificial Intelligence (A.I.) Tutor for a Java Programming Class*.
- Chavez, M. R. (2023). ChatGPT: the good, the bad, and the potential. *American Journal of Obstetrics and Gynecology*. <https://doi.org/10.1016/j.ajog.2023.04.005>
- Else, H. (2023). Abstracts written by ChatGPT fool scientists. *Nature (London)*, 613(7944), 423–423. <https://doi.org/10.1038/d41586-023-00056-7>
- Fergus, S., Botha, M., & Ostovar, M. (2023). Evaluating Academic Answers Generated Using ChatGPT. *Journal of Chemical Education*, 100(4), 1672–1675. <https://doi.org/10.1021/acs.jchemed.3c00087>
- Gordijn, B., & Have, H. T. (2023). ChatGPT: evolution or revolution? *Medicine, Health Care, and Philosophy*, 26(1), 1–2. <https://doi.org/10.1007/s11019-023-10136-0>
- Graf, A., & Bernardi, R. E. (2023). ChatGPT in Research: Balancing Ethics, Transparency and Advancement. *Neuroscience*, 515, 71–73. <https://doi.org/10.1016/j.neuroscience.2023.02.008>
- The Lancet Digital Health. (2023). ChatGPT: friend or foe? *The Lancet. Digital Health*, 5(3), e102–e102. [https://doi.org/10.1016/S2589-7500\(23\)00023-7](https://doi.org/10.1016/S2589-7500(23)00023-7)
- Teixeira da Silva, J. A. (2023). Is ChatGPT a valid author? *Nurse Education in Practice*, 68, 103600–103600. <https://doi.org/10.1016/j.nepr.2023.103600>
- Tel, A., Parodi, P. C., Robiony, M., Zanotti, B., & Zingaretti, N. (2023). Letter to the Editor: Could ChatGPT Improve Knowledge in Surgery? *Annals of Surgical Oncology*. <https://doi.org/10.1245/s10434-023-13518-z>
- Thorp, H. H. (2023). ChatGPT is fun, but not an author. *Science (American Association for the Advancement of Science)*, 379(6630), 313–313. <https://doi.org/10.1126/science.adg7879>
- Tools such as ChatGPT threaten transparent science; here are our ground rules for their use. (2023). *Nature (London)*, 613(7945), 612–612. <https://doi.org/10.1038/d41586-023-00191-1>
- Tremblay, C. W. (2023). Meet ChatGPT. *College and University*, 98(1), 49–54.
- Wang, J. (2023). ChatGPT: A test drive. *American Journal of Physics*, 91(4), 255–256. <https://doi.org/10.1119/5.0145897>

Yang, H. (2023). How I use ChatGPT responsibly in my teaching. Nature (London).
<https://doi.org/10.1038/d41586-023-01026-9>

Experiences and Pedagogical Reflections on Virtual Teaching Practice in Mexico

Antonio Alanís Huerta, Centro de Actualización del Magisterio en Michoacán, Mexico

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Digital platforms help us establish sociocultural and educational communication with the ethical *other*. They have facilitated pedagogical follow-up for our students during the pandemic period through the intermediation of the digital interface and the emerging pedagogical mediation of students' parents. With the purpose of acquiring data regarding the everyday experiences of teachers during the COVID-19 pandemic to draw valuable insights for the context of the Mexican basic education system, a survey was developed and implemented with active teachers across various regions. This paper summarizes their experiences, exploring their challenges and roles during the global health crisis.

Keywords: Virtual Teaching, Teaching Practice, Teachers' Education, COVID-19, Mexico

iafor

The International Academic Forum
www.iafor.org

Introduction

Currently, satellite communication and digital information are part of our everyday lives, affecting how we relate to others and how we do our jobs. When it comes to educating the youth, teachers have faced an increasing demand to become integrated into digital culture and the newest platforms of communication. There is also a demand to learn and adopt digital resources and other technological tools for the purpose of professional development.

Virtual and remote education is understood today as a way of teaching and learning with the use of digital knowledge networks. The pedagogical link is constructed through a computer, from the image created by the intermediation of the face constructed by the subject, beyond its corporality. In fact, it can be said that in virtual teaching practice, a third actor is formed. In other words, a virtual *third body*. This is a representation that only exists in the brain of the teacher and the student; it is constructed by digital image and sound.

As a result of my responsibility as a professor of postgraduate studies in Education within the Mexican education system, I have had to learn (since 1989) and adopt several different tools to support my teaching practice. These tools include the projector, the personal computer, the Internet, laptops, iPads, tablets, and smartphones.

Based on these previous experiences, I conducted a test run (*réunion zéro*) with three of my postgraduate students on Friday, March 27th. The following sessions of our postgraduate course were undertaken in the form of a seminar—which worked similar to a regular classroom session, except confined to our homes—maintaining the workflow of theme-oriented presentations (*diaporamas*). In each of the sessions, there was a space for group discussions and explanations, while emphasizing controversial talking points to build up to a consensus or conclusion toward the end of each session. Other teachers—both at the preschool and elementary school levels—tasked their students with homework for a month (from March 20th all the way to April 20th). This proved to be insufficient, given that the social isolation period was originally extended until April 30th and was eventually extended further in Mexico.

The question that we should ask ourselves is this: How did teachers experience this period of social isolation? They remained at home, trying to stay in touch with their students through the Internet or perhaps coordinated with their students' parents (in the case of preschool children) via social networks or telephone.

The Pedagogical Problem Within the Context of Social Distancing

With the purpose of acquiring data regarding the everyday experiences of teachers in higher education in Mexico, Colombia, Argentina and Spain, considering the context of the Mexican basic education system (which comprises preschool and elementary school), I have undertaken the task of designing and distributing a survey to explore the aforementioned topic, which is aimed at preschool educators and elementary school teachers.

This survey consisted of seven brief questions on five main topics, namely, a) the experience of isolation, b) personal and professional concerns, c) educational and pedagogical practices, d) learning during the period of social distancing, and e) final reflections and conclusions. It should be noted that this survey was sent to 20 educators and colleagues on April 1st, 2020,

including my postgraduate students. I received a swift reply from my colleagues in Chile, Colombia, and Spain, whose ideas and reflections are included in the present text.

According to the data gathered, while technological resources and tools are useful under such circumstances—i.e., global health crises—the general sentiment is that human contact in the classroom and teachers' personalized attention for students to achieve their learning goals are irreplaceable.

Empathetic education, through its social, socializing and integrating forces (Spain), loses strength as a result of social distancing measures. This is partly owed to the fact that through a computer screen, interactive creativity is rendered sterile (Chile), especially for those who do not possess the minimum resources to receive proper pedagogic support. However, in the case of students in Mexico, stakeholders have displayed a wealth of improvisation techniques to adapt to the circumstances—e.g., students submitting their tasks through email or WhatsApp in the absence of virtual videoconferencing platforms.

My colleague, Rolando Pinto of the University of Playa Valparaíso (UPLA) in Chile, notes that in his country, there has been a great deal of suffering over the social distancing measures, emphasizing the government's lack of precision and political competence strengthening the Chilean education system through the ongoing health crisis. By their own volition, professors like him have been using the same digital communication platforms available to most students, such as WhatsApp, email services, as well as cellphone calls and text messages. To conduct formal postgraduate master's sessions, Dr. Pinto prepares virtual classes through the EDU-Aula system made available and created by the UPLA.

When it comes to the teaching praxis, Dr. Pinto emphasizes that through virtual education, the essence of face-to-face teaching is lost, because there is a degradation in interaction (Spain) and in argumentative thinking (Chile). Thus, the wealth of professional pedagogic practice as a performance (with its corresponding emerging *avatars*) is lost (Colombia). Dr. Pinto notes that, beyond the affirmations (attributed to Chomsky in some cases) that the coronavirus has a military, economic, or political origin (and other conspiracy theories of this kind), it is crucial to remember Freire's (1977) critical pedagogy. From this perspective, the silencing the other is a manner of oppression, doubly perverse because it does not allow for living communication and it castrates affection. In this vein, Escobar Guerrero (2007) argues that:

The pedagogy of the oppressed is a hymn to love, a challenge that calls to break the chains of oppression, a belief made struggle in the human capacity to put biophilia (Eros) before necrophilia (Tanathos), and to set forth on a journey toward liberation, thus assuming the commitment of humanization, knowing that no one frees oneself on their own; instead we are freed in communion, mediated by the world, by history, and by our culture.

In other words, human beings—particularly teachers—need the other to communicate, interact with, and challenge; we learn *with* the other; we reflect *with* the other; with the other we build that much needed dialectic relationship of the everyday but also the pedagogical relationship, within school or a discussion group. This is how we build, piece by piece, trust and hope (Freire, 2007, p. 105), which are necessary ingredients of any education aimed toward freedom.

Educators in Isolation

Of a total of 20 surveys sent to an equal number of postgrad students, only 10 were returned. With the data gathered, I was able to build a more or less cohesive compendium of ideas regarding stakeholders' experiences of the pandemic during the social isolation period. It should be noted that this information displays, simultaneously, the perspective of basic education professionals (preschool and elementary school teachers), parents, children, and master's students.

Before going forward with the specific analysis of the ideas and input of the students and former students of the postgraduate program in Education, I have deemed it convenient to include some of the observations made by a rural educator in elementary school. These observations were put forth by my colleague, the educator Dr. Sergio Aguilar Reveles, from the state of Zacatecas in Mexico, whom I visited in his small rural preschool on March 17th before social isolation policies came into effect in Mexico.

Dr. Aguilar works with multilevel groups in the rugged and rocky landscape of the Sierra Madre Occidental mountain range. I made the visit as part of a school tour, named "*El Circuito de la Ciencia*" (The Science Circuit), which I carried out. This formidable rural teacher (who possesses a PhD) argues that the digital realm has helped maintain a much-needed connection between teachers, students, and parents, while simultaneously imposing a stringent restriction on human interaction, which is by itself an emotionally complex process.

Given the characteristics of the rural educator's profession, before closing the school (where he is a principal), in El Tambor, Zacatecas, Dr. Aguilar assigned his students homework for a period initially contemplated to last a month (from the 20th of March to the 20th of April), pointing out that students had to use the workbook as a support according to their level. However, after the period of social isolation was extended, Dr. Aguilar had to find a way to provide them with further schoolwork instructions, taking into consideration that it is a rural community without the same available digital resources that those of urban centers.

Now, in line with our original intention to show the reader the input of the educators under my supervision (both current and former students of the postgraduate Education course), their contributions will be grouped according to the five themes mentioned at the beginning of this text.

Personal and Professional Experiences of the Pandemic

The implementation of lockdown measures was a sudden process—and, in many respects, unforeseen—that put to the test educators' ability to adapt and devise adequate pedagogical strategies to educate children under social isolation. Meanwhile, it should be noted that these children were at home with their families (which is positive) but they were also tasked with housework that they did not have to do before (which may have been detrimental to their learning process).

Educators also experienced the fear that their families could become while buying and doing other essential activities. However, carrying out these activities required the constant reminder to follow government policies regarding personal hygiene and social distancing. Further, in some cases, social distancing presented additional problems, from a pedagogical standpoint.

The main problem was that these educators, as many people worldwide, experienced considerable anxiety as a result of being confined over a long period of time. However, these teachers found a way to cope with the circumstances presented by the health crisis but and the psychological pressure of mandatory isolation. In the case of pregnant educators and postgraduate students, the uncertainty and fear of infection was especially burdensome.

There was also an evident shift in everyday habits. For teachers whose children studied a different level from the one they were teaching, they had to serve a dual role as educators for both their students and their own children, supporting them through homework to contribute to their learning process from home. Consequently, most of the educators surveyed pointed out that they relied on social media and other communications methods (WhatsApp, Facebook, email, phone, Facetime, Skype, and Zoom) for their everyday activities.

From the Personal to the Professional

It is evident that educators' main concern, in all cases, was the fear that their families and students could become infected. Similarly, they expressed concern regarding students' lack of proper support at home, given that not all parents had the resources for digital communication, much less the professional background to provide their children with pedagogical support.

This is why educators became concerned with whether their students had sufficient information on COVID-19's dangers. Similarly, they were concerned with the prospect of the long-term economic impact that the health crisis would have on the economy due to the closing of businesses. This was especially the case for educators who worked part-time in such businesses (e.g., stationary stores, cafés or bakeries) during the pandemic.

Specifically, within the Mexican context, teachers were concerned with the further degradation of economic stability as a result of the massive unemployment that would result from many informal businesses being unable to recover. Moreover, some of the educators worked in private institutions that became threatened by the looming probability of a massive economic recession.

As postgraduate students, the respondents reported feeling worried that they were incapable of carrying out their courses and seminars normally in a classroom setting because no matter how many digital platforms were available, they were at the mercy of the stability of their connection to the Internet, which in many cases was poor. Furthermore, one cannot help but think of the possibility that the stress caused by isolation and its consequences on strained interpersonal relationships could deeply affect the long-term future of their families, especially in those where there is a risk for domestic violence.

From Pedagogic Principles to Remote Online Learning

Because of the multifaceted nature of pandemic isolation, the educator is taken out of their comfort zone—mostly because of the policies of social distancing implemented and the suspension of certain freedoms. However, the pedagogic work has had to continue through a myriad of changes; thus, the educator's responsibility toward their students has only increased in the face of changing circumstances.

Teachers in this situation were instructed that they should use all available technological resources to continue with their teaching praxis, with all the didactical and methodological changes that this would imply. They did this based on their often limited experience with online education and off-site educational practices.

The younger educators from urban backgrounds exhibited scarce trouble adapting to this change, but the same could not be said for students' parents, who were often caught unprepared. Thus, the educators had to face a situation where the tools required to continue the learning process at a distance were not available for their students.

It should be noted that *millennial* and 'digital native' educators had the least trouble adapting their strategies, whereas senior educators were the ones who struggled most, given their limited proficiency with online tools. Senior educators had to rely on alternative communication options, such as cellphones, some social media platforms, and messaging through WhatsApp.

Communication with the parents occurred, more or less, every two or three days; sometimes once a week. Usually, on Sundays, the teacher would submit the planning for the following week, with an attachment of methodological directives and didactical tools for the children. In some cases, the children would ask their teachers to send them a video with the methodological instructions for the week, as it was unclear for them if the instructions relayed to them by their parents were not fully accurate.

Regularly, mothers sent the educators evidence of the students' homework, through photographs or video recordings. In some private institutions, the demands imposed upon the family unit were significant, often overwhelming, as children were required to perform considerably above their level. This is a common problem in private institutions at this level.

Another way of supporting the children through social isolation was through the addition of games, tales, riddles, wordplay, and "*carretillas* silábicas" (a type of syllabic game for children based on the Minjares method), all of which aimed at strengthening their reading and writing proficiency, while some counting exercises were also added to help them develop mathematical thought.

In some cases, instructional videos were created by the educators to provide step-by-step instruction for tasks. Preschool educators relied on the workbook provided by the Public Education Secretariat in Mexico. These workbooks have different pedagogical activities designed primarily for preschool students. However, it should be noted that this did not occur in all cases, such as in rural areas and marginalized zones, as these options are rarely available due to the remoteness of the students' location or chronic economic and cultural poverty.

Learning Within the Educator's Praxis

The surveyed educators emphasized that through this period of social isolation, they gained a new perspective of online degrees, courses, and seminars, and appreciated their availability. They learned that interaction with their colleagues and students is a vital source of learning, especially because children establish a learning experience through play, which is how they strengthen their psychomotricity and abilities of communication and corporal expression.

The educators also learned that lesson plans are susceptible of being adapted and even improved with additional didactical tools and tactics of pedagogic communication. It is generally believed that the classroom is the environment which instills in society a sense of certainty that children are learning.

The teachers surveyed also confessed that they missed the classroom environment, as well as their students. They acknowledged that the demands stemming from the radical change produced by the health crisis are important, and that all of us should face this trial with seriousness, proactivity, and optimism.

For childhood education professionals, nothing can make up for the lack of face-to-face interaction with their students in a classroom environment, as this context is a source of nourishment for educators who love what they do and deeply appreciate the displays of commitment from their students when it comes to their schoolwork, as well as the bond they develop with them.

From a strictly pedagogical standpoint, some of the educators surveyed pointed out that they learned to support their students at a distance, bridging the gap through technological and digital resources. They learned to put into practice alternative pedagogical strategies and developed a better disposition toward independent work, seeking other tools and materials and reinforcing their ability for tolerance and resilience against unexpected situations.

Unfortunately, it was also confirmed that parents often consider schools mere daycare centers (especially at a preschool level), rather than specialized educational environments. Thus, educators gained a better grasp of what it means to be a teacher; they learned to value their role and acknowledged that there are alternative methods of learning, teaching, and being educators.

Similarly, through the survey, one can understand that teaching and learning have no limit, as humans are capable of reinventing themselves and improve with each passing day. Conversely, it is also evident that the educator's profession is sometimes severely underrated by parents as a result of their own past experience.

The Experience of Isolation

Today it is widely acknowledged that some teachers in Latin America are functionally illiterate when it comes to the pedagogic application of technology, especially when compared to students. However, most children have learned pedagogical routines, procedures, and directives that are useful for periods of social isolation. Thus, there is a need to bridge this gap in order to understand how pedagogic accompaniment can be achieved.

During the pandemic, the teaching practice has been confined to teachers' and students' homes, enabled by digital communication tools. Thus, educators have relied on the assertive participation of students' parents, as they are their main allies in achieving their children's pedagogical goals.

Moreover, no matter how specific and structured the activities are when they are virtually distributed to students, there will always be a gap resulting from the absence of the teacher, whose task it is to coordinate students' work. Educators' role is crucial in directing discussions, contrasting opinions, and evaluating the educational process; in general, they are

tasked with accompanying the students and strengthening the pedagogical bond. However, the bond between teacher and student is hindered by the distance inherent to an online setting.

Today we can affirm the conviction that learning is an unending process, while knowledge can always be improved and continue to hold surprises even for seasoned educators. Our capacity to access the data stored in our memory is nearly unlimited, which allows us to build upon past experiences through cooperation and piece together the zeitgeist of historical events, such as the COVID-19 pandemic. In the end, we are left with a wealth of resources that can allow us to learn and adapt.

What Did We, as Educators, Learn During the Pandemic?

First of all, we learned that professional development and online education acquired a new dimension during the pandemic. The global crisis has shed light on educational institutions and governments' considerable efforts to ensure continuity in the learning process, even in a situation that has left students unable to be present in the classroom. This contrast has also allowed us to acknowledge the privilege of being able to study a career in a classroom.

However, we have become aware of the fact that several free-of-charge videoconferencing platforms can host virtual meetings through which educators may provide students with accompaniment and establish a bond with them. We have observed that it is easier for younger students to adapt to new technologies, compared with their older counterparts. However, simultaneously, some educators (such as I) have managed to attain a degree of proficiency with these emerging tools during the isolation period.

The pedagogical recommendation that I give my students is that they should create virtual planning sessions with their colleagues, which could allow them to strengthen their teamwork and provide them with more elements for their pedagogical toolbox, as they are postgraduate students who are actively working as elementary school teachers.

Conclusion

When faced with a threat against their existence, the most important thing for the individual is to keep themselves and their loved ones alive. Thus, within the context of a pandemic, it is imperative to understand and follow the guidelines established by healthcare authorities, including those related to social distancing. While it is desirable that education remains an interactive and inquisitive process, it should be conducted within the margins of mandatory isolation. This is why virtual communication has acquired a crucial role in education throughout the health crisis.

It is imperative that, in spite of such health crises, new initiatives are put forward and that we lose the fear of thinking outside the box. Even though we should remain aware of the fragility of human life, it is also important to recognize that human knowledge is capable of devising new mechanisms of preservation and survival through the wonder of intelligence and creativity.

References

Escobar Guerrero, M. (2007). Las cuatro etapas de Paulo Freire en sus cinco pedagogías: del oprimido, de la esperanza, de la autonomía, de la indignación y de la tolerancia [The four stages of Paulo Freire in his five pedagogies: of the oppressed, of hope, of autonomy, of indignation, and of tolerance]. *Eccos*, 9(1), 199–219.

Freire, P. (1977). *Pedagogía del oprimido* [*Pedagogy of the oppressed*]. México: Siglo XXI Editores.

Contact email: dralanis8492@hotmail.com

Support Technology for Nonverbal Communication of Students With Autism Spectrum Disorder –Systematic Review

María Isabel Gómez-León, Universidad Internacional de La Rioja, Spain

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

In recent years there have been an exponential number of technological proposals designed for students with autism spectrum disorder (ASD) of which there is not always enough evidence to support their effectiveness. This can make it difficult for teachers and students to benefit from technology support that is more effective and tailored to the needs of these students. The aim of this review was to analyze and synthesize scientific evidence on the effectiveness of technological resources in improving the nonverbal communication skills of students with ASD. To this end, a systematic review of the scientific publications indexed in some of the most relevant databases was carried out following the criteria established in the PRISMA declaration. In total, the methodological quality of 43 articles that met the pre-established inclusion criteria was analyzed. A clear trend was found to encourage student inclusion through mobile technologies and low-cost, high-availability platforms that allow personalized real-time and remote interventions in natural contexts such as classrooms. However, future research should consider measuring the effectiveness of these technologies through more robust studies in terms of methodology.

Keywords: Education Technology, Autism, Autism Spectrum Disorder, Social, Emotional

iafor

The International Academic Forum
www.iafor.org

Introduction

Nonverbal communication skills account for more than 60% of overall communication capacity and have been identified as the basis of socio-emotional competence and one of the largest deficits in the way children with autism spectrum disorder (ASD) socialize (Wall et al., 2021). The difficulties associated with this type of communication vary widely and include the understanding of facial expressions, the use of conversational gestures and the imitation of body movements (Gómez-León, 2019a, 2019b). For students with ASD understanding these subtleties in communication plays a fundamental role in building friendships and trusting relationships with others, especially during school years. It is therefore essential that school-based interventions respond to these needs, using the right tools. One of the resources that can be effective is the use of technology, which has a number of characteristics that favor its implementation in this population. Technology allows predictable, consistent programming and free of immediate social stressors, in addition, students can work at their own pace and level of understanding, lessons can be repeated until mastery is achieved and rewards are usually immediate and personalized, which increases the interest and motivation of students (Zervogianni et al., 2020).

The socio-emotional competence required in real life involves a combination of different skills of greater or lesser complexity, such as perspective-taking, emotional regulation, cognitive flexibility, or proper use of language. However, research has suggested that early deficits in the basic skills of social interaction, such as understanding and emotional expression, imitation and joint attention, give rise to cascade difficulties in acquiring more complex forms of social skills. So a significant part of the design of intervention technologies for children with ASD has focused on basic skills that support more complex forms of social skills (Berggren et al., 2018). In this sense, during the last years there has been an exponential number of technological proposals designed for children with ASD, of which there is not always enough evidence to support its effectiveness (Zervogianni et al., 2020). Kim et al. (2018) found that of 695 mobile apps labeled as «autism apps» only 4.9% had actual clinical evidence supporting their use or benefit. In addition, digital media that do have published evidence of effectiveness are rarely available to the consumer, so education professionals often turn to other sources of information to make decisions about the type of technology to use in the classroom, such as personal values and preferences or product website reviews (Zervogianni et al., 2020). This can make it difficult for students with ASD to benefit from the most effective and tailored digital support, moreover, inappropriate practice could lead to counterproductive and sometimes potentially harmful outcomes for the student.

To successfully integrate technology into any educational program, professionals should have a frame of reference that allows them to know what technology is available and what level of evidence can support its use in the classroom.

The objective of this review is to analyze and synthesize scientific evidence on the effectiveness of potentially viable technological resources for implementation in the classroom in improving understanding and emotional production skills, imitation and joint care of children and adolescents with ASD.

Method

A search was made for the scientific publications indexed in the databases Scopus, Web of Science, PubMed, ERIC, IEEE Xplore and ACM Digital Library following the criteria established in the PRISMA declaration (Page et al., 2021).

The terms (autism OR autism spectrum disorder OR ASD) AND (technology* OR tablet OR iPad OR iPod OR smartphone OR mobile device OR apple watch OR google glass OR virtual reality OR augmented reality OR computer OR avatar OR kinect OR eye tracker) were used AND (social* OR emotional* OR imitation OR joint attention).

Articles published in peer-reviewed journals or conference proceedings aimed at demonstrating the effectiveness of digital technology in improving emotional understanding and production, imitation and joint care of children and adolescents with ASD were included. Only primary studies were included and all designs (e.g., randomized control, inter- or intra-subject, case reports) without language restriction were considered. Following the evidence criteria established by Wong et al. (2015) revisions from 2000 to 2023 were included so that the intervention could have been replicated a sufficient number of times by independent researchers to justify its effectiveness.

Systematic reviews and meta-analyses were excluded, articles whose sample did not include children with ASD or did not report the results of ASD separately and those focused on training general interaction and social communication skills that did not present data on emotional recognition and production, imitation and joint care independently. Also excluded were those studies focused exclusively on the academic or cognitive results of the participants and whose purpose was not to check the effectiveness of the digital technology used. In addition, studies whose technology was not feasible, in terms of implementation, in the current educational context, such as immersive virtual environments CAVE (Cave Assisted Virtual Environment) or Blue Room, training through covert audio or neurofeedback were excluded.

The final selection consisted of 43 articles were classified into four categories: emotional recognition, emotional expression, imitation and joint attention.

Emotional Recognition

Children with ASD have difficulty recognizing facial expressions, these difficulties increase over time which, in turn, is related to greater difficulties in social situations (Wall et al., 2021). Most applications on computers or digital tablet for children with ASD work emotion recognition. These are based on media such as photos, drawings, audio recordings, videos or 3D characters. It has been shown that, although young children with ASD show poor performance in emotional recognition of human and nonhuman faces, teens with ASD show significantly better recognition when it comes to cartoons presented through the computer than when it comes to humans, being able to improve even, the performance of neurotypical adolescents in the *Mind Reading Eye Test* (Atherton & Cross, 2021).

The first applications created for emotional recognition required associating the facial expressions of the avatar (happy, sad, angry and frightened) with an emotion or a social situation with emotional connotation. In the experiment of Moore et al. (2005) the results showed that more than 90% of children with high functioning ASD were able to assign the

appropriate emotional state to the animated characters. Golan et al. (2010) designed an interactive DVD called *The Transporters* aimed at young children that depicts social interactions between vehicles (train, tram, bus) with real expressive human faces. After watching the episodes, the child interacted with the system by matching faces with faces, faces with emotions or situations with faces. In their study, the children who participated in the intervention showed a significantly greater improvement in the ability to recognize facial expressions than those who did not receive intervention. Moreover, they were able to transfer this ability to real human characters. This result was found in two randomized controlled studies and one of subsequent intrasubject design with 25 (Young & Posselt, 2012), 77 (Gev et al., 2017) and 14 (Yan et al., 2018) preschoolers with ASD, respectively. Hopkins et al. (2011) and Rice et al., (2015) in two randomized controlled studies showed that practicing emotional recognition, the direction of the gaze and joint attention through the serious game *FaceSay* with interactive and realistic avatar assistants improved the recognition of emotions. Moreover, Rice et al., (2015), using the same application, found improvements in broader domains of cognitive and social skills.

Although the recognition of emotions is multimodal in nature, visual unimodal learning has most often been used. In this sense, LaCava et al. (2007) added audio support in the program *Mind Reading*, students not only improved in the recognition of facial and vocal emotions with educational software, but also improved interactions with their peers. Thomer et al. (2015) used an improved *Mind Reading* protocol that included interactive software instructions, live testing, and behavioral reinforcement. The authors found improvements in all measures: recognition of emotions in faces and voices and skills of coding and decoding emotions, although the sizes of the effect were only great in recognizing emotions in faces. Fridenson-Hayo et al. (2017) evaluated transculturally (in the UK, Israel and Sweden) the training with *Emotiplay*, a serious game aimed at teaching the recognition of emotions through faces, voices, body language and its integration into context in children with high functioning ASD. In the three samples, from 15, 38 and 36 participants aged six to nine years, significant improvements in emotional recognition were found, moreover, there were more widespread gains in socialization and reduction of autism symptoms.

Few games have been interested in body posture as an indicator of the emotion felt. *JeStiMule* is a serious game validated in a design of independent measures. It is intended to work recognizing nine emotions through facial expressions, but also gestures and posture. The game is aimed at children and adolescents with ASD regardless of their level of cognitive functioning (Serret et al., 2014). There are two phases, a learning phase to teach children to associate facial expression, vocal, posture and gestures before an emotion. And a phase of the game in which the player is immersed in a 3D environment and during which he attends scenarios that must associate an emotion. The results showed that children progressed with the use of play and were able to generalize progress outside the context of the intervention. However, during the game, the children received no feedback on the quality of their responses, especially at times of imitation, nor on the quality of their emotional production on the plane of facial movements or prosody, something that Grossard et al. (2019) incorporated in later versions.

Most of these games have proposed working the recognition of emotions with avatars and preconstructed contexts, so there is a lack of communication in real time between children and guardians. To avoid this, Beaumont & Sofronoff (2008) created *The Junior Detective*, a training program in recognition of emotions and social skills. A randomized trial was conducted with several types of interventions: the computer game itself, but also group

interventions that included the training of parents and professionals to generalize learning done on the computer through role play or exercises at home. In the study the children progressed in social skills, which remained five months after the intervention. However, no progress was observed in the recognition of facial expressions and body postures. Sturm et al. (2019) designed a hybrid Kinect game to promote collaboration between students with ASD and their neurotypical peers and encourage recognition of complex emotions. The game required two students to cooperate and interact with each other, not only within the game environment but also in the real world. The emotion recognition game had two phases: in the first the students independently assembled the pieces of a digital puzzle, in the second they had to communicate with each other to agree on the appropriate emotion according to the context and build the emotional face for the body they had assembled. Preliminary observations showed the effectiveness of emotion recognition modeling and collaboration by peers who had stronger social skills.

Augmented reality allows you to overlay virtual data in real world images to draw attention to the social keys that allow you to acquire the skills of recognition and emotional production. The combination of real and virtual elements can favor the generalization of learning to the real world. The augmented reality *Ying mobile app* was used for emotion recognition using three-dimensional characters depicting a parody. The child had to find out what emotion the character would have in a given situation. The application showed its effectiveness in eight children between two and six years with ASD (Alharbi & Huang, 2020). Augmented reality also includes the representation of one's own body, which can help the development of body awareness in students with ASD. In the studies of Chen et al. (2015) and Chen et al. (2016), a system was designed using an augmented reality mirror through which three and six teenagers with ASD, respectively, could see themselves with virtual 3D facial expressions. The data indicated that intervention could improve appropriate recognition and response to facial emotional expressions seen in the situational task.

Mantzio et al. (2015) found that the benefits of technology were only seen in children with high-functioning but not low-functioning ASD. The author questioned whether the results could be generalized to the entire population with ASD. In this sense, Tanaka et al. (2010) found an improvement in the holistic processing of faces in adolescents with ASD of different degree of functioning. Improvement was observed after a 20-hour facial recognition training using *Let's Face It!* However, in a later study he found that, although adolescents were able to label basic facial emotions, they showed difficulties in generalizing emotions through different identities (Tanaka et al., 2012). Moreover, while neurotypical participants showed a more holistic coding for the eyes than for the mouth on expressive faces, participants with ASD exhibited the inverse pattern. This suggests that difficulties in generalizing learning may be related to the type of analytical and holistic facial processing strategies used by students with ASD.

Emotional Expression

Carter et al. (2014) compared human intervention with a human-controlled avatar for emotional expression training in twelve children with ASD aged four to eight. Verbal and gestural communication of children with ASD was found to be stronger with the therapist and weaker with the cartoon character of the software. However, Froli et al. (2022) found in a sample of 60 children with high functioning ASD, aged 9 and 10, that the virtual reality intervention was more effective in the use of secondary emotions than the intervention with a therapist.

To train emotional expression, a series of experiments with video models have been established, a technique that shows desired video behaviors to develop social skills. So et al. (2016) performed an intervention on 20 children with low functioning ASD. School-age children were taught to recognize, imitate and produce 20 gestures by video modeling through a robotic animation presented through a computer. The children recognized, imitated and produced more gestures adapted to different social contexts after the training. In addition, they were able to generalize their gestural skills to a novel environment with a human researcher. In a later study they used social robots to teach children to recognize and produce gestures that express feelings and needs (So et al., 2017). After the intervention, children were more likely to recognize gestures and gesture accurately in trained and untrained scenarios. They also generalized the recognition skills acquired to person-to-person interaction. However, there was no solid evidence showing that children in the intervention group could produce precise gestures in person-to-person interaction.

Few serious games have been found for the production of facial expressions adapted to a given social context. *LifeIsGame* aims to teach children with ASD to recognize facial emotions by automatically analyzing real-time facial expressions and synthesizing virtual characters. It also offers the ability to make the game more challenging by hiding the eyes or mouth of the avatar. The game offers different modes to users, including the evaluation of the expression made by a character, manipulate the facial expression of a three-dimensional avatar and physically perform a facial expression consistent with a story told without an avatar model. Fernandes et al. (2011) verified the effectiveness of this game in the emotional expression of two children with high functioning ASD.

One of the limitations of these programs is that most focus only on predefined body language and facial expressions limited by the training system. To avoid this, recent research has created the *Kinect Skeletal Tracking* system that allows trainers to control virtual 3D characters so they can produce in real time the full range of natural body language and appropriate facial expressions. The data showed that this system helped three children with ASD from seven to nine years to improve their social interaction (Lee, 2021).

Anishchenko et al., (2017) developed an application for learning the perception and production of facial expressions using a computer vision algorithm. This algorithm, recently designed for facial expression analysis, provides the child with indicators that help him to evaluate the quality of his production and improve it. The clinical trial was conducted in 19 children with ASD aged 6 to 12 years. It was shown that after the intervention improved the skills of participants in the recognition of emotions. The ability to transfer newly developed skills to children's daily lives was also investigated. The questioning of the parents 6 months after the intervention shows that 10 of the 19 children were able to recognize emotions and change their behavior in everyday life. *JEMImE* aims to train emotional production in a virtual 3D environment with social situations (Dapogny et al., 2018). This app also uses an algorithm that provides the child with real-time facial expression feedback. During the training phase, 23 children with school-age ASD showed a significant progression in the production of facial expressions (Grossard et al., 2019).

Imitation

Imitation has two essential functions for adaptation: it serves to learn and it serves to communicate without words. Lack of understanding and imitation of another person's action is one of the main problems when interacting with a child with ASD, However, the

appropriate stimulation of imitation can favour behaviours that share a common objective and adapted to the social context.

Malinverni et al. (2017) developed a *Kinect*-based virtual environment game for children with high-functioning ASD called Pico's Adventures. Through the programmed movement this game aimed to encourage children to initiate interaction with peers and increase imitation, cooperation, role-playing and emotional recognition. The results showed that the game was effective in promoting social behaviors of ten children with ASD, from four to six years. This game reflects an interesting application to develop a programmed movement game that promotes prosocial behaviors in children with autism. However, the effectiveness of the game in generalizing target abilities to the real world has not been evaluated.

Goliath (Bono et al., 2016) is a platform that seeks to stimulate imitation and joint attention. To progress the child needs to interact with the instructor, who can control what is proposed to the child. For the imitation tasks, six games were designed with different levels of difficulty: imitating a sound, vocal imitation, imitation action sequences, imitation construction and imitation of sentences or sound sequences. For joint attention were created four games, also with different levels of difficulty and conditions, which concern joint attention in the image, in the video, in a drawing task, and finally in an exercise of cooking recipes for two. The study by Bono et al. (2016) with 10 children aged 5 to 9 years showed a rapid improvement in performance in tasks based on imitation and joint attention. However, another study found no significant differences between children aged five to eight years who used the game with their usual treatment and those who did not use it (Jouen et al., 2017).

Joint Attention

Joint attention refers to a triadic interaction in which both agents focus on a single object. This interaction involves following the gaze or looking simultaneously and seeing the behavior of other agents as intentionally driven. Children with ASD have difficulty sharing care or interests with others, reducing their chances of social interaction.

Grynszpan et al. (2012) analyzed the social gaze patterns often reported in children and adolescents with ASD and designed a computer system that leverages the ability of an eye tracker or real-time tracking of users' eye movements. His device allowed videos to be displayed on the screen completely blurred except for a clear viewing window located around the user's focal point. The movements of the child's eyes thus moved the window of vision that served as feedback to control the look. The objective was to capture with the viewing window the emotional state of the face and deduce the correct interpretation of its message. For example, if the character said "*What luck!*" with a disappointed expression, the message conveyed should be understood as ironic. The results were promising, but more research is needed to prove their effectiveness. In *ECHOES* (Bernardini et al., 2014), children interact with a virtual character in the context of social situations through a screen with eye tracking. Children were rewarded when they produced behaviors that manifested a non-verbal communication, such as eye contact or tracking the look of the virtual face. The interaction was structured around a series of routine real-world activities at school and at home. The results with 29 children aged 4 to 14 years with ASD in the school context showed that *ECHOES* helped to practice and acquire joint care and social communication skills. Lahiri et al. (2011) developed a similar dynamic eye tracking system. This system called «Virtual interactive system with adaptive response technology sensitive to the look» (*Virtual Interactive system with Gaze-sensitive Adaptive Response Technology, VIGART*) monitored

the child's gaze in real time and provided individualized feedback during their interaction with a virtual agent. Data from six adolescents with ASD indicated an improvement in social care for agents.

The use of mobile devices in the classroom provides advantages such as low cost and greater flexibility of use and availability. However, the results in terms of their effectiveness in improving joint care are not sufficiently proven. Lozano et al. (2017) in a case study with a four-year-old with ASD found an increase in joint care after a seven-session intervention through educational applications on a digital tablet. In another study, Guzman et al (2022) found no difference in attention time when eleven children with ASD aged five to nine interacted with the *AppTEA* application or when they did not. Alcorn et al. (2011) employed an autonomous virtual agent through the simplified version of *ECHOES* to develop joint care skills in 32 school-age children. The virtual character «looked» at the child with ASD participating in the game, then looked at the flower, sometimes pointing at it. Children could point to the correct flower on the screen or two of which were not designated by the virtual agent. Both precision and reaction time data suggested that the children were able to successfully complete the task by pointing to the right flower. However, the study does not report any change in participants' skills due to the short training session. Pérez-Fuster et al. (2022) used the Pictogram Room augmented reality application on six children with low-functioning ASD between 3 and 8 years old. The aim of the intervention was to improve joint care, eye tracking and pointing. Different activities were carried out to encourage body language and recognition of oneself through a *Kinet* sensor. The results showed the effectiveness of the application in joint care skills. Improvements were maintained over time and generalized to real-world situations (Pérez-Fuster et al., 2022).

MOSOCO was one of the first mobile assistive apps to use augmented reality and eye tracking to help students with ASD practice social skills like eye contact in real-life school situations (Escobedo et al., 2012). If *MOSOCO* inferred that eye contact was not achieved correctly it showed a warning with an image and a text message that suggested to the child what to do (e.g., «look your partner in the eye»). Once it detected that both students had made eye contact, it made a sound and highlighted the next step. The application was effective in increasing the number and practice of social interactions in three students with ASD from 8 to 11 years.

Wearable technology such as watches or smart glasses is a novel advance capable of providing potentially more discreet, naturalistic and real-time strategies through which to support students with ASD. O'Brien et al., (2021) tested the feasibility of using smartwatches (*Apple Watch*) on eight children between the ages of six and fifteen with ASD to increase joint attention to the task. Through a case series design it was proven that the children could follow the directives of scene signals that a mentor sent through images in real time. However, the study was limited to one session and therefore lacks data on the generalization and maintenance of results.

Recent research uses Google Glass hardware to direct the attention of children with ASD to the keys that can guide them to a better understanding of facial expressions (Liu et al., 2017; Voss et al., 2019). Through a mobile application the instructor can control participation activities at a distance and in real time. The system tracks faces, classifies partner emotions, provides listening and verbal cues, and provides immediate social cues for reinforcement. In a randomized clinical trial, Voss et al. (2019) demonstrated that the *Superpower Glass* intervention implemented through *Google Glass* promoted joint attention, eye contact,

emotion recognition and social interaction in 40 children with ASD aged 6 to 12. Moreover, the effects were maintained until at least six weeks after treatment. *Face Game* and *Emotion Game* are two apps designed to help children look at the face and eyes and recognize facial emotion, respectively. *Face Game* detects human faces in real time by superimposing them with an augmented reality cartoon face to attract the child's attention. When he has succeeded he gradually fades revealing the underlying human face. At this time, reward him with points, if the child looks at more socially relevant regions, such as the eye region, the reward is greater. Its effectiveness has been shown in two eight- and nine-year-old ASD students, who improved joint attention, eye contact and social engagement (Liu et al., 2017).

Conclusion

The use of technology offers new options in teaching those teachers who aim to improve the socio-emotional competence of students with ASD. There is a tendency to design mobile, low-weight and controlled technologies in real time and at a distance with a clearly inclusive approach. Studies have highlighted the positive impact of serious gaming and the virtual and augmented reality used in combination with other technologies, including smart phones and glasses, mirror-based systems and Kinect sensors.

Some projects aim to: empower children to recognize and reproduce facial expressions, voice tones and body gestures through interactive games, text communication, animations and video and audio clips; create technologies that can capture the orientations of the users' eyes and guide them towards the relevant social keys in natural contexts and at a distance; combining multiple technologies that help students assess the quality of their production and improve it in real time; upgrading network-based remote control platforms allowing teachers greater customization, availability and ease of use at a lower cost.

However, future research should consider measuring the effectiveness of these technologies through more robust studies in terms of methodology, i.e., large and heterogeneous samples (in terms of age and severity of symptoms) control groups, longer processing periods and data on the generalization and maintenance of results.

References

- Alcorn, A., Pain, H., Rajendran, G., Smith, T., Lemon, O., Porayska-Pomsta, K., ... & Bernardini, S. (2011, June). Social communication between virtual characters and children with autism. In *international conference on artificial intelligence in education* (pp. 7-14). Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-21869-9_4
- Alharbi, M., & Huang, S. (2020). An Augmentative System with Facial and Emotion Recognition for Improving Social Skills of Children with Autism Spectrum Disorders. In *2020 IEEE International Systems Conference (SysCon)* (pp. 1-6). IEEE. <http://doi.org/10.1109/SysCon47679.2020.9275659>
- Anishchenko, S., Sarelaynen, A., Kalinin, K., Popova, A., Malygina-Lastovka, N., & Mesnyankina, K. (2017, February). Mobile Tutoring System in Facial Expression Perception and Production for Children with Autism Spectrum Disorder. In *VISIGRAPP (5: VISAPP)* (pp. 319-324). <https://doi.org/10.5220/0006146003190324>
- Atherton, G., & Cross, L. (2021). The Use of Analog and Digital Games for Autism Interventions. *Frontiers in psychology*, 12, 669734. <https://doi.org/10.3389/fpsyg.2021.669734>
- Beaumont, R., & Sofronoff, K. (2008). A multi-component social skills intervention for children with Asperger syndrome: the Junior Detective Training Program. *Journal of child psychology and psychiatry, and allied disciplines*, 49(7), 743–753. <https://doi.org/10.1111/j.1469-7610.2008.01920.x>
- Berggren, S., Fletcher-Watson, S., Milenkovic, N., Marschik, P. B., Bölte, S., & Jonsson, U. (2018). Emotion recognition training in autism spectrum disorder: A systematic review of challenges related to generalizability. *Developmental neurorehabilitation*, 21(3), 141–154. <https://doi.org/10.1080/17518423.2017.1305004>
- Bernardini, S., Porayska-Pomsta, K., & Smith, T. J. (2014). ECHOES: An intelligent serious game for fostering social communication in children with autism. *Information Sciences*, 264, 41-60. <https://doi.org/10.1016/j.ins.2013.10.027>
- Bono, V., Narzisi, A., Jouen, A. L., Tilmont, E., Hommel, S., Jamal, W., Xavier, J., Billeci, L., Maharatna, K., Wald, M., Chetouani, M., Cohen, D., Muratori, F., & MICHELANGELO Study Group (2016). GOLIAH: A Gaming Platform for Home-Based Intervention in Autism - Principles and Design. *Frontiers in psychiatry*, 7, 70. <https://doi.org/10.3389/fpsyg.2016.00070>
- Carter, E. J., Williams, D. L., Hodgins, J. K., & Lehman, J. F. (2014). Are children with autism more responsive to animated characters? A study of interactions with humans and human-controlled avatars. *Journal of autism and developmental disorders*, 44(10), 2475–2485. <https://doi.org/10.1007/s10803-014-2116-8>

- Chen, C. H., Lee, I. J., & Lin, L. Y. (2015). Augmented reality-based self-facial modeling to promote the emotional expression and social skills of adolescents with autism spectrum disorders. *Research in developmental disabilities*, 36C, 396–403. <https://doi.org/10.1016/j.ridd.2014.10.015>
- Chen, C.-H., Lee, I.-J., & Lin, L.-Y. (2016). Augmented reality-based video-modeling storybook of nonverbal facial cues for children with autism spectrum disorder to improve their perceptions and judgments of facial expressions and emotions. *Computers in Human Behavior*, 55(Part A), 477–485. <https://doi.org/10.1016/j.chb.2015.09.033>
- Dapogny, A., Grossard, C., Hun, S., Serret, S., Bourgeois, J., Jean-Marie, H., ... & Bailly, K. (2018, May). JEMImE: a serious game to teach children with ASD how to adequately produce facial expressions. In *2018 13th IEEE International Conference on Automatic Face & Gesture Recognition (FG 2018)* (pp. 723-730). IEEE. <https://doi.org/10.1109/FG.2018.00114>
- Escobedo, L., Nguyen, D. H., Boyd, L., Hirano, S., Rangel, A., Garcia-Rosas, D., ... & Hayes, G. (2012, May). MOSOCO: a mobile assistive tool to support children with autism practicing social skills in real-life situations. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 2589-2598). <https://doi.org/10.1145/2207676.2208649>
- Fernandes, T., Alves, S., Miranda, J., Queirós, C., & Orvalho, V. (2011, October). LIFEisGAME: A facial character animation system to help recognize facial expressions. In *International Conference on ENTERprise Information Systems* (pp. 423-432). Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-24352-3_44
- Fridenson-Hayo, S., Berggren, S., Lassalle, A., Tal, S., Pigat, D., Meir-Goren, N., O'Reilly, H., Ben-Zur, S., Bölte, S., Baron-Cohen, S., & Golan, O. (2017). 'Emotiplay': a serious game for learning about emotions in children with autism: results of a cross-cultural evaluation. *European child & adolescent psychiatry*, 26(8), 979–992. <https://doi.org/10.1007/s00787-017-0968-0>
- Frolli, A., Savarese, G., Di Carmine, F., Bosco, A., Saviano, E., Rega, A., Carotenuto, M., & Ricci, M. C. (2022). Children on the Autism Spectrum and the Use of Virtual Reality for Supporting Social Skills. *Children (Basel, Switzerland)*, 9(2), 181. <https://doi.org/10.3390/children9020181>
- Gev, T., Rosenan, R., & Golan, O. (2017). Unique effects of The transporters animated series and of parental support on emotion recognition skills of children with ASD: Results of a randomized controlled trial. *Autism research: official journal of the International Society for Autism Research*, 10(5), 993–1003. <https://doi.org/10.1002/aur.1717>
- Golan, O., Ashwin, E., Granader, Y., McClintock, S., Day, K., Leggett, V., & Baron-Cohen, S. (2010). Enhancing emotion recognition in children with autism spectrum conditions: An intervention using animated vehicles with real emotional faces. *Journal of autism and developmental disorders*, 40(3), 269-279. <https://doi.org/10.1007/s10803-009-0862-9>

- Gómez-León, M.I (2019a). A través de los ojos del niño con trastorno del espectro autista. *EDU REVIEW. International Education and Learning Review*, 7(1), 11-22. <https://doi.org/10.37467/gka-revedu.v7.1876>
- Gómez-León, M.I (2019b). Conexión neuronal en el trastorno del espectro autista. *Psiquiatría biológica*, 26(1), 7-14. <https://doi.org/10.1016/j.psiq.2019.02.001>
- Grossard, C., Hun, S., Dapogny, A., Juillet, E., Hamel, F., Jean-Marie, H., ... & Cohen, D. (2019). Teaching facial expression production in autism: The serious game jemime. *Creative Education*, 10(11), 2347. <https://doi.org/10.4236/ce.2019.1011167>
- Grynszpan, O., Nadel, J., Martin, J. C., Simonin, J., Bailleul, P., Wang, Y., Gepner, D., Le Barillier, F., & Constant, J. (2012). Self-monitoring of gaze in high functioning autism. *Journal of autism and developmental disorders*, 42(8), 1642–1650. <https://doi.org/10.1007/s10803-011-1404-9>
- Guzman, G., Gago-Galvagno, L., Quiroz, N., Serafini, M., Pallia, R., & Risk, M. (2022). Uso de una aplicación de tableta personalizada para evaluar la comunicación en niños con TEA: AppTEA. *Aloma: Revista de Psicología, Ciències de l'Educació i de l'Esport*, 40(1), 55-64. <https://doi.org/10.51698/aloma.2022.40.1.55-64>
- Hopkins, I. M., Gower, M. W., Perez, T. A., Smith, D. S., Amthor, F. R., Casey Wimsatt, F., & Biasini, F. J. (2011). Avatar assistant: improving social skills in students with an ASD through a computer-based intervention. *Journal of autism and developmental disorders*, 41(11), 1543-1555. <https://doi.org/10.1007/s10803-011-1179-z>
- Jouen, A. L., Narzisi, A., Xavier, J., Tilmont, E., Bodeau, N., Bono, V., ... & Cohen, D. (2017). GOLIAH (Gaming Open Library for Intervention in Autism at Home): a 6-month single blind matched controlled exploratory study. *Child and adolescent psychiatry and mental health*, 11(1), 1-14. <https://doi.org/10.1186/s13034-017-0154-7>
- Kim, J. W., Nguyen, T. Q., Gipson, S. Y. M. T., Shin, A. L., & Torous, J. (2018). Smartphone apps for autism spectrum disorder—Understanding the evidence. *Journal of Technology in Behavioral Science*, 3(1), 1-4. <https://doi.org/10.1007/s41347-017-0040-4>
- Lacava, P. G., Golan, O., Baron-Cohen, S., & Smith Myles, B. (2007). Using assistive technology to teach emotion recognition to students with Asperger syndrome: A pilot study. *Remedial and Special Education*, 28(3), 174-181. <https://doi.org/10.1177/07419325070280030601>
- Lahiri, U., Warren, Z., & Sarkar, N. (2011). Design of a gaze-sensitive virtual social interactive system for children with autism. *IEEE transactions on neural systems and rehabilitation engineering: a publication of the IEEE Engineering in Medicine and Biology Society*, 19(4), 443–452. <https://doi.org/10.1109/TNSRE.2011.2153874>
- Lozano, M. D. J., Sánchez, J. L. S., & Espinosa, M. P. P. (2017). Estudio de caso de la influencia del aprendizaje electrónico móvil en el desarrollo de la comunicación y el lenguaje con un niño con TEA. *Educación*, 53(2), 419-443. <http://dx.doi.org/10.5565/rev/educar.782>

- Lee, I. J. (2021). Kinect-for-windows with augmented reality in an interactive roleplay system for children with an autism spectrum disorder. *Interactive Learning Environments*, 29(4), 688-704. <https://doi.org/10.1080/10494820.2019.1710851>
- Liu, R., Salisbury, J. P., Vahabzadeh, A., & Sahin, N. T. (2017). Feasibility of an Autism-Focused Augmented Reality Smartglasses System for Social Communication and Behavioral Coaching. *Frontiers in pediatrics*, 5, 145. <https://doi.org/10.3389/fped.2017.00145>
- Malinverni, L., Mora-Guiard, J., Padillo, V., Valero, L., Hervás, A., & Pares, N. (2017). An inclusive design approach for developing video games for children with autism spectrum disorder. *Computers in Human Behavior*, 71, 535–549. <https://doi.org/10.1016/j.chb.2016.01.018>
- Mantziou, O., Vrellis, I., & Mikropoulos, T. A. (2015). Do children in the spectrum of autism interact with real-time emotionally expressive human controlled avatars? *Procedia Computer Science*, 67, 241-251. <https://doi.org/10.1016/j.procs.2015.09.268>
- Moore, D., Cheng, Y., McGrath, P., & Powell, N. J. (2005). Collaborative virtual environment technology for people with autism. *Focus on autism and other developmental disabilities*, 20(4), 231-243. <https://doi.org/10.1177/10883576050200040501>
- O'Brien, A. M., Schlosser, R. W., Yu, C., Allen, A. A., & Shane, H. C. (2021). Repurposing a smartwatch to support individuals with autism spectrum disorder: Sensory and operational considerations. *Journal of Special Education Technology*, 36(4), 215-226. <https://doi.org/10.1177/0162643420904001>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Alonso-Fernández, S. (2021). Declaración PRISMA 2020: una guía actualizada para la publicación de revisiones sistemáticas. *Revista Española de Cardiología*, 74(9), 790-799. <https://doi.org/10.1016/j.recesp.2021.06.016>
- Pérez-Fuster, P., Herrera, G., Kossyvaki, L., & Ferrer, A. (2022). Enhancing Joint Attention Skills in Children on the Autism Spectrum through an Augmented Reality Technology-Mediated Intervention. *Children*, 9(2), 258. <https://doi.org/10.3390/children9020258>
- Rice, L. M., Wall, C. A., Fogel, A., & Shic, F. (2015). Computer-Assisted Face Processing Instruction Improves Emotion Recognition, Mentalizing, and Social Skills in Students with ASD. *Journal of autism and developmental disorders*, 45(7), 2176–2186. <https://doi.org/10.1007/s10803-015-2380-2>
- Serret, S., Hun, S., Iakimova, G., Lozada, J., Anastassova, M., Santos, A., ... & Askenazy, F. (2014). Facing the challenge of teaching emotions to individuals with low-and high-functioning autism using a new serious game: a pilot study. *Molecular autism*, 5(1), 1-17. <https://doi.org/10.1186/2040-2392-5-37>

- So, W. C., Wong, M. K., Lam, C. K., Lam, W. Y., Chui, A. T., Lee, T. L., Ng, H. M., Chan, C. H., & Fok, D. C. (2017). Using a social robot to teach gestural recognition and production in children with autism spectrum disorders. *Disability and rehabilitation. Assistive technology*, 13(6), 527–539.
<https://doi.org/10.1080/17483107.2017.1344886>
- So, W. C., Wong, M. Y., Cabibihan, J. J., Lam, C. Y., Chan, R. Y., & Qian, H. H. (2016). Using robot animation to promote gestural skills in children with autism spectrum disorders. *Journal of Computer Assisted Learning*, 32(6), 632-646.
<https://doi.org/10.1111/jcal.12159>
- Sturm, D., Kholodovsky, M., Arab, R., Smith, D. S., Asanov, P., & Gillespie-Lynch, K. (2019). Participatory design of a hybrid kinect game to promote collaboration between autistic players and their peers. *International Journal of Human–Computer Interaction*, 35(8), 706-723. <https://doi.org/10.1080/10447318.2018.1550180>
- Tanaka, J. W., Wolf, J. M., Klaiman, C., Koenig, K., Cockburn, J., Herlihy, L., ... & Schultz, R. T. (2010). Using computerized games to teach face recognition skills to children with autism spectrum disorder: the Let's Face It! program. *Journal of Child Psychology and Psychiatry*, 51(8), 944-952. <https://doi.org/10.1111/j.1469-7610.2010.02258.x>
- 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, and allied disciplines*, 53(12), 1259–1267.
<https://doi.org/10.1111/j.1469-7610.2012.02571.x>
- Thomer, M. L., Smith, R. A., Lopata, C., Volker, M. A., Lipinski, A. M., Rodgers, J. D., McDonald, C. A., & Lee, G. K. (2015). Randomized Controlled Trial of Mind Reading and In Vivo Rehearsal for High-Functioning Children with ASD. *Journal of autism and developmental disorders*, 45(7), 2115–2127.
<https://doi.org/10.1007/s10803-015-2374-0>
- Voss, C., Schwartz, J., Daniels, J., Kline, A., Haber, N., Washington, P., Tariq, Q., Robinson, T. N., Desai, M., Phillips, J. M., Feinstein, C., Winograd, T., & Wall, D. P. (2019). Effect of Wearable Digital Intervention for Improving Socialization in Children With Autism Spectrum Disorder: A Randomized Clinical Trial. *JAMA pediatrics*, 173(5), 446–454. <https://doi.org/10.1001/jamapediatrics.2019.0285>
- Wall, N. G., Smith, O., Campbell, L. E., Loughland, C., Wallis, M., Henskens, F., & Schall, U. (2021). E-technology social support programs for autistic children: Can they work?. *World journal of psychiatry*, 11(12), 1239–1246.
<https://doi.org/10.5498/wjp.v11.i12.1239>

- Wong, C., Odom, S. L., Hume, K. A., Cox, A. W., Fetting, A., Kucharczyk, S., Brock, M. E., Plavnick, J. B., Fleury, V. P., & Schultz, T. R. (2015). Evidence-Based Practices for Children, Youth, and Young Adults with Autism Spectrum Disorder: A Comprehensive Review. *Journal of autism and developmental disorders*, 45(7), 1951–1966. <https://doi.org/10.1007/s10803-014-2351-z>
- Yan, Y., Liu, C., Ye, L., & Liu, Y. (2018). Using animated vehicles with real emotional faces to improve emotion recognition in Chinese children with autism spectrum disorder. *PloS one*, 13(7), e0200375. <https://doi.org/10.1371/journal.pone.0200375>
- Young, R. L., & Posselt, M. (2012). Using the transporters DVD as a learning tool for children with autism spectrum disorders (ASD). *Journal of autism and developmental disorders*, 42(6), 984-991. <https://doi.org/10.1007/s10803-011-1328-4>
- Zervogianni, V., Fletcher-Watson, S., Herrera, G., Goodwin, M., Pérez-Fuster, P., Brosnan, M., & Grynspan, O. (2020). A framework of evidence-based practice for digital support, co-developed with and for the autism community. *Autism: the international journal of research and practice*, 24(6), 1411–1422. <https://doi.org/10.1177/1362361319898331>

Contact email: isabel.gomez@unir.net

All Work and No Play Makes Jack a Dull Boy Is No Longer True

Mickael Bosco, ESAIP–French Engineering School, France

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Education is not always funny, and teachers must motivate students in order to give them the sense of a constant work. Active learning removes apprentices from their safe place by establishing a situation where risk gambling is supported, as Howell (2021) explains in his investigation. This environment allows them to share their thoughts and highlights team building to increase their confidence, that's why active pedagogy is also becoming increasingly used in schools all around the world. It's time to change the ways learners get access to knowledge. Other studies starting with Bloom (1956), Le Brun (2004), but also more recently with the works of Cailliez (2016) and Dietrich (2018) have inspired me on the creation of a playful scheme. I will present you this pedagogical scenario built for my engineering school, after several trials in my Mathematics and Physics classes, in which games are present in three key moments: The first moment corresponds to the first session as an icebreaker workshop. Afterwards, the second key time is located around the middle of the scenario so as to check that the three first steps of the Bloom's Taxonomy are achieved. Finally, the last crucial moment is during the last course where a big immersive Escape classroom is organized to evaluate the entire competencies. Satisfaction surveys, feedbacks and success rate will also strengthen how this educational method needs to be well-known. This scheme is adaptative to any class level, number of students enrolled and to any topic.

Keywords: Active Pedagogy, Escape Classroom, Gamification, Numerical Tools, Scenario

iafor

The International Academic Forum
www.iafor.org

1. Introduction & Context of the Study

Nuruzzaman, A. (2016) highlights the fact that, through history, pedagogy has known a lot of ups and downs from an access to knowledge passing by a practice for the privileged ones to a mean of oppression. A pedagogical revolution has started since the pandemic and has accelerated research concerning different methods of teaching and training in class or remotely (Miller, 2021).

1.1 What are Active and ludic Pedagogies?

Education has existed for ages and several types of pedagogies exist. One of the most tremendous pedagogy for these last few decades is active pedagogy. It corresponds to the fact that students are active in their own education and the classroom organization changes and becomes a problem solving environment instead of being a one way delivery or teacher centered environment as it is mentioned in the study of Van de Bogart (2009).

This learning method has hugely become a preferred practice to change the old-fashioned teacher centered classroom to a learner centered approach for a better knowledge. One of its strength is that several techniques are possible in active learning and so the student don't get bored and are happy to work. Lenz Tagushi (2009) shows that a lot of cognitive activators, such as pre-set activities, let students focus on learning independently and where or when they want to.

Ludic learning is an example of active education. The specificity is that the philosophy and practice of this method includes fun, play, playfulness and humor into the learning process as it is described in the study of Lauricella (2022). Thankfully, academic and intellectual rigor are still omnipresent. It integrates positive attitude and helps faculty into classrooms by creating a stressless and playful environment. These changes occurs an increase of engagement, motivation and learning outcomes (Lei 2010).

As it is highlighted in the study of Mooney (2018), fun is a great motivator because thank to this feeling, we can do a lot of activities, it is interesting to evolve the way students see education.

Thus, active and ludic learning have a preferred place in our society nowadays because they are a part of our needs and our approaches of knowledge (Proyer, 2011).

1.2 Is Gamification Useful for Education?

Gamification is increasingly becoming omnipresent in education. Students are no longer known as we thought with our traditional way of thinking as they go to school, sit at their desks, pay attention at the lesson, and take part in the "sit and get" way of learning all day long (Carneiro, 2007).

What is the best way for teachers to make students acquire knowledge? A lot of studies have been undergone to prove that using games could be the icing on the cake in education. There are a few examples possible such as cellphone application games like Kahoot, Factile Jeopardy, but also computer or board games like Scratch and get-up-out-of-your-seat games like Escape classroom games are interesting (Joseph, 2015).

A lot of reasons can explain how games are helpful in pedagogy:

Firstly, it is crucial that we need to find a way that we pay attention to our learners who live in a digital world. They use the Internet for everything, and they are used with immediate feedbacks, and they need to have instant answers all day long (Sun, 2015).

Secondly, games are fun and ludic learning too because they are enjoying time while playing without getting disinterested (Deterding, 2011).

Thirdly, as teachers, we are constantly searching to improve our courses in order to appeal our students.

Then, as the brain is a complex organ, we still don't know what the best way is to learn something and remember forever. So, it is interesting to experiment different way to acquire knowledge including games, social interaction, and friendly competition (Durdanović, 2015).

Thus, education, more precisely, teaching and learning methods are changing so as the world is becoming digital that's why if we teach as the old-fashioned way, without taking account of the multiple factors of our society, students are not learning adequately. Furthermore, we need to develop potential skills and knowledge needed to lead productive working lives (Scott 2015). Pedagogy should be tailored to the needs of each learner to help them reach their full potential. Students will be capable to interact with the society, deal with people from abroad cultures, while engaging in learning activities throughout their lives. This change is not only the responsibility of the teacher but of the entire nations and each one can contribute to a global pool of expertise on how best to implement the new century learning based on its context (Redecker, 2013).

As Uchechi (2021) explains in her study: "Education should prepare students to develop transferable skills such as collaborating among themselves to solve scenarios of real-world challenges, reflecting on their ideas, strengthening their critical and creative thinking capacities, showing initiative, and exploring analytical skills."

1.3 State of the Art Concerning Ludic Learning

Ludic learning has become very popular without a doubt and is set to be the most used education process for this century. Even if at the beginning, game-based learning was not welcomed, for about ten years, educational games have surprisingly become one of the most efficient ways of teaching with a newfound respect and enthusiasm. Nevertheless, given that gaming can be a problem for some students at school because of addiction, some teachers refused to try game-based education knowing that it's not easy for an educator to change the way of teaching and to use new technologies. Thinking about that, forms of play and games have been existed for thousands of years whereas traditional teaching have been only existed for hundred years, which can be very disturbing when we know some educators refused to try games in education as it is described during Adeeb Syed for Harvard university.

2. The Importance of a Pedagogical Scenario

2.1 Why Do We Need a Scenario?

An educational scenario corresponds to the progress of learning sequence, the definition of the objectives, the planning of the tasks and the methods of assessment as it is presented in the following figure:

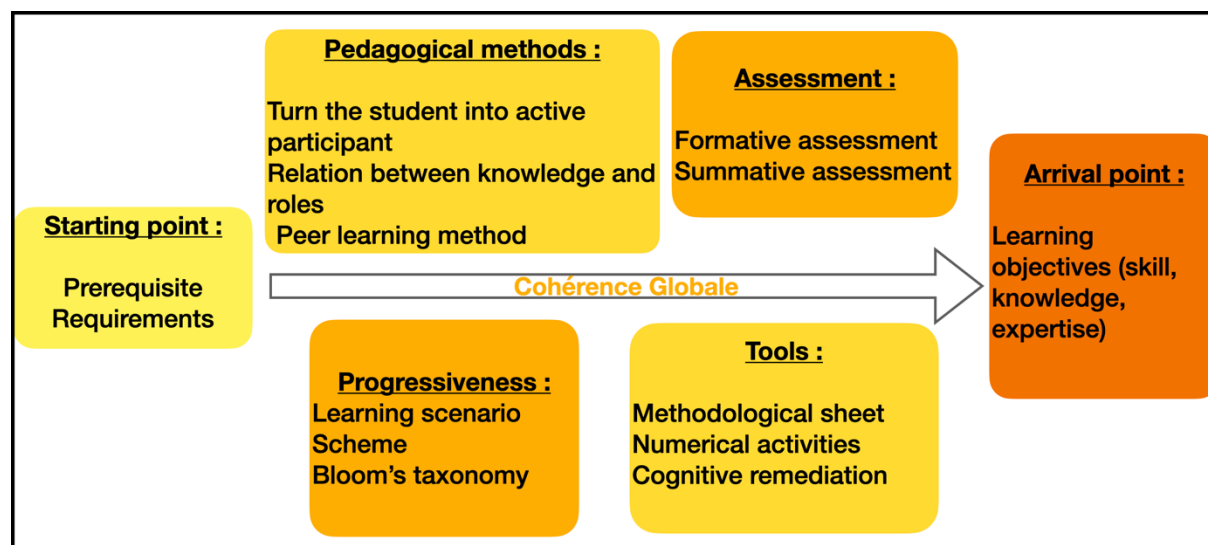


Figure 1: A pedagogical scenario

To organize a sequence, a teacher needs to know the prerequisite of the students to prepare remediation if it is necessary as a starting point. The learning objectives must be known so as to think up about the knowledge, skills and expertise requested as the final point. Then, the progressiveness including the learning scenario, the scheme and the Bloom's taxonomy is important to appear in the teacher's pedagogical sequence to guarantee the temporal organization. Two types of assessments can occur: the formative at home or at school to verify students' knowledge and the summative one at the end of the sequence. The tools type must be specified including numerical activities, the use or not of methodological sheet and a possibility of remediation for students in difficulty. The scenario helps the educators to highlight the pedagogical methods used such as peer learning process or active pedagogy.

Nevertheless, there are a lot of possibilities concerning how to insert activities in the educational sequence, that is what we call the useful scenario.

2.2 The Useful Scenario

This scheme describes how the numerical activities are inserted in the sequence precising the frequency, the purpose, the type of activities and the time remaining for each task. As there are a lot of parameters, there are a lot of useful schemes available.

The frequency is a key parameter because it arbitrates the number of activities used. On the first hand, if the activities occur too often, the students could weary and the motivation can decrease, on the other hand, if the frequency is too small, the impact of numerical activities would not be efficient.

The purpose is also a main parameter because an activity can be done as a traditional exercise, an ice breaker, an assessment, or a remediation. Numerical tools have the big advantage of instant feedback so it can be done for all purposes but this one need to be clear for the teacher and the students.

Every day, new software, and new technologies surface in the world so as in pedagogy. Kahoot, Factile jeopardy, Quizzlet, FizziQ, Wooclap, Moodle, Wims, Phyphox, Genially and more are numerical tools that can be served for pedagogy. In the following section, I will describe two applications I used a lot in school but there are a few examples of possibilities and features.

During a numerical activity session, the time passes faster than lesson or exercise session so the teacher must take care of the interval of time the numerical session can last.

3. Presentation of My Ludic Pedagogical Scheme and Methodology

3.1 A Global Approach

After a lot of tries, I have finally built my own ludic scheme that is mapped and described below:

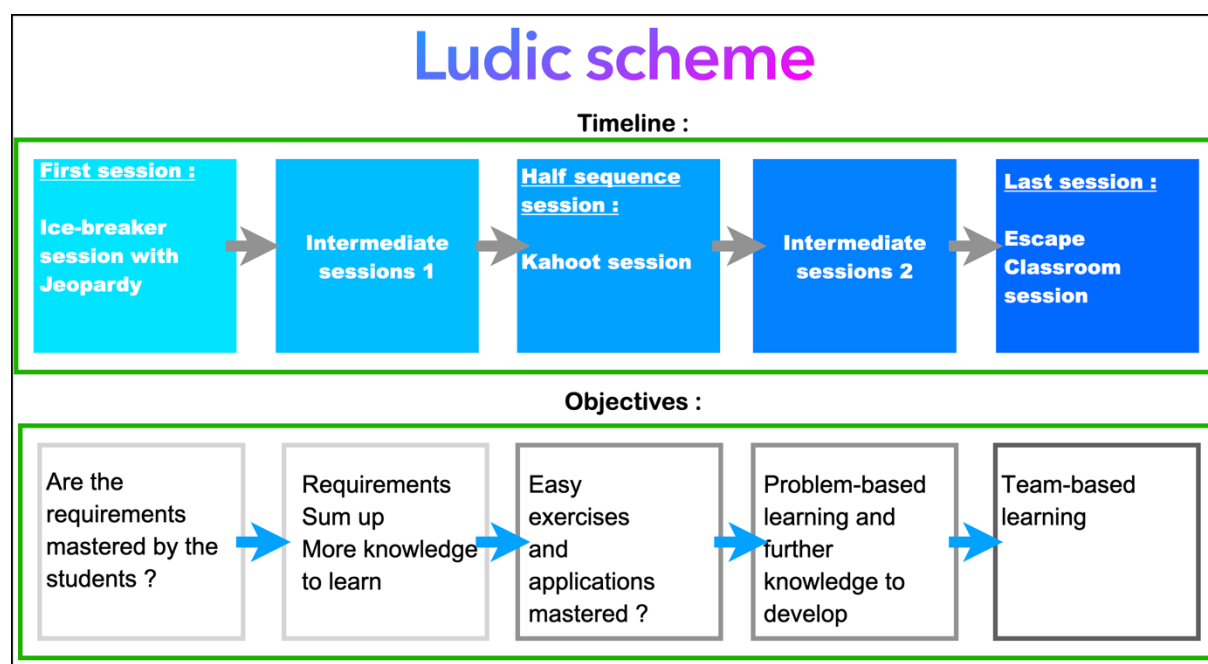


Figure 2: My ludic scheme

This fun scenario starts with the first session dedicated to an icebreaker activity in order to check if the requirements needed for the students are acquired or not. If it is the case, the next sessions will be devoted to the progressiveness of the topic but if it is not, a session of remediation will be organized.

After that, traditional lessons and exercises happen until the half sequence session regarding the Bloom's taxonomy.

The next fun activity is a playful formative test online which is placed at the middle so as to check if the first part of the low difficulty and new skills are mastered. As previously, if it is the case, the next sessions will be devoted to the progressiveness of the topic but if it is not, a new session of remediation will be organized again.

Then, high difficulty exercises and problem occur before the last session. This last session corresponds to a global-skill evaluation turned as a new playful activity.

Thus, this sequence is characterized by three key moments devoted to fun activities that will be developed in the next subsection.

3.2 Three Key Moments

3.2.1 First Step, the Icebreaker

The first key moment of the sequence is the icebreaker session with the application Factile Jeopardy (<https://www.playfactile.com>).

An icebreaker is a ludic activity which is helpful to start a session because it permits people to get to know each other but more precisely in education because it can be devoted to test the audience concerning the prerequisites. Teacher can use this kind of activity to help the acquirement of students with the content and the expectations of the sessions. This kind of ludic session is also handy for online classes to warm up students to participate from home. (Pelz, 2010).

They contain advantages in the classroom because firstly they motivate learners to share ownership for the education environment of the class. Secondly, they create a calm area where students can share ideas and participate more friendly and freely. Then, they can foster a productive pedagogical climate. Finally, they get ready students for team-based work.

For my part, I have decided to use Factile Jeopardy as an icebreaker because in a session of an hour, I can check up the requirements needed to go further for the progressiveness of my sequence, and I put the students in 5-people teams, and I choose six categories and I range the questions in order of difficulties (see figure 3).



Figure 3: Icebreaker session with Factile Jeopardy

3.2.2 Second Step, the Formative Test With Kahoot

Once half the sequence has been done, students are supposed to master the low difficulty skill and knowledge. So, it is the good moment to organize a formative assessment with a fun activity. For this purpose, I use Kahoot application (<https://kahoot.com>).

It is a convenient tool to break up the middle of the class or in the middle of a sequence to check for student understanding. A test of 10 to 20 questions summarizing all the previous program studied until this session is planned. It is a fun formative assessment which breaks with the traditional old-fashioned and boring evaluation, and it has also the great advantage of instant feedback and thus the teacher can easily evaluate the entire class quickly and be able to organize, if necessary, a remediation for students in difficulty (Barnes, 2017).

This would provide you with immediate feedback. I could also see it being used as an end of class activity.

3.2.3 Last Step, the Escape Classroom

The last key moment in my ludic sequence happens during the last session, it corresponds to an Escape Game session that I use to call "Escape Classroom". Thus, students compete against other teams so as to escape the classroom before it is too late because they have been locked in the classroom. I made the decision to use it to conclude my sequence because such activity is very interesting in pedagogy as it develops skills, encourage psychological skills too, but it also creates a taste for learning and grow a team cohesion (Sanchez, 2019).

During this session, I put students in group of 4 or 5 students and I give them an hour to practice this activity. For that, I build a pedagogical Escape game precising the context, the purpose, the challenges, and the secret code to find in order to succeed. I create 5 challenges that I organize with an increased difficulty (see figure 4). During this session, I evaluate all the knowledge acquired for all the sequence with this playful exercise.



Figure 4: Summative assessment with an Escape classroom

4. Results & Discussion

In the following subsections, we report the results obtained classified in two categories: the first one is located from the student's viewpoint and the second one in from the educator 's point of view.

4.1 Students' Outcome

The best way to collect students' viewpoints and to show how this sequence has a good impact on the learners is to make a satisfaction survey that the students must fill in and when the results are gathered, they are analyzed and summed up in the following figure below:

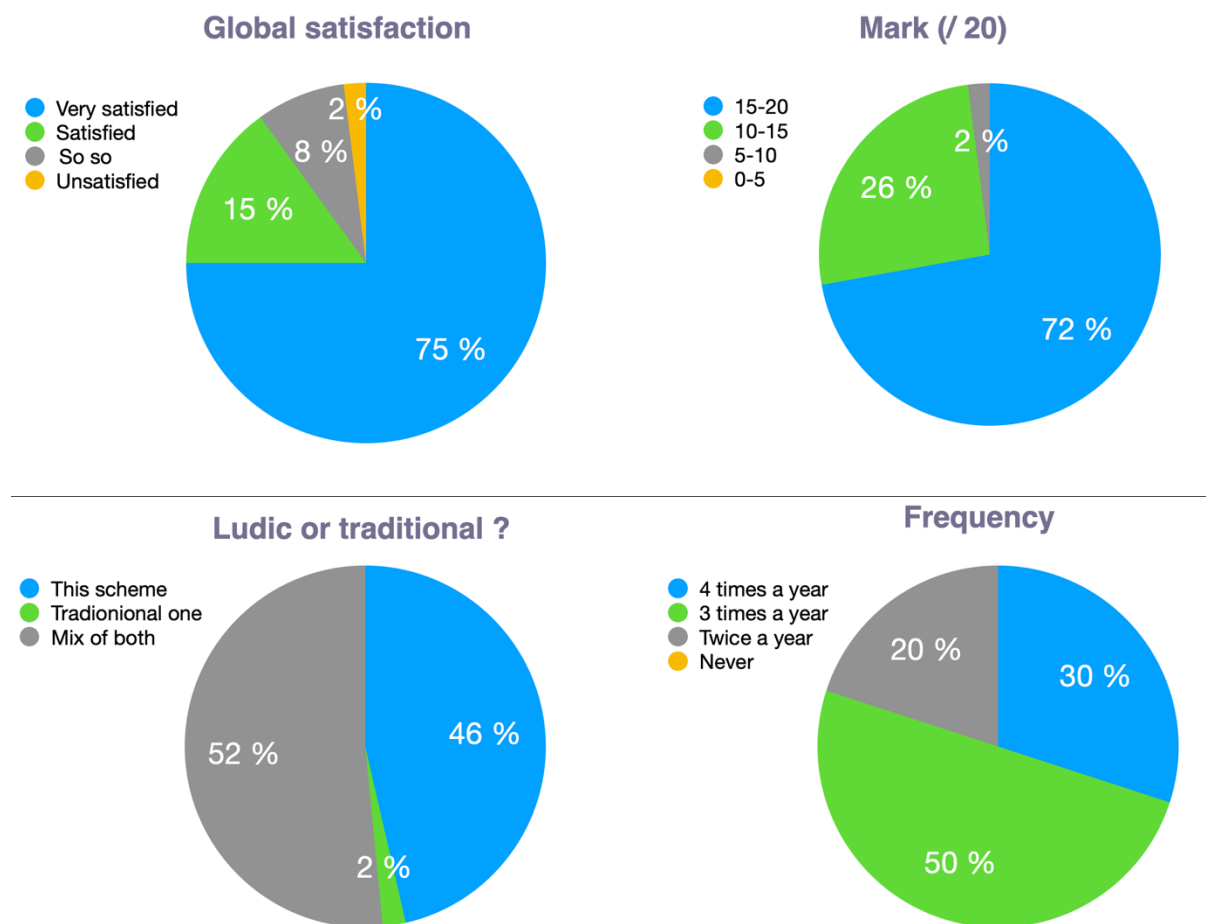


Figure 5: Results obtained from the satisfaction survey

This satisfaction survey is composed of 4 questions. The first question concerned the global satisfaction of the ludic sequence. The next question permits them to give a score out of 20 about this scenario. The third question lets them wonder what kind of scheme they like, the ludic one or the traditional one and the last one asks them about the frequency they would like to meet this scheme. These resulted have been collected during three years of teaching with this scenario for 250 students.

Regarding the answers, we can clearly make the following statement: more than 75% of the students are very satisfied about this teaching method and the average mark gotten for this scheme approaches 15/20 according to the students. The third question lets us believe that this ludic method is attractive for the students but a mix between the traditional and ludic method can be a good solution. Finally, the frequency of using this method needs to be think about in order to find the perfect match.

4.2 Teacher's Viewpoint

It is always important to focus not only on the student viewpoint but also to make a statement concerning the educators experience using this method.

On the first hand, building such a scenario is not easy the first time and it is a time-consuming process to build our one ludic sequence with imagining and preparing numerical activities that will be used for the course. On the other hand, there a lot of advantages. Firstly, it is very pleasant to see students 'motivation and pleasure to go in class. Secondly, with this approach, it is possible to do exercises more difficult in class. Furthermore, students get very good results at tests, and we have observed that the success rate has increased by 15% during the three years done with and compared at the same time with another class following the same courses but not with the same method at this is highlighted in the following figure:

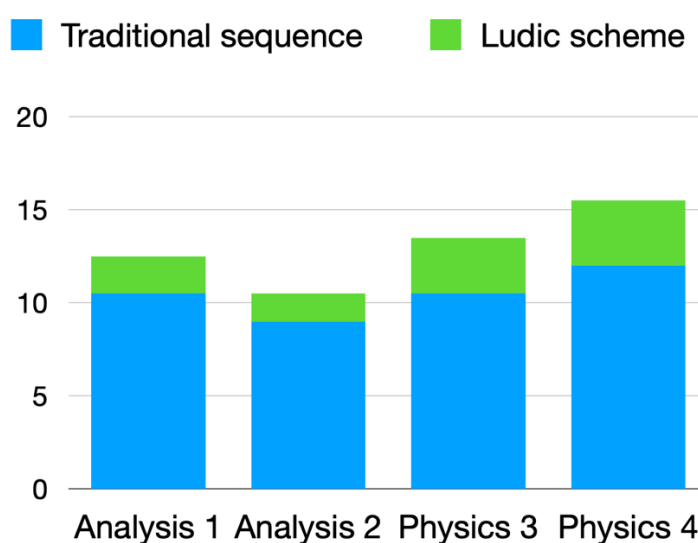


Figure 6: Comparison of students 'success rate between two methods

The mark has been calculated for each semester for three years. This comparison concerned 4 courses: Analysis 1 and 2 (Mathematics during the first and second semester) and Physics 3 and 4 (Physics during the third and fourth semester). For this comparison, at the same time, one group class has followed the traditional sequence and the other group class has followed the ludic scheme. The students can gain about 2 to 3 point out of 20 with this approach.

5. Conclusion

This article has presented a ludic scenario built for learners in preparatory classes in an engineering school in the south of France but can easily be adapted to a different level of knowledge and to any topics. This sequence is composed of three key moments using playful activities starting with a numerical icebreaker, followed in the middle of the sequence by a fun assessment using Kahoot and finishing with an Escape Classroom. What is interesting about this learning method is that students get great scores at the end of the semester in comparison to a traditional sequence and their motivation increased.

This sequence may be one of the first proof that playing in class is possible and can be a secret of their success rate.

That would be interested to export this educational approach in different topics so as to see how it can be modified in this way.

References

- A. Syed, (2023). Ludic learning : designing playful learning experiences, <https://pll.harvard.edu/course/ludic-learning-designing-playful-learning-experiences?delta=0>
- Barnes, R. (2017). Kahoot! in the classroom: student engagement technique. *Nurse Educator*, 42(6), 280.
- Carneiro, R. (2007). The big picture: understanding learning and meta-learning challenges. *European Journal of Education*, 42(2), pp 151-172.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining "gamification". Proceedings of the MindTrek '11. doi:10.1145/2181037.2181040
- Durdanović, M. M. (2015). The use of teaching aids and their importance for students' music education. *International Journal of Cognitive Research in Science, Engineering and Education*, 3(2), pp 33-40.
- Joseph, O. (2015). Teaching Aids: a special pedagogy of brain development in school children, interest and academic achievement to enhance future technology. *Journal of Education and Practice*, 6(29), pp 92-101.
- Lauricella, S., & Edmunds, T. K. (2022). Ludic Pedagogy Online: Fun, Play, Playfulness, and Positivity. *Thriving Online: A Guide for Busy Educators*.
- Lei, S., Cohen, J., & Russler, K. (2010). Humor on learning in the college classroom: evaluating benefits and drawbacks from instructors' perspectives. *Journal of Instructional Psychology*, 37(4), 326-332.
- Lenz Taguchi, H. (2009). Going Beyond the Theory/Practice Divide in Early Childhood Education: Introducing an Intra-Active Pedagogy (1st ed.). Routledge. <https://doi.org/10.4324/9780203872956>
- Miller, A. N., Sellnow, D. D., & Strawser, M. G. (2021). Pandemic pedagogy challenges and opportunities: Instruction communication in remote, HyFlex, and BlendFlex courses. *Communication Education*, 70(2), 202-204.
- Mooney, S. & Harkison, T. (2018). Assessment for learning in university settings: fun and games. *Anatolia*, 29(4), 507-517.
- Nuruzzaman, A. (2016). The Pedagogy of Blended Learning: A Brief Review. IRA International Journal of Education and Multidisciplinary Studies (ISSN 2455–2526), 4(1). doi:<http://dx.doi.org/10.21013/jems.v4.n1.p14>.
- Pelz, B. (2010). (My) three principles of effective online pedagogy. *Journal of Asynchronous Learning Networks*, 14(1), 103-116.

- Proyer, R. (2011). Being playful and smart? The relations of adult playfulness with psychometric and self-estimated intelligence and academic performance. *Learning and Individual Differences*, 21, 463-467.
- Redecker, C. & Punie, Y. (2013). The future of learning 2025: developing a vision for change. *Future Learning*, 1, pp 3-17.
- Sanchez, E., & Plumettaz-Sieber, M. (2019). Teaching and learning with escape games from debriefing to institutionalization of knowledge. In *Games and Learning Alliance: 7th International Conference, GALA 2018, Palermo, Italy, December 5–7, 2018, Proceedings 7* (pp. 242-253). Springer International Publishing.
- Scott, C. (2015). The futures of learning: Why must learning content and methods change in the 21st century? ERF Working Papers Series, No. 13. Paris: UNESCO Education Research and Foresight.
- Stranford, S. A., Owen, J. A., Mercer, F., & Pollock, R. R. (2020). Active learning and technology approaches for teaching immunology to undergraduate students. *Frontiers in public health*, 8, 114. <https://www.playfactile.com>
- Sun, J., Anderson, R., Lin, T. & Morris, J. (2015). Social and cognitive development during collaborative reasoning. In C. S. Asterhan, S. N. Clarke & L. B. Resnick (Eds.) *Socializing intelligence through academic talk and dialogue*, pp. 63-76.
- Uchechi B O. (2021). The Role of Teaching and Learning Aids/Methods in a Changing World, New Challenges to Education: Lessons from Around the World BCES Conference Books, 2021, Volume 19. Sofia: Bulgarian Comparative Education Society, pp 210-216.
- Van de bogart, Willard. (2016). Active Learning Pedagogy. <https://www.southeastasianreview.com/Active%20learning%20Pedagogy.pdf>
- Wang, A. I., & Tahir, R. (2020). The effect of using Kahoot! for learning—A literature review. *Computers & Education*, 149, 103818. <https://www.sciencedirect.com/science/article/pii/S0360131520300208>

The Development and Evaluation of Artificial Intelligence (A.I.) Tutor for a Java Programming Class

Alessia Tripaldelli, Embry-Riddle Aeronautical University, United States

Brian Butka, Embry-Riddle Aeronautical University, United States

Casey Elder, Embry-Riddle Aeronautical University, United States

The Paris Conference on Education 2023

Official Conference Proceedings

Abstract

The advent of Artificial Intelligence has brought numerous opportunities for innovation in the field of education. One such tool is ChatGPT, a conversational AI model, which can aid students in their learning process and enhance their Java programming skills. This study aims to evaluate the effectiveness of ChatGPT in helping students with Object Oriented Java programming tasks. The research was conducted by having four students work on the class assignments using ChatGPT as a supplementary tool. The students were helped and guided by the researchers to input the prompts in a way to make the AI produce the desired answer. Then, they were assessed through an exam taken first without the AI, and then with its help. The assessment included the topics where they struggled the most in the class. The students' performance was graded by the researchers and the students were interviewed about their experience with ChatGPT. In today's rapidly advancing technological world, it is imperative that education keeps pace. This study highlights the importance of adapting to technological advancements in education and teaching methods and provides valuable insights into the effectiveness of using AI as a teaching tool. The growing use of AI in language modeling has increased the interest in this field of research, and this study contributes to the body of knowledge by demonstrating the potential of ChatGPT as an AI tutor for programming tasks. The results of the study reveal that ChatGPT has the potential to play a valuable role in reinforcing teaching techniques and improving students' understanding. ChatGPT's features, such as code readability assessment, grading based on a predefined rubric, quality check of comments, and debugging, can provide students with immediate feedback and help them make necessary improvements.

Keywords: Artificial Intelligence, Object Oriented Programing, Machine Learning

iafor

The International Academic Forum

www.iafor.org

Introduction

Chat-GPT is a large language trained by OpenAI designed to respond to natural language input. This AI has the ability to respond to a large variety of questions, including programming and software development technical topics. ChatGPT uses a deep learning technique called a transformer neural network, which consists of multiple layers of self-attention mechanisms and feed-forward neural networks, enabling it to understand and generate coherent and contextually relevant text. This AI has been trained on a big amount of data from the internet, which helps it learn grammar, facts, reasoning abilities, and even some degree of common sense. When a prompt is input into ChatGPT, the response gets generated by sampling words from a probability distribution over the model's vocabulary. Thus, ChatGPT can generate appropriate responses based on patterns and information learned. The two phases in training this AI model are pre-training and fine-tuning. Pre-training involves gaining knowledge by predicting future events in a large dataset that includes portions of the internet, such as grammar, syntax, and semantics. Instead, during the fine-tuning phase, OpenAI created specialized datasets that are used to train the model, which compare and contrast alternative responses and examples of proper behavior. However, ChatGPT does not process information after September 2021 [1].

ChatGPT can be a useful tool in several different areas, such as writing, coding, explaining theoretical concepts, and many more. For instance, the creation of scientific abstracts and journal articles is one area where ChatGPT has shown its potential. In a recent study, researchers discovered that ChatGPT was capable of producing high-quality scientific abstracts that were equivalent to those produced by humans when combined with domain-specific data. Professor John Pavlik conducted a study on the effects of this AI on journalism, stating that this AI has become an important and influential technology for journalism and media, making it increasingly relevant for journalism and media education. Therefore, as this article argues, AI has the capacity to produce relevant, possibly high-quality written content that is relevant to the journalism and media domains [5].

In addition, our previous research titled *Can Artificial Intelligence Pass a Sophomore Level Digital Design Laboratory?* shows that ChatGPT can be a useful peer or a tutor in coding and electrical engineering material. While ChatGPT was unable to physically wire the circuits in the laboratories for the CEC222 class at Embry-Riddle Aeronautical University, it was able to describe the wiring, write the programs needed to run the laboratories, and provide answers to the lab questions. When the labs were scored individually, ChatGPT received a 73% [3]. Therefore, according to the study, ChatGPT performed on par with many other students and may be regarded as a peer in a laboratory environment where peer-to-peer learning is encouraged. ChatGPT has the potential to be a beneficial tool for students because students may feel more at ease asking simple questions to ChatGPT rather than to a person, which may increase their interest in the course content. However, while applying AI in education, it is vital to proceed with caution and consider any potential consequences on student learning and critical thinking abilities.

In this regard, even while ChatGPT can produce coherent and well-written essays, there are concerns about cheating and the loss of critical thinking skills that come with relying too much on AI-generated content. However, many professors carefully analyzed what ChatGPT may provide if used similarly to other programs already in use, including Grammarly. Although it is nothing new, learning quickly is not necessarily a bad thing. The professor John Warner in his essay "How About We Put Learning at the Center?" states that: "While much of the discussion of ChatGPT is about how disruptive it seems to be, my view is that it merely reveals

what was already present, rather than fundamentally changing the picture. For example, students taking a shortcut to a grade in order to avoid the longer journey through learning is not a new phenomenon” [4].

Moreover, it can be a useful tool to aid students with Object Oriented Java programming tasks, representing a virtual Teaching Assistant available all day to help students better understand what was taught in class. Chat-GPT performs well in coding technical assessments and code debugging. In fact, Chat-GPT was used for a LinkedIn Python skill assessment, producing a score of 85%. Thus, in the paper titled “ChatGPT outperforms 85% of the 4m programmers assessed on Python on LinkedIn,” was outlined that: “ChatGPT has proven its ability to understand and write code at a basic level, and beat basic assessment tests that are used to assess a candidate’s programming skills. Given the emphasis of hard skills in the industry today and many companies hiring based on these criteria, it is imperative to assess the way we assess the suitability of a candidate. Assessing only hard skills is no longer the solution if an AI machine like ChatGPT can do better than 85% of 3.9 million people” [5]. This AI is not only able to solve basic tasks and answer questions, but it can interpret and perform advanced tasks, which are acquired by programmers in years of studying. Therefore, Chat-GPT could represent a valid help for students that are struggling in understanding coding tasks providing examples and detailed explanations.

This research investigates whether Chat-GPT can represent a coding tutor for students, providing answers to their questions and a large variety of examples. This study worked with four students of varying abilities at Embry-Riddle Aeronautical University that are taking the Computer Science II Object Oriented Java class (CS 225). The researchers visited the class to ask the students the areas where they struggle the most. The students reported the critical areas as class inheritance between communicating programming classes, UML diagrams, and File I/O. In addition, the students reported a lack of examples and active learning in class, which was based more on theory. Thus, all the four students were helped by the researchers using Chat-GPT as a tutor to perform their homework, which reported a faster and more efficient completion of the task, which resulted in a better grade. In particular, the researchers helped in Chat-GPT’s prompt construction, to make the AI produce the desired answer.

Then, the four students were asked to take a coding exam first without the help of ChatGPT, and then with ChatGPT to test the knowledge they gained being tutored through it. In particular, three of the students were part of the class and were a computer science major, while one student was not currently enrolled in the class. The exam tested the students on two inheritance coding questions, a UML diagram question, one programming question, and two theoretical questions. The first time, the students took the exam in 30 minutes completely unaided. Then they were able to ask ChatGPT questions, and they were given the exam again.

The results showed that the student who was not in the class improved drastically, going from a failing grade to a passing grade (B). The other three students improved by a letter grade. All the students expressed positive feedback and evaluated the time they spent using ChatGPT more valuable than passively sitting in class listening to the professor. In this sense, we might be looking at a new way of tutoring students at any time, which raises the question if professors should be changing the way they teach in the future. The following section will provide more details about the way students were tutored and assessed.

Methodology

This research paper presents a pilot study aimed at investigating how students can use AI as a supplemental tutor in their classes. It is important to note that this study was conducted with a small number of subjects, and therefore, should be considered with caution and as a preliminary study as opposed to a definitive study of the topic. The use of the small sample size in the study is acknowledged and was driven by practical constraints.

To test the quality of ChatGPT's ability to help students perform on assignments, an exam containing 6 questions was given to the students twice. The first attempt was taken without the aid of Chat-GPT, while the second was supported by the help of the AI. Each question was worth five points, for a total of 30 points. The first question included the following:

Attributes and Methods (5 points): Create a Java class called Person with the following attributes:

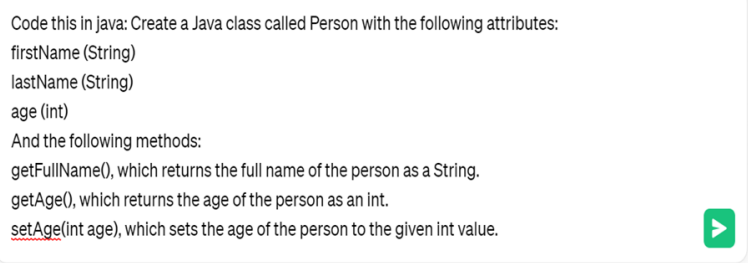
- firstName (String)
- lastName (String)
- age (int)

And the following methods:

- getFullName(), which returns the full name of the person as a String.
- getAge(), which returns the age of the person as an int.
- setAge(int age), which sets the age of the person to the given int value.”

The students overall performed decently on this question without ChatGPT initially with the average score being 3.75 points. After they were able to ask ChatGPT questions, the average score was 4.75 points.

For this question, the following images show what a student typed into ChatGPT and what was given as a response:



Code this in java: Create a Java class called Person with the following attributes:

```
firstName (String)
lastName (String)
age (int)
```

And the following methods:

```
getFullName(), which returns the full name of the person as a String.
getAge(), which returns the age of the person as an int.
setAge(int age), which sets the age of the person to the given int value.
```

The screenshot shows a chat window with a light gray background. The user's prompt is in a white text box on the left, and the AI's response is in a white text box on the right. The response includes code snippets for attributes and methods. A green send button is visible at the bottom right of the chat window.

Free Research Preview. ChatGPT may produce inaccurate information about people, places, or facts. [ChatGPT May 24 Version](#)

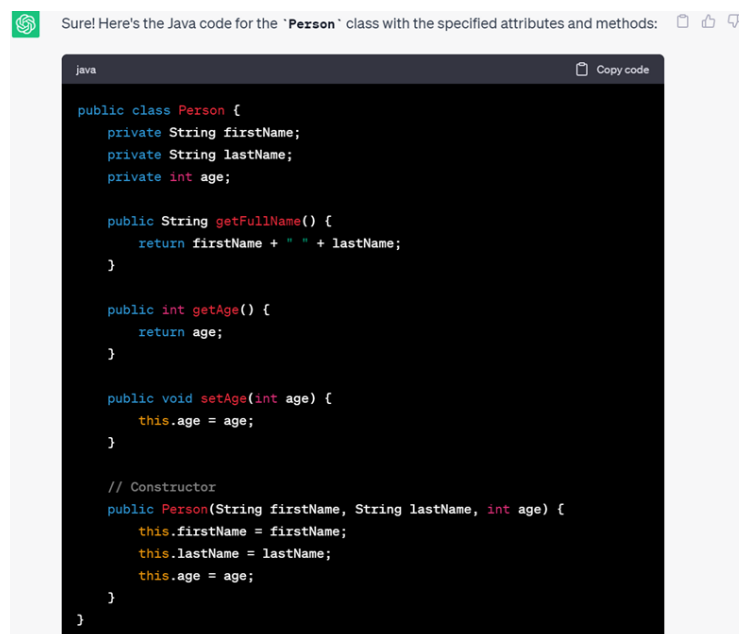


Figure 1: ChatGPT Response Example

The second question was based on creating a Java class to extend the “Person” class, to test the students on inheritance. The following prompt was given:

Inheritance (5 points): Create a Java class called Employee that extends the Person class and adds the following attributes:

- employeeId (int)
- salary (double)

And the following methods:

- getEmployeeId(), which returns the employee ID as an int.
- getSalary(), which returns the salary as a double.
- setSalary(double salary), which sets the salary to the given double value.
- Override the getFullName() method to include the employee ID in the full name.

The students performed well on this question initially with an average of 3.87 points. Using ChatGPT, the average became 5 points, getting a perfect score.

The third question was based on drawing a UML diagram to represent the two classes created in the two previous assessments. The following prompt was given to the students:

UML Diagram (5 points): Draw a UML class diagram for the Person and Employee classes, including all attributes and methods. Include inheritance and any necessary relationships.” The students got an initial score of 4.37 points. After using ChatGPT the score slightly changed, going up to an average of 4.67 points, because the AI does not have capabilities to draw UMLs. However, ChatGPT can provide help understanding the type of inheritance and consequently the type of arrow that has to be used.

The fourth prompt was based on a basic programming task to test the students’ proficiency with the Java language. The following question was given to the students:

Programming Task (5 points): Write a Java program that takes a list of integers from 0 to 9 as a user input and returns the sum of all even numbers in the list.” The initial score without using ChatGPT was 3.3 points. However, the attempt with the help of the AI reported an average score of 93%.

The fifth task was a theoretical question on one of the main concepts of the class, which is based on object oriented programming. The following prompt was given to the students: **Theory (5 points):** What is the meaning of object oriented programming?.” Without the help of ChatGPT the students earned an average score of 3.13 points. The help of ChatGPT made the score increase up to 5 points.

The sixth task was another theoretical question: **Theory (5 points):** What is data encapsulation?.” The first try reported an average score of 4 points, while the attempt with ChatGPT increased the score up to 5 points.

Results

After the students took the test the first time, unaided by ChatGPT, the average score was 71.25%. Then, after they were able to use ChatGPT as a tutor, the average score was 93.325%. The individual results can be seen in the following table, where the “a” questions are the first attempt at the test before ChatGPT and the “b” questions are the second attempt after they were able to ask ChatGPT questions.

Student #	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b
1	40%	100%	40%	100%	90%	60%	20%	60%	20%	100%	40%	100%
2	90%	100%	90%	100%	100%	100%	70%	100%	80%	100%	80%	100%
3	100%	100%	100%	100%	80%	80%	90%	80%	80%	100%	100%	100%
4	70%	80%	80%	100%	90%	80%	70%	100%	80%	100%	100%	100%
Average	75%	95%	78%	100%	90%	80%	63%	85%	65%	100%	80%	100%

Table 1: Summary of Scores

The first and section questions’ average scores increased by 20% and 22%, respectively, after the students were allowed to use ChatGPT as a tutor. Since the questions were fairly similar, these similar results make sense. The questions should have been easy to answer regarding the content taught in the course, however the C average on these questions says otherwise. This result shows that the lack of examples being provided in class is negatively affecting students’ understanding of the concepts and students’ abilities to apply those concepts. After ChatGPT provided the students' example code, the scores increased significantly.

The third question required students to draw a UML diagram. Initially, the students seemed to understand what was being asked and, overall, succeeded. They did not need ChatGPT as much for this question as they did for the other ones. This result was convenient because ChatGPT can not produce images, therefore it can not draw a UML diagram. It does have the ability to explain what a UML diagram is and what the different symbols and arrows mean, but since it can not produce an actual diagram, it is not entirely useful in this sense. This is one of the most relevant limitations of ChatGPT.

The fourth question had an average increase of 23%, which was the second highest increase overall. This question asked the students to write a simple program, which was completely within the scope of the course content. Initially, most of the students knew what to do, but had

trouble implementing that in actual code syntax. However, after they were able to view sample code from ChatGPT, they were much more successful.

The fifth and sixth questions were theory questions about things they would have learned in class. The students did significantly better after asking ChatGPT for help. ChatGPT tends to perform well when asked questions that require explanations and also performs well with follow up questions.

After the students finished the second iteration of testing, they were all in agreement regarding how much better they felt about the second exam as opposed to the first. They all claimed that they learned more in our singular tutoring section than they learned in the entire duration of the class thus far. They claimed that the class was very lecture heavy, and often, no examples were given. They said that seeing ChatGPT provide example code that included comments describing what the code did was extremely beneficial to their learning and helped them understand the concepts taught in the lectures on a deeper level, so at that point, they were then able to apply the concepts taught in class to actual code.

Conclusion

Though ChatGPT is still a fairly new resource for students, it has proved to be very useful in the field of academics. Some theorize that it will cause students to lack critical thinking or problem solving skills, however others are able to see it as a beneficial thing to aid students' learning. However, it is necessary that ChatGPT is used carefully and lightly because sometimes it can give incorrect answers. In the article, "Collaborating With ChatGPT," the authors explain that "There are substantial limitations to the capabilities of AI, including its range and depth of knowledge and capacity to think critically or creatively. Yet, ChatGPT has an impressive level and range of knowledge" [2]. Even though ChatGPT houses some limitations that must be considered when using it in the field of academics, it is still an extremely useful tool for students. This can be seen in the test results taken in this study. They show that when students are able to use ChatGPT as a tutor, the scores increased greatly. Overall, ChatGPT is on the peer level with students, and should be used as a tutor, especially in the computer science field. ChatGPT has the potential to serve as a tutor in a programming class, as it is available 24/7.

Overall, ChatGPT's strengths outweigh its weaknesses in many ways. The results shown here show that after ChatGPT was used to tutor students, their performance increased significantly.

References

- [1] *Chatgpt*. ChatGPT. <https://openai.com/chatgpt>
- [2] J. V. Pavlik, "Collaborating With ChatGPT: Considering the Implications of Generative Artificial Intelligence for Journalism and Media Education," *Journalism & Mass Communication Educator*, vol. 0, no. 0, 2023, <https://doiorg.ezproxy.libproxy.db.erau.edu/10.1177/10776958221149577>
- [3] C. Elder, G. Pozek, S. Horine, A. Tripaldelli and B. Butka, "Can Artificial Intelligence Pass a Sophomore Level Digital Design Laboratory?," *SoutheastCon 2023*, Orlando, FL, USA, 2023, pp. 861-868, doi: 10.1109/SoutheastCon51012.2023.10115116.
- [4] J. Warner, "How about We Put Learning at the Center?: Inside Higher Ed," *Just Visiting*, 2023, <https://www.insidehighered.com/blogs/just-visiting/how-about-we-put-learning-center>
- [5] *CHATGPT outperforms 85% of the 4 million programmers assessed on python on linkedin*. CFTE. (2022, December 13). <https://courses.cfte.education/chatgpt-outperforms-4m-programmers/>

Contact emails: tripalda@my.erau.edu
butkab@erau.edu
elderc2@my.erau.edu

Bridging the STEM Education Gap Among Secondary School Female Learners: Need for an Integrated Secondary School STEM Education Monitoring Tool

David Mkwambisi, Malawi University of Science and Technology, Malawi
Patrick Chimseu, Lilongwe University of Agriculture and Natural Resources, Malawi
Brighton Chunga, Mzuzu University, Malawi
Jonathan Makuwira, Malawi University of Science and Technology, Malawi

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The under-representation of girls in science, technology, engineering and mathematics (STEM) education in developing countries has been, and continues to be, an issue of global debate. As a result, a study was undertaken to explore factors affecting STEM education including the learning and teaching environment of students and teachers. This paper presents research findings on secondary school STEM learners especially girls and their teachers located in rural and urban, private and public schools in Malawi. Using learner (532 learners: 263 males and 269 females) and teacher (90 teachers: 60 males and 30 females) surveys in 15 districts, the results show that more learners 28.3%, 24.5%, 22.3%, 11.8% and 3.8% of learners are in public schools located in urban areas, community day urban, private urban, community day rural and public rural respectively. Most of female learners were enrolled in public urban (14.0%) whose parents (29.1%) have secondary school education. The most significant geographical variation on factors affecting enrollment came in from the problem of lack of facilities (p-value = 0.019), demotivation from pressure (p-value = 0.00), shortage of qualified teachers (p-value = 0.02), and lack of teacher bridging programs (p-value = 0.00). The findings suggest engaging an integrated digital secondary school monitoring tool. The tool has different features for different end-users including students' profiles, enrollment tracker, school calendar, class schedule, report card generation, assessment and grading, parents' and teacher's information among others. The tool will create an enabling environment for quality education by generating evidence on quality of teaching and learning and ensuring gender balance in enrollment. Furthermore, the tool will promote governance with insights generated from the available data.

Keywords: STEM Education, Monitoring Tool, Female Learners

iafor

The International Academic Forum
www.iafor.org

1. Introduction

Globally, the concept of gender-inclusive education has taken a center stage in the development discourse and practice (Byrne, 2019). This has also been linked to the UN Declaration of Rights to Education (Loma, 2017). Within the policy programming, gender-inclusive education has also been linked to ‘leaving no one behind’ slogan and has mostly been advocated in developing countries (Vargas-Tamez, 2019). Gender-inclusive education is an approach to education that recognizes and addresses gender inequality and promotes gender equality for all students (Halldén & Helgesson, 2020). It recognizes the diversity in gender identity and expression and embassies on creating a safe, supportive and welcoming environment for all students regardless of gender identity (UN, 2022; Write et al., 2016).

Several projects including UN Women STEM education and leadership program, UNESCO Engineering for Sustainable Development project, UNICEF Innovations for Education initiative, UNDP STEM for Development project, have been supporting both inclusive education as well as right to education (Kurth et al., 2018; Kostelnik & Stein, 2019). However, the number of children failing to access education has been increasing (UNESCO, 2017).

While the right to [quality] education is a universal human right, many developing countries are facing difficulties in meeting this obligation. This has led to several consequences, particularly among low-income communities (Srivastava et al., 2015). In addition, poor policy programming and support for STEM and sanitation education have led to increased number of learners dropping out of school. For example, over one million learners in Malawi have not been able to complete primary school education, whilst only 60-70% of primary school graduates attend secondary schools (UNICEF, 2021). For those that have made it to secondary school, very few learners especially females opt for Science, Technology, Engineering and Mathematics (STEM).

Previous studies have revealed that despite policy interventions of increasing percentage of female learners in natural sciences and technology degrees from 25% to 60% (GoM, 2012), female students in STEM are still under-represented in the field (Mbano and Nolan, 2017). The situation is even worse when it comes to sanitation education across all levels of education resulting in few female experts advancing both STEM and Sanitation education (Shaw et al. 2019). Reasons for this have been discussed with possible reasons varying from constraints at household level such as financial availability, lack of curriculum specialists, lack of policies and practical limitations such as lack of teaching and learning infrastructure (UNICEF, 2020).

This policy gap is further linked to lack of inclusive education monitoring tools that allow key factors such as parents, teachers, government officials to understand the trend and progress of learners in STEM and sanitation education. Recognition of the need for inclusive education monitoring tool that is both useful and usable is developing rapidly alongside a growing literature on dealing with inclusive education models (UNESCO, 2015). Understanding the wider learning environment for learners in developing countries especially females is critical since some of the factors are linked to social as well as wider group dynamics (World Bank, 2022). Longer economic outcomes of education led by STEM education to support SDG 4 will be affected due to non-use of tools and systems for monitoring education performance among female learners. This is particularly relevant in developing countries where the number of female learners who are shunning away from STEM and sanitation education (AAUW, 2015). Locally adapted education monitoring tools can

support decision making among education actors that can allow learners to complete and excel in their STEM and sanitation education. A further consideration is that for inclusive education and leaving no one behind concepts to be supported by decision makers, there is need for new tools of monitoring education and programming that should be embraced by all actors (Elsa et.al. 2016).

Appropriate and timely development of inclusive education monitoring tool is inevitable for developing countries in general and specifically for Malawi. Malawi's education sector is faced with several challenges, including: low funding and insufficient resources, shortage of trained teachers, inadequate infrastructure, lack of basic school facilities, which affects enrolment and attendance, resulting in high dropout and low completion rates (GOM, 2017). According to Wamba and Mgomezulu (2014), factors such as poverty, lack of conducive environment, limited qualified teaching staff, teaching, and learning materials, infrastructure and overall policy support have been recognized to be critical in achieving inclusive education.

Using a case study from Malawi, through a survey, we iteratively engaged female learners and secondary school teachers from public and private secondary schools in both urban and rural areas in order to (i) understand the extent to which access to STEM and sanitation education is still hindered despite policy interventions (ii) to analyze teacher programming and monitoring in support of STEM and sanitation education among female learners and (iii) conceptualize a STEM and sanitation education monitoring tool for inclusive education system. Our argument is that policy interventions should be supported with proper monitoring tools that do not only rely on data and information, but also other actors that indirectly affect education.

2. Materials and Methods

2.1 Study Area and Context

Malawi has one of lowest education enrolments in STEM and sanitation education in Africa, with the lowest number of students graduating with STEM degrees. The majority of learners are still having challenges accessing education in general due to lack of proper infrastructure among others. Teacher-pupil ratio in primary school is 1:59 whilst secondary schools is 1:72 (World Bank 2018). This situation is further worsened by high poverty rates. According to World Bank data, around 80% of the country's population live in poverty in 2015, with the majority of people residing in rural areas. The poverty rate is estimated to be around 60% and 90% in urban and rural areas respectively (World Bank 2022).

The Ministry of Education is responsible for all education levels in Malawi (early childhood development, primary, secondary, and higher education). The ministry and development partners have applied several development and policy interventions to promote girl education in general and particularly to promote STEM education among female learners (MoE, 2019).

This study took place in 15 districts in Malawi including Karonga, Nkhatabay, Mzimba, Rumphi Nkhotakota (northern region), Salima, Lilongwe, Dedza Ntchisi, Ntcheu (central region), Blantyre, Zomba, Phalombe, and Balaka in the southern region (See Figure 1). Within these districts, the survey covered urban and rural secondary schools represented by public conventional, community day secondary and private secondary schools. Community

Day secondary schools only operate during the day and do not provide boarding facilities and services whilst public conventional secondary schools accommodate students as boarders.

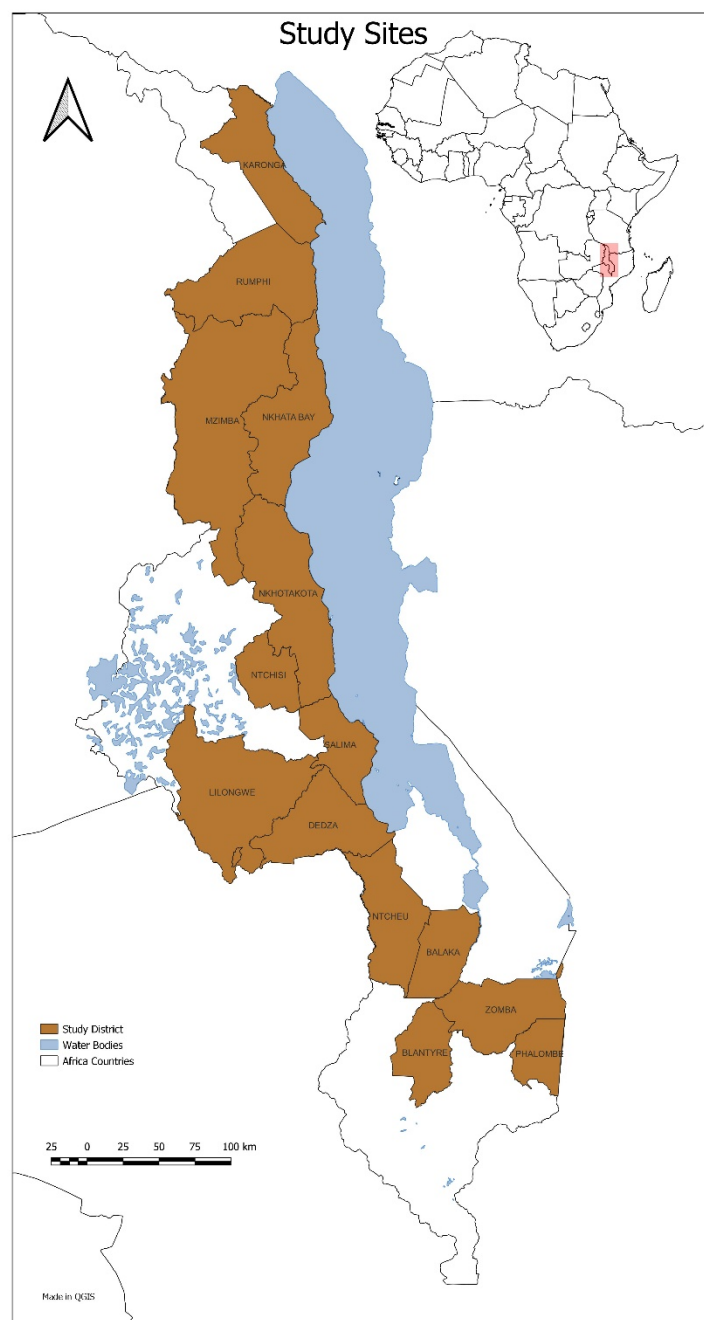


Figure 1: Study sites

2.2 Data Collection

A digital structured questionnaire on mWater Application was used to collect primary data. mWater is a cloud-based platform that provides tools for monitoring and managing data. It offers different features including: mobile data collection, interactive maps, real-time data visualization and reporting, data sharing and collaboration and integration with other systems and data sources. Using the digital tool surveys with open and closed questions were conducted at each secondary school. The surveys covered details of school information,

demographic information, enrolment into STEM subjects, barriers to STEM education, and sanitation in different modules. In total, 45 secondary schools were sampled covering community rural (8.9%) and urban (18.8%), public rural (18.9%) and urban (30.0%), private rural (4.4%) and urban (14.5%) and faith based secondary schools (4.4%).

Students and teachers from the sampled secondary schools were conveniently sampled and were informed and asked for consent to participate in the survey. Twelve (12) students (6 males and 6 females) and three (3) teachers including the head teacher were interviewed in each secondary school. In total 532 students (263 males and 269 females), 90 teachers (60 males and 30 females) and 42 head teachers (33 males and 9 females) were interviewed from 9 January 2022 to 27 May 2022. The questionnaire was initially written in English and then translated into Chichewa, the main local language to enhance understanding during interviews. The research assistants were graduates from Mzuzu University and Malawi University of Science and Technology. The variables that were studied and included in the questionnaire for learners, teachers and head teachers are provided as supplementary materials in Annex 1.

2.3 Data Analysis

Data were analyzed using Stata 17. Stata is a software suite that provides a range of tools for data management and statistical analysis. It offers a variety of features that were used in this study including data management, data visualization, descriptive statistics, and inferential statistics among other features. Spatial analysis was done in Stata using GIS boundary information and spatial data from study dataset to produce choropleth maps. The maps were produced to show patterns, distribution and interactions of the data across the districts to gain insights based on geographic context.

The study employed descriptive statistics supported by Student t-test and Pearson chi-square, to analyse factors affecting female enrolment in STEM education. Furthermore, geospatial analysis was conducted to explore regional variation to inform policy on interventions necessary to support secondary schools.

3. Results and Discussion

3.1 Who are the Learners and Teachers in Malawian Secondary Schools

Table 1 has results on who are the learners. The majority (52.8%) of learners (66.7% males and 33.3% females) are aged between 18-21 years followed by those aged 14-17 (45.1%) whereby 60.8% were females and 29.5% were males).

Table 1 Social demographics of sampled students

		Community Day		Faith Based	Private		Public		Total
		Rural %	Urban %		Rural %	Urban %	Rural %	Urban %	
Gender	Male	47.7	50.0	38.9	47.8	49.4	52.1	50.3	49.4
	Female	52.3	50.0	61.9	52.2	50.6	47.9	49.7	50.6

Age	14-17	35.4	42.4	61.1	39.1	39.5	35.4	54.8	45.1
	18-21	56.9	56.8	38.9	60.9	56.8	64.6	44.1	52.8
	22-25	7.7	0.9	0.0	0.0	3.7	0.0	1.1	2.1
Main source of income for head of households	Business	27.7	34.8	50.0	39.1	29.6	27.1	23.5	29.3
	Farming	46.2	17.8	0.0	17.4	13.6	31.3	27.4	24.4
	Formal employment	15.4	35.6	38.9	34.8	46.9	33.3	41.3	36.7
	Informal employment	3.1	8.5	5.6	8.7	4.9	8.3	4.8	5.8
	Others	7.7	3.4	5.6	0.0	4.9	0.0	3.4	3.8
Highest qualification of head of household	Primary	40.0	22.9	11.1	13.0	14.8	31.3	18.4	22.2
	Junior Secondary	15.4	11.0	11.1	4.4	7.4	12.5	6.2	9.2
	Senior Secondary	24.6	33.9	55.6	34.8	34.6	14.6	34.1	32.0
	Tertiary (University)	13.9	21.2	22.2	39.1	29.6	29.2	29.6	25.9
	No idea	3.1	9.3	0.0	8.7	9.9	4.2	8.9	7.7

These results show that despite reported low gender disparities in Malawian primary schools, as the learners progress to senior classes the ratio turns with more male learners than female learners (NSO, 2017). According to literature, underrepresentation of girls in secondary schools in Malawi is caused by socio-cultural factors, financial constraints, access to schools, early marriage and pregnancy, and discrimination and biases (UNFPA, 2022; Lovell, 2021; Malongo, 2016). In terms of enrolment versus type and location of secondary school, the study found that the majority (28.3%) of learners are in public schools located in urban areas. These are followed by community day urban (24.5%) private urban (22.3%) and community day rural (11.8%) whilst public rural had fewer students (3.8%). Most of the female learners were enrolled in public urban (14.0%), community day urban (12.1%), and private urban (11.3%). Public rural schools tend to lack appropriate infrastructure as well as teachers. The living standards for teachers also affects teacher availability with lack of energy as part of the challenge.

Most learners come from male headed households (72.5%) compared to those from female headed households (27.5%). It was further observed that most of learners' parents (29.1%) have secondary school education followed by those with tertiary education (28%) and

primary education (22.5%). The main source of income for their guardians/parents is formal employment (38.2%) followed by farming (23.4%). The results show that there is gender gap in female learners in rural areas versus those in urban areas (**Pearson $\chi^2(1) = 0.0021$**). This gender disparity is alarming, especially as STEM careers are often referred to as the jobs of the future, driving innovation, social wellbeing, inclusive growth and sustainable development (UNESCO, 2023).

Since STEM education is crucial for sustainable development, there is need for policy intervention and implementation of different initiatives to address these gender disparities and attract female educators pursue STEM career (UNICEF, 2020). Furthermore, due to the variation in learners social-economic background, the initiatives have to be made in such a way that all parents get engaged to render support to their children education (UNESCO, 2020; OECD, 2016). Digitization can enhance information flow and participation of parents through an inclusive digital portal accessible through feature phones, smart phones, radio programs and other means. The tools may further promote diverse contribution, information sharing on different opportunities and offer equal education and opportunities to all (Anastasiou & Papagianni, 2020).

3.2 Typical Landscape and Contexts of Secondary Schools in Malawi

Results (see Table 2) show that most (71.2%) teachers in secondary schools visited have a bachelors degree as their highest qualification followed by those with diplomas (23.4%). Only four teachers (10%) of the 90 consulted had a masters degree with few teachers having Malawi School Certificate of Education (equivalent to O-levels). There were more (79%) male teachers especially in the centre (31%) and the north (29%) compared to the south (19%). In terms of age, the results show that more teachers (62%) have over 50 years of age followed by those in the age range of 35-39 years. Most of there were teaching Mathematics (51.1%), Chemistry (45%), Biology (36.7%) and Physics (35.5%). Only 6.6% and 1.1% were teaching computer studies and Additional Mathematics respectively.

Table 2 Social demographics of sampled teachers

		Community Day		Faith Based	Private		Public		Total
		Rural %	Urban %		Rural %	Urban %	Rural %	Urban %	
Gender	Female	12.5	35.3	25.0	50.0	15.4	41.2	40.7	33.3
	Male	87.5	64.7	75.0	50.0	84.6	58.8	59.3	66.7
Highest qualification	Bachelors Degree	37.5	58.8	50.0	75.0	76.9	76.5	85.2	71.1
	Diploma	50.0	35.3	50.0	0.0	23.1	17.7	11.1	23.3
	MSCE	12.5	5.9	0.0	0.0	0.0	0.0	0.0	2.2
	Masters	0.0	0.0	0.0	0.0	0.0	0.0	3.7	1.1
	Teaching	0.0	0.0	0.0	25.0	0.0	5.9	0.0	2.2

		Certificate								
Aware of NESP	Yes	50.0	35.3	75.0	0.0	15.4	35.9	44.4	36.6	
	No	50.0	64.7	25.0	100.0	84.6	64.7	55.6	63.3	
Training In STEM& Sanitation	Yes	75.0	70.6	75.0	50.0	53.9	64.7	66.7	65.5	
	No	25.0	29.4	25.0	50.0	46.2	35.3	33.3	34.4	

Most of the teachers (51.1%) have attached STEM education and they teach mathematics (51.1%) followed by chemistry (45.4%) and physics 35.5%. Few of them are teaching computer studies (6.6%) and additional mathematics (1.1%).

In terms of age, the study found that these children are being taught by teachers who are 50 years old and above (62%) followed by those aged between 35-39 years (17%). Policy need to support professional development, monitor and evaluate the gap in teachers' expertise and inform teachers in a convenient way to be aware of education policies. Utilising emerging technologies would optimise teaching practices and enhance overall students' outcome (UNESCO, 2015; Kim et al., 2022).

3.3 Factors Hindering Access to STEM Education by Learners

Results show that 69.2% of the sampled students agreed that lack of or insufficient learning facilities such as laboratories, affect enrollment in STEM education. The results further show that 77.4 % of the students perceive that pressure from peers highly affects enrollment of females into STEM education whilst 52.6% and 47.6% indicated that shortage of qualified teachers and teachers' attitude towards females, affect enrollment of female students into STEM subjects respectively. Figure 2(a-d) shows a geographical variation of the constraints across surveyed districts.

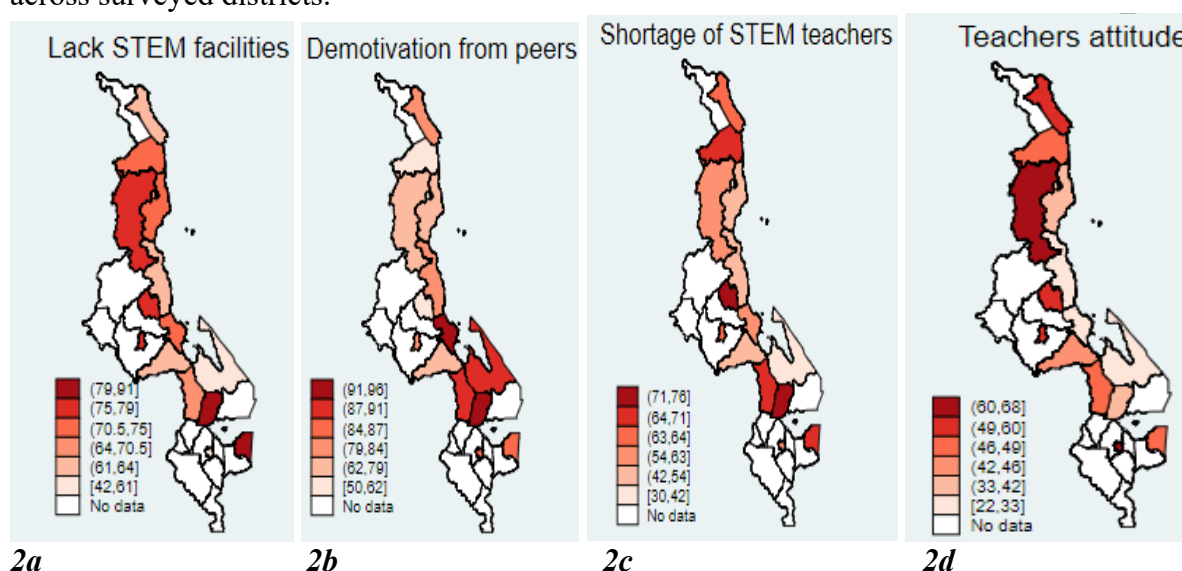


Figure 2 Factors hindering access to STEM education

The most significant geographical variation came in from the problem of lack of facilities (p-value =0.019), demotivation from pressure (p-value =0.00), and shortage of qualified teachers

(p-value =0.02). Based on the surveyed districts the problem of lack of insufficient facilities registered high in Balaka, Salima and Ntcheu (2a); whilst demotivation from peers registered high in Mangochi, Balaka, Ntcheu, Zomba, and Salima, (2b); shortage of qualified teachers registered high in Ntchisi, Balaka and Rumphu (2c) and the problem of attitude of teachers towards female students registered high in Mzimba (2d).

UNICEF reported similar results on various factors including lack of resources social-cultural norms, financial constraints, limited access to schools, early pregnancy and early marriages contributing to high number of males than female learners in Malawian secondary schools (UNICEF, 2021). To address these gender disparities there is need of policy support in promoting stakeholder engagement and utilizing available resources. Among other stakeholders' parents are key in supporting inclusive education (Dollinger et al., 2022). Currently, parents are mostly involved through the Teacher-Parent Association whose mandate is limited to quality education especially for a girl child (GOM, 2017). There is need for a proper tool that includes them to get actively engaged in education monitoring. Digital tools can be utilized as a means to enhance parental involvement and communication to allow parents to play an active role in their children education to support teachers (Anastasiou et al, 2020). Apart from parents, other organizations can easily collaborate through different projects to support STEM education and the system can provide information of schools getting support and underprivileged schools that need more support Cleland & Lumsdon, 2021).

3.4 Factors Hindering STEM Teaching Programming

Based on perceptions of surveyed teachers, 98% of the teachers agreed that there is lack of bridging programs while 74% agreed that there is need for STEM training to improve STEM education in secondary schools. Results show a significant variation in teachers' perception on factors hindering teaching programming (See Table 3). These findings are similar to other studies that emphasised the need for training and professional development for teachers (Vidakis et al., 2019; Ejiwale, 2013). According to Mervis (2011), an inspired teacher inspires students.

Table 3 Factors hindering teaching programming

Table 5.1 Factors hindering teaching programming									
Variable		CDSS		Faith	Private		Public		Total %
	Chi2								
		Rural %	Urban %	Based %	Rural %	Urban %	Rural %	Urban %	
Lack of bridging program	0.00	12.0	10.0	2.0	5.0	17.0	17.0	36.0	98.0
Lack of STEM training	0.07	10.0	7.0	5.0	2.0	5.0	17.0	29.0	74.0
Policy issues	0.08	4.0	7.0	2.0	0.0	0.0	8.0	12.0	33.0

The success of facilitating student's activities depends on how well STEM educators have been prepared for the challenges they will face in class. Therefore, there is need for more policy support as results show 50% of teachers agree that there are some policy issues that are

hindering STEM education. These results indicate a need for collaboration and networking opportunities for teachers. Digital tools can serve as a platform for dissemination of information on training opportunities, exchange programs, policy workshops to support all teachers in improving the provision of quality education. Furthermore, online resources can be easily shared to enhance knowledge and skills in STEM education (Perna et al, 2022).

4. Monitoring Framework for Inclusive STEM Education

Set against the results and within a broad context of growing economic, social and educational problems and a complex and sometimes, ineffectual institutional setting for an inclusive STEM education, understanding how different actors including guardians, teachers and education officials can help play a positive role in STEM education requires developing an integrated digital secondary school monitoring portal. Thus, it is of upmost relevant to allow key actors including guardians, teachers, educationists and policy makers to use modern monitoring application (MA) tools in STEM trends for inclusive education, especially in developing countries.

4.1 Current Gaps and Challenges on Existing STEM Portals

Despite efforts and interventions made in the development of existing STEM portals, the initiatives face several challenges and some gaps remain unexplored (OECD, 2016; UNESCO, 2022). Majority of the systems available offer online resources and support to students and teachers (OECD, 2020). Current available STEM platforms include Khan academy, Ghana STEM school portal, TEDEd, NASA STEM Engagement, among others. In Malawi students lack access to online resources and in many cases the content available differ from the local curriculum (UNESCO, 2022; GOM, 2019). Many public secondary schools in Malawi do not have websites and students portal. This leaves them at a disadvantage from communicating to the international community for possible collaboration and joint projects.

4.2 Components of the Proposed System to Address the Gaps

The proposed tool contains different features for different end-users including students, teachers, guardians, policy makers and development partners. The first component is the students profile which contains students demographic and academic information, to understand the heterogeneous interest of students and their personal goals for easy provisions of necessary support. The second component is the student grades that show performance of the students in different subjects and enables understanding students' strength and weaknesses of students across subjects. The third component is fees and financials, which shows fees payments and balance and provides information for available financial support for different needy students.

The other component is the enrollment information which provides summaries of students' enrollment in different subjects across classes, schools, region and at national level. The syllabus component provides clarity for relevant information of what is supposed to be covered in different subjects to help in planning. Institutions component provides for contacts for linkage to different institutions that provide services in the education sector. The feedback component provides for engagement and reviews for various programs to get feedback for possible improvements. Settings enable users to set preferred privacy priorities and users can

sign in as students, guardians, teachers, institution representative and administrators to access policy dashboard.

4.3 Functions of the Tool

The system is proposed to perform the following functions: signing up and log in as different users with two-factor authentication; creation of profiles and linking databases between students, teachers, guardians and school administration. Furthermore, the system may serve as a communication hub between students, teachers, parents, and the wider school community and provide a great wealth of information about the schools' mission, vision, policies, and projects. In addition to that information on enrollment, school calendar, and students' performance may be shared and lastly generation of report cards. Different features will be made available based on roles of different users of the system.

The tool will create an enabling environment for quality education by generating evidence on quality of teaching and learning and ensuring gender balance in enrollment. Furthermore, the intervention will promote governance with insights generated from the available data.

4.4 Information to be Generated

Among other useful data, the system will generate real-time enrollment data, student performance data, students and teachers' profiles to help in monitoring and evaluation of different programs and provide for national feedback data on what needs to change or improve (OECD, 2016). The development may assist in adjusting projects and programs and allow easy collaborations among institutions.

4.5 Application of the Portal

The tool will enable tracking female enrolment in different schools for possible policy interventions to archive gender gaps in STEM education. Using available APIs and machine learning tools different trends will be analysed across years or terms to generate insights on the variation and determinants of different factors bringing in the variations in STEM education (Baker & Uckelman, 2018). Furthermore, the tool will facilitate communication between teachers, students, and parents to enhance accountability and transparency in education delivery and to encourage collaboration among different stakeholders (Schleicher, 2018; OECD, 2019). The system will generate notifications for various profiles that have the opportunity for certain scholarships and grants.

The tool will also generate real-time data for informed policy decision making with regards to national target (World Bank, 2021). This information may provide a bases from which schools can learn from each other and overall learning what works and what doesn't from ongoing initiatives. Lastly the tool may help in facilitating national planning and resource allocation to fit in current gaps.

5. Conclusion

Our argument is that the STEM tool will help in monitoring students' enrollment and performance in STEM education from Form 1 to Form 4 and will generate information for policy makers and all stakeholders in education sector. The platform will create an enabling environment to facilitate quality education, promoting human capacity with regards to gender

in STEM education and enhance collaboration among organization in promoting STEM education at national and global level.

The tool will be accessible through different convenient and secured platforms i.e., website, mobile application, SMS and USSD or Call service for relevant Stakeholders including parents to be informed of the current trends on students' education for appropriate interventions and support. Apart from informing policy, the tool will enable parents or guardians to register with respective secondary schools to be able to keep track and monitor performance for better parental advice or initiatives. With a proper system in place, students with special talents may be identified, teachers and schools may also learn from each other in forums based on the generated data.

At the national level, students' enrollment and performance data will be readily available for all relevant stakeholders. Through a secured portal, head teachers will be able to upload consolidated results and access data insights through a dashboard. Different funding opportunities or events will also be shared through the platform for the schools and students. This will enable interested organizations to collaborate in joint programs for bigger impact. Conceptual frameworks have been used by researchers, development agencies and governments for decades to understand everything from interaction of poverty and environment and the links between ecosystems and social systems (Parkes *et al.*, 2003); and the importance of community participation in decision making (Ellis, 2000).

Other frameworks have utilised indigenous knowledge to understand scientific research problems (Jarvelin and Wilson, 2003), while the majority have been used by scientists to generate new ideas and concepts on issues affecting the human kind (Downs, 2007). These are constructed in order to present information logically (Midgley, 2007) and they capture the essential concepts of systems (e.g. function, system and requirement) and guide in understanding the outputs and outcomes of the systems.

A conceptual framework for advancing inclusive STEM education monitoring, however, seems to be missing. As such, government programmes and resource allocation are based on learning from other sectors. While findings have revealed several institutional and structure gaps for STEM education, actors are lacking a proper framework that clearly help to shape roles and functions of different actors to support female learners.

Acknowledgements

This work was possible with funding from the National Academy of Sciences through the Partnership for Enhanced Engagement in Research grant. The ethics approval for this study was obtained from Mzuzu University Research Ethics Committee (MZUNIREC).

References

- Anastasiou, S. & Papagianni, Aggeliki. (2020). Parents', Teachers' and Principals' Views on Parental Involvement in Secondary Education Schools in Greece. *Education Sciences*. 9. 69. 10.3390/educsci10030069.
- Ayalon, H. L. (2013). Educational standardization and gender differences in mathematics achievement: A comparative study. *Sage*, 432–445.
- Baker, M. a. (2013). Boy-girl differences in parental time investments: evidence from three countries. *National Bureau of Economic Research (NBER)*, <http://www.nber.org/papers/w18893>
- Besold, T. R. & Uckelman, S. L. (2018). Normative and descriptive rationality: From nature to artifice and back. *Journal of Experimental & Theoretical Artificial Intelligence*, 30(20), 331-344. doi: 10.1080/0952813X.2018.1430860
- Cleland, Jonathan & Lumsdon, David. (2021). How can school – parental participation support the generation of social capital for parents? *Educational and Child Psychology*. 38. 19-39. 10.53841/bpsecp.2021.38.2.19.
- Dollinger, Mollie & Harvey, Andrew & Naylor, Ryan & Mahat, Marian & D'Angelo, Belinda. (2022). A student-centred approach: Understanding higher education pathways through co-design.
- Eagly, A. H. (2012). Social role theory,” in *Handbook of Theories of Social Psychology*, Thousand Oaks, CA: Sage.
- Else-Quest, N. M. (2010). Cross-national patterns of gender differences in mathematics: a meta-analysis. *Psychol. Bull.*, 136, 103–127. doi: 10.1037/a0018053
- Elson & Seth. (2019). Gender equality and inclusive growth: economic policies to achieve sustainable development. NY: UN Women.
- GOM (2017). Girls’ Primary and Secondary Education in Malawi: Sector Review Final Report: Ministry of Education Science and Technology, Lilongwe
- Hill Nancy (2022). Parental involvement in education: Toward a more inclusive understanding of parents’ role construction, 10.1080/00461520.2022.2129652,:*Educational Psychologist*
- Houjeir, R. & -K.-D. (2019). UAE Females in STEM higher education. *CASET*, 1-6. 10.1109/I.2019.8714543.
- Jennifer Dusdal, Justin J W Powell, Benefits, Motivations, and Challenges of International Collaborative Research: A Sociology of Science Case Study, *Science and Public Policy*, Volume 48, Issue 2, April 2021, Pages 235–245, <https://doi.org/10.1093/scipol/scab010>

- Kim, Insook & Ko, Bomna & Oh, Daekyun. (2022). Professional Development Policies and Practices for Developing Content Knowledge of Physical Education Teachers. *International Journal of Kinesiology in Higher Education*. 1-13. 10.1080/24711616.2022.2130843.
- Kurth, Jennifer & Miller, Amanda & Gross Toews, Samantha & Thompson, James. (2018). Inclusive Education: Perspectives on Implementation and Practice from International Experts. *Intellectual and developmental disabilities*. 56. 471-485. 10.1352/1934-9556-56.6.471.
- Miller, D. E. (2015). Women's representation in science predicts national gender-science stereotypes: evidence from 66 nations. *Journal of Education Psychology*., 107:631-644.
- Mohtar, L. &. (2019). A MODEL OF INTEREST IN STEM CAREERS AMONG SECONDARY SCHOOL STUDENTS. *Journal of Baltic Science Education*, 404-416.
- Moorhouse, E. (2017). Sex segregation by field of study and the influence of labor markets: Evidence from 39 countries. *International Journal of Comparative Sociology*, 58: 3–32.
- National Planning Commission (2020). Malawi 2063. Lilongwe: National Planning Commission
- Nosek, B. A. (2002). Math = male, me = female, therefore math ≠ me. *J. Pers. Soc.*, 83:44. doi: 10.1037/0022-3514.83.1.44
- OECD (2019). *Improving School Quality in Norway: The New Competence Development Model, Implementing Education Policies*, OECD Publishing, Paris, <https://doi.org/10.1787/179d4ded-en>
- OECD (2016). *Innovating Education and Educating for Innovation: The Power of Digital Technologies and Skills*, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264265097-en>
- OECD (2020). *The Pursuit of Gender Equality: An Uphill Battle* Paris: OECD Publishing.
- Perna, Johannes & Kanematsu, Hideyuki & Godoy, Michal & Zúñiga, Elisa & Pérez, Javiera & Cassot, Del & Carrasco, Eduardo & Tomljenovic, Marijana. (2022). OPEN ACCESS EDITED BY Development of digital and science, technology, engineering, and mathematics skills in chemistry teacher training. *Frontiers in Education*. 7. 10.3389/feduc.2022.932609.
- Schleicher, A. (2018). *World Class: How to Build a 21st-Century School System, Strong Performers and Successful Reformers in Education*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264300002-en>

Shaw, S. M., Bothwell, M., Furman, K., Gaines, L., John, D., Lopez, C., Osei-Kofi, N., Özkan-Haller, H. T., Plaza, D., Ruder, B., & Warner, R. L. (2019). Advancing women in STEM: institutional transformation. *Lancet (London, England)*, 393(10171), e17–e18. [https://doi.org/10.1016/S0140-6736\(19\)30206-5](https://doi.org/10.1016/S0140-6736(19)30206-5)

UNESCO (2023). Gender imbalances remain in digital skills and STEM careers. Accessed from <http://uis.unesco.org/en/blog/gender-imbalances-remain-digital-skills-stm-careers> on May 4th 2023

UNICEF (2021). UNICEF Annual Report 2021., Lilongwe, Malawi: United Nations Children's Fund (UNICEF).

Vargas-Tamez, C. (2019). Leaving no one behind: Bringing equity and inclusion back into education. In L. Tett & M. Hamilton (Eds.), *Resisting Neoliberalism in Education: Local, National and Transnational Perspectives* (pp. 239-252). Bristol University Press. doi:10.46

Locating Your Inclusive Practice: A Reflective Heuristic and Workshop

Anna Carissa Rozzo, University of Glasgow, United Kingdom

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Conceptions and theoretical understanding of what constitutes Inclusive Pedagogy abound (Hernández-Torrano et al., 2020; Hockings, 2010; Lawrie et al., 2017; Livingston-Galloway & Robinson-Neal, 2021). Furthermore, wide-ranging recommendations proliferate, complicating implementation. Building on the groundwork of Lewis and Norwich (2004) and that of Moriña (2020), the facilitator provides a heuristic for attendees to clarify their own conception, implementation, rationale, and context-specific iteration of Inclusive Pedagogy. Individuals in this participatory professional development workshop reflected on their own understandings of Inclusive Pedagogy while gaining clarity regarding their own theoretical, axiological, and disciplinary locations within Inclusive Pedagogy. This enabled participants to begin to evaluate their own context in order to articulate a specific approach to Inclusive Pedagogy and to share this positionality and professional practice with peers. The results of this participatory workshop demonstrate the potential of workshop-as-method for both data collection and the co-construction of knowledge among higher education professionals.

Keywords: Inclusive Pedagogy, Professional Practice, Reflection, Theory to Practice, Workshop as Methodology

iafor

The International Academic Forum
www.iafor.org

Introduction

The following article aims to document a professional development workshop designed to elucidate professional practice in Inclusive Pedagogy at The International Academic Forum's (IAFOR) Paris Conference on Education, held in June 2023. The objectives of the workshop were to aid the participants in concretising their conception of Inclusive Pedagogy and to critically reflect on their theoretical, axiological, and disciplinary positionality. The workshop employed a heuristic developed by the author (myself) to enable participants to evaluate their own contexts and articulate specific approaches or iterations of Inclusive Pedagogy. Finally, a shared learning artefact was created in the session that enabled attendees to share their professional practice with peers and the facilitator (also myself). While the goal of workshops such as this one is primarily professional development and idea sharing, the structure also presents the possibility for data capture that scholar-practitioners may consider.

Exploring Complexity

This workshop opened with an icebreaker, followed by moments of informational presentation punctuated with opportunities for individual reflection and audience participation. After an explanation of my heuristic, participants were invited to reflect and discuss, which led to whole group discussion and creation of the learning artefact. The participants (4) were all in professorial teaching roles; one professor from India (PhD) with 21 years of experience; one participant who obtained their¹ PhD in the previous year and was working as a professor in the UK; one EdD candidate from the US; and one faculty member and program director from the US working in the EU. What follows is both the workshop content and the participants' responses.

I began the workshop with a simple icebreaker asking the participants to articulate their conceptions of "inclusive pedagogy":

Participant 1: I'm in K-12 in America, and we use the term 'inclusive' in education. That means we're tailoring our services, our supports, to differing ability, the differing abilities in the population.

Participant 2: ...pedagogy or learning methods [that] take into consideration the differences in ability but also the differences of background and also the bias that goes with that and the perceptions...

Participant 3: ...my connotation is kind of similar. It's not just about ability, but it's also about cultural background, sometimes even religious background... So any lesson has to be in consideration with their backgrounds and being also careful with kind of the sensitivities that come with all of that.

Participant 4: It puts particular emphasis on the student, giving them equal rights.

Regarding inclusive pedagogy, there is a breadth of interpretation, a plurality of theoretical framings that practitioners draw from, and a wide range of suggestions for practice. According to Hernández-Torrano et. al. (2020), the field of inclusive education:

¹ "Their" is used for anonymisation.

... has been fragmented and has developed in multiple and varying directions, making it extremely challenging to harmonise the diversity of existing theoretical, conceptual, and methodological approaches into an integrated framework that enables the field to move forward. (p. 894-895)

Stentiford & Koutsouris (2021) critique the “inconsistency and fragmentation in the conceptual understandings and theoretical approaches,” arguing:

The discourse of inclusive pedagogies has become confused and confusing... the term lacks core meaning and, therefore, has little applied relevance for HE educators working on ground-level who might require coherent guidance as to how to improve their practice. (p. 2257)

For the sake of this presentation, I chose to define “inclusive pedagogy” as an umbrella term that denotes various teaching approaches that equitably attempt to serve and engage all students. Lawrie et al. (2017) claim, “Inclusion remains elusive, and opinions about how best to achieve it proliferate” (p. 9). In their literature review, Livingston-Galloway & Robinson-Neal (2021) conclude that “there is no consensus on what constitutes inclusive pedagogy in higher education (HE) or if inclusive pedagogy even exists in that space” (p. 29-30). These assessments are strongly critical of the field, questioning the feasibility of implementation or progression. This is due in part to the complexity of inclusive pedagogy in its meaning, theory, and practice.

Following this brief introduction, I presented visual examples of meaning and theory based on a selection of literature reviews (Hernández-Torrano et al., 2020; Hockings, 2010; Lawrie et al., 2017; Livingston-Galloway & Robinson-Neal, 2021; Moríña, 2020; Stentiford & Koutsouris, 2021; Tupan-Wenno et al., 2020).



Figure 1: Meanings Visual

Upon this slide, participants were afforded 20 seconds of quiet reflection and prompted with, “What do you notice? Is there a common thread?” One participant shared her observation: “The word ‘all’ is repeated multiple times in different kinds of ways.” In the UK, the term

“inclusive pedagogy” connotes a movement to mainstream instruction in public, often primary, education for all students, regardless of (dis)ability. This is executed by empowering teachers with training and development (Florian, 2008) as well as by supporting a “whole school” (Losberg & Zwozdiak-Myers, 2021, p. 16) approach to support learning in this environment. In this context, inclusion moves away from “special needs” to shift towards practices designed to serve all students (Florian, 2008). Inclusive Pedagogy in the US, by contrast, is primarily located within a DEI (Diversity, Equity, Inclusion) framework, with a strong focus on equity (ACUE, 2020; Danowitz & Tuitt, 2011; Hockings, 2010; Tupan-Wenno et al., 2020). (Equity will be addressed further below.) Inclusive Pedagogy is oriented towards creating learning opportunities that particularly support “underserved” (ACUE & SOVA, 2021; Finley & McNair, 2013) or “underrepresented” (Danowitz & Tuitt, 2011; Rapp & Corral-Granados, 2021) student populations. In their literature review of Inclusive Pedagogy, Hernández-Torrano et al. (2020) found “a stronger relationship with inclusive systems and structures rather than disability and special education” (p. 908). A shared emphasis between these two national contexts is that Inclusive Pedagogy is an approach aimed at supporting learning for all students (Florian, 2008; Florian & Black-Hawkins, 2011; Hockings, 2010; Sanger, 2020; Tupan-Wenno et al., 2020). Lawrie et al. (2017), in a review of recent Inclusive Pedagogy research, affirm inclusion endeavours to serve the whole learner and all learners. Likewise, Livingston-Galloway & Robinson-Neal (2021) assert that Inclusive Pedagogy “welcomes all learners and treats them as valuable citizens” (p. 31).

Another participant shared the concern that the “who” (a lack of specificity beyond teachers and students) was missing. Conceptions of inclusive pedagogy often centre the classroom as the locus of engagement. However, institutional and community views of inclusive pedagogy implementations advocate for a more holistic approach. Lawrie et al. (2017) call for enhanced awareness of “larger social, cultural, and institutional structures” and how they affect the classroom context (p. 15). Examples of this include campus policies (Whitehead, 2015), community engagement (Tupan-Wenno et al., 2020), and systematic faculty professional development (Iturbe-LaGrave et al., 2021; Moriña, 2020).

After this exchange, I presented a word cloud based on theory represented in the aforementioned literature reviews.

Theory Word Cloud



Figure 2: Theory Visual

Again, participants were afforded 20 seconds of quiet reflection and prompted with, “What do you notice? Which theoretical perspectives do you share? Would you add anything?”

Participant 2 reacted with, “It’s interesting. There’s one statement there I really don’t agree with: ‘inclusion is making difference invisible.’ I don’t agree with that... because it’s contradictory to children, but also to adults, when we say being different is ok, so why?”

The phrase in question reflects Stentiford & Koutsouris’ (2021) observation (p. 2254) of the conceptual tensions of inclusion between downplaying, masking, or reducing the need to address difference (e.g. Colourblindness, Universal Design for Learning) and actively addressing diverse needs (e.g. equity, differentiation). In the historical context of “special needs” (inclusive)² education, great effort was put forth in primary and secondary schools to destigmatize and mainstream previously differentiated students who had disabilities. It is from this perspective that Florian and Spratt (2013) “call for a response to individual differences between learners that avoids marking some students as different” (p. 121). In contrast, Lewis and Norwich (2004) recommend acknowledging the needs of all students, particular groups of students, and individual students. It is this latter framework that I incorporate into my conceptual heuristic below. Stentiford & Koutsouris’ (2021) categorise the multi-tiered needs perspective as “moderate” and Florian and Spratt’s (2013) as a “strong position of about (full) inclusion” (p. 2247). Like my workshop participant, I hold that it is possible to acknowledge specific group needs carefully to enhance learning while also avoiding marginalisation. This tension perhaps reflects the move away from equality as sameness and equality of access, towards equity of process and outcome. Much of the literature on Inclusive Pedagogy in the US emphasises the role of equity to repair disparity (ACUE & SOVA, 2021; Hockings, 2010; Hogan & Sathy, 2022; Tupan-Wenno et al., 2020). To do so necessitates acknowledging differences as integral to the process of supporting the success of all students.

² “Inclusive” is preferred, as the term “special” denotes euphemism and the very stigmatization the movement seeks to address.”

Another participant was surprised that Learning Sciences were not represented, citing the “cognitive connection” between culturally responsive teaching and the brain (Hammond, 2015). Likewise, I would have added Social Reproduction (Bourdieu & Passeron, 1990), Gender Theory, and Queer Theory to the visual snapshot had they been more emphasised across literature reviews. Allusions to these include (Hernández-Torrano et al., 2020; Hockings, 2010; Lawrie et al., 2017; Livingston-Galloway & Robinson-Neal, 2021; Moriña, 2020; Stentiford & Koutsouris, 2021; Tupan-Wenno et al., 2020)(2021), who cite “racial, gender, and class prejudices” (p. 39), and Tupan-Wenno et al. (2020) who assert:

Dimensions such as socioeconomic background, gender, religion, (mental) health and so forth can create divisions in education systems and in society and must therefore be considered carefully, while bearing in mind the reality of how these identities manifest in different educational institutions. (p. 14)

Next, I prompted practitioners to consider recommendations for practice. Examples in the following word cloud were gleaned from previously mentioned literature reviews (Hernández-Torrano et al., 2020; Hockings, 2010; Lawrie et al., 2017; Livingston-Galloway & Robinson-Neal, 2021; Moriña, 2020; Stentiford & Koutsouris, 2021; Tupan-Wenno et al., 2020) as well as HE teacher resources, *Inclusive and Equitable Teaching ACUE Curriculum Crosswalk* (2020), Sanger (2020), and Hogan & Sathy (2022).

Practice Word Cloud



Figure 3: Practise Visual

After considering this slide, participants shared the following observations:

Participant 2: I’m starting to pull out more of the impact of environments that may not be at least intentionally inclusive, like, for example, conflict management or managing microaggressions... So it’s the policies that are in place and that aren’t working or that need different skill sets to manage to allow open conversation to happen.

Ecological language is often present in the recommendations for Inclusive Pedagogy that evokes “spaces” and the “environment,” often pertaining to classroom management. Hockings (2010) frames her evaluation of inclusive teaching and learning in terms of

“environment” and to a lesser extent “climate” throughout her literature review. Sanger (2020) makes her recommendations within the context of “diverse learning environments” (p. 60) and Hogan & Sathy (2022) discuss the classroom in terms of the inclusive and “noninclusive environment” (p. 87).

Ambrose et al. (2010) describe inclusivity as a “climate” (p. 170) culminating from a variety of factors such as “faculty-student interaction” (p. 170), classroom composition, and content choices. Arao & Clemens (2013) interrogate the comprehensiveness of the term “safe space” and propose “brave space” instead, from their case-study work using training that “intentionally pushes the boundaries of the participants’ comfort zones” (p. 137). Similar to Ambrose et al. (2010), the emphasis is on cultivating a “learning environment” (p. 138) through norm-setting, with an acknowledgement that social justice and privilege are not easily navigable. Smith & Felch (2016) invoke metaphorical settings for teaching: journeys and pilgrimages; gardens and wilderness; and buildings and walls. The spatial notion of a garden or a room with walls invites the instructor to conceptualise the process of cultivating or constructing not only the learning process but also the community. Inclusive Pedagogy creatively and critically considers the context, the content, and the learner(s). Participant 2’s comment points to the need to proactively build the learning environment rather than (only) reacting once an offence has occurred. Participant 1 made further comments on this topic:

Participant 1: I don’t see empowering or including space for dialogical conversation.

Facilitator: Like intergroup dialogue?

Participant 1: And, taking it one step further, having opposing viewpoints and creating the knowledge and a deeper understanding because of those viewpoints... It’s not just about argument, disagreement but then discourse and dialogue and dialectical thinking and that space.

This goes beyond norm-setting in a contentious discussion, towards fostering cognitive flexibility and a posture of learning from the other.

A Heuristic for Inclusive Pedagogy

Finally, my observation is that the above recommendations for implementing Inclusive Pedagogy fall into two categories: general teaching guidance and inclusivity-specific practices. Moriña (2020a) raises the question of whether these practices and recommendations necessarily fall under “inclusive pedagogy” or more elementally draw from “sound professional knowledge” (p. 142). Among the recommendations for Inclusive Pedagogy could be considered general teaching guidance are applying a student-centred philosophy; active-learning; and Andragogic principles to the classroom. Many of the recommendations in the *Inclusive and Equitable Teaching ACUE Curriculum Crosswalk* ((2020) pertain to teaching approaches generally, such as formulating clear objectives; student-centred instruction (self-directed learning, active learning, collaborative learning, discussions, group work); expressing clear expectations (directions, rubrics, syllabi, exemplars, civil norms, feedback); aligning objectives and assessment; and implementing transparent and formative assessment. This is a helpful guide of teaching techniques often presented at the initial teacher education stage (“learning students names”, p.10) with additional cultural sensitivity tips. This document is often cited on university websites in the US as a key framework; however, with the exception of providing diverse representation in

the curriculum, microaggression management, and implicit bias awareness raising, the bulk of the advice pertains to teaching generally. Likewise, in Hockings' (2010) review of inclusive pedagogy, many of the recommendations were in line with a student-centred, adult learning approach.

Inclusivity-specific practices are recommendations and approaches within Inclusive Pedagogy literature that target serving the needs of all, some, and individual students (Stentiford & Koutsouris, 2021) with particular intentionality towards diversity, equity, and inclusion in classrooms and institutions. These range from cultural sensitivity to faculty professional development. The loci of engagement for these recommendations reside in individual instructors, classroom management and design, professional development, and institutional strategies. Individual instructors might consider their positionality in society generally, as well as in relation to their institutional context and the students they serve (Dewsbury et al., 2022) as a clearer view of one's socio-economic standing could lead to a deeper understanding of structural and systemic factors affecting students. Related to reflexive awareness is implicit or unconscious bias raising (ACUE, 2020; Dewsbury et al., 2022) which may elucidate cultural differences in the classroom community and produce fairer outcomes. To that end, Sanger (2020) recommends instructor introspection regarding cultural views and expressions of conflict. Similarly, teachers should be able to identify and address stereotypes and microaggressions (ACUE, 2020; Barnett, 2020; Hogan & Sathy, 2022; Sanger, 2020) as they arise in the classroom. Finally, and related to "mindset," teachers need to shift their perspective away from deficit-thinking (Hockings, 2010; Hogan & Sathy, 2022; Livingston-Galloway & Robinson-Neal, 2021; Sanger, 2020; Tupan-Wenno et al., 2020) towards a cultural asset view (Yosso, 2005).

This twofold approach is likely due to 1) a systematic lack of teacher training among US faculty (ACUE & SOVA, 2021; Iturbe-LaGrave et al., 2021; Pallas et al., 2017) leading to a felt need to offer remedial professional guidance, and 2) the mounting evidence that active and student-centred learning advances the success of students of colour (Dewsbury et al., 2022; Eddy & Hogan, 2014; Finley & McNair, 2013; Theobald et al., 2020).

With such diversity in interpretation and range of suggestions for practice, how might practitioners approach this in a contextualised (one description of Inclusive Pedagogy itself) and reflexive manner? How might they assess their own progress, that of others, and that of institutions? What frameworks could they use in research? My heuristic presents a self-reflective, iterative approach to engaging with these questions.

My heuristic: What, Why, How, Where

Relatively Constant		Context Specific	
What	Why	How	Where
Definitions, understandings, conceptual frameworks	Normative or sociological rationale	Recommendations for practice, implementation; Pedagogical tools and teaching philosophies	Locus of engagement; disciplinary home and/or Theoretical base
<ul style="list-style-type: none"> Student Perspective: <u>All. Some. One</u> (Stentiford & Koutsouris, 2021 citing Lewis & Norwich, 2004)	rights-based; addressing sociological inequality; equity as moral principle	e.g., student-centred teaching, representation in the curriculum	e.g., classroom, institutions, community, systems
<ul style="list-style-type: none"> Teacher Perspective: <u>Beliefs. Knowledge. Action. Design</u> (Moriña, 2020)			e.g. CRT, Gender Studies, Disability Studies

Figure 4: My heuristic of Inclusive Pedagogy theory and practice

What- *two-pronged consideration of student needs and teacher professional output. From the student perspective*, Lewis & Norwich (2004) (as cited in Stentiford and Koutsouris (2021) and Livingston-Galloway & Robinson-Neal (2021)) present a helpful framing: The needs of all students, the needs of some students, and the needs of a particular student. I give an example of this model with first-generation college students below. *From the teacher perspective*, Moriña (2020), drawing on Rouse (2008) and others, asserts that inclusive pedagogy can be described and captured by teacher beliefs, knowledge, and actions. She adds “design” to acknowledge planning and careful intentionality. Key ideas include: teachers believe that all students are capable of success; they know about their students, their needs, and appropriate teaching and assessment methods; and they plan and take actions accordingly to support student learning.

Why- *normative or axiological reasoning for one’s practice.* This is usually based on some kind of moral imperative such as universal right to education, democratic equality, or equity as a reparative measure to address sociological inequality. For example, in the United States, the school funding system results in de-facto segregated schools. Students of colour are more likely to have unqualified or inexperienced teachers and are less likely to have university preparatory coursework or guidance compared to their white peers (Chiu & Khoo, 2005; Clotfelter et al., 2005; Harper & Griffin, 2010; Mickelson et al., 2013). Measures, such as inclusive pedagogy, are thus required to counter racial injustice.

These aspects of the framework (what and why) are relatively constant, though participants were encouraged to personalise and critically reflect (see Appendix A- Participant Handout).

How- *one’s chosen methodology.* As discussed, there is a catalogue of options ranging from classroom strategies to organisational change management. Participants were encouraged to explore this further at a later point in the workshop.

Where- *two-pronged consideration of one's theoretical base and one's locus of engagement.* Theoretically, for the de-facto segregated school scenario for example, one might consider interrupting social reproduction ((Bourdieu & Passeron, 1990) or addressing institutional racism (Ladson-Billings, 2006). Additionally, participants were invited to consider their location of practice and spheres of influence (e.g. classroom, department, institution, community, systems).

In this heuristic, the *what* and *why* are more or less constant while the *how* and *where* are context and need dependent. For example, some first-generation university students drop out of school because of different cultural capital and a perceived lack belonging in the campus community (Lehmann, 2007). What: While all students need a sense of belonging and community, this particular group has a heightened need for support (Phinney & Haas, 2003; Stephens et al., 2012) and individual students may need more explicit explanations of course tasks in the classroom (Collier & Morgan, 2008). Stakeholders and faculty require knowledge of these needs and the belief that first-generation students are capable of success despite these challenges. Administrators may need to shift their operational model from “college-ready” expectations to an institutional mindset of “student-ready” (Whitley et al., 2018). Why: The larger aim is to address the inequality of low access and high attrition rates of first-generation students based on class or intersectional factors (Beattie, 2018). Where: The application of these efforts will likely be affected by the academic department, type of institution, and the location of the institution. Serving first-generation college students may theoretically fall under Bourdesian studies of class, cultural capital, habitus, etc. The loci of engagement might take place in the classroom, in office hours, in the dormitories, and in offices of student support on campus. How: This may come in the form of explicit, tailored support for first-generation students such as extra orientation, mentoring, peer support, and extended office hours as well as specialised and expanded financial aid options (Whitley et al., 2018). Just as the how and the where are context-dependent, the inputs (what is required, e.g., teacher training) and outcomes (the desired results, e.g., increased retention) will likely differ based on the how and the where.

In response to this heuristic, Participant 1 shared the similarity in philosophy and approach between Lewis and Norwich's (2004) needs framing and the California Department of Education's Multi-Tiered System of Supports (2023).

Participant 1: ...where all students receive, like, we're all going to say good morning, greet; some students need an extra check-in; and then there's that top 5-10% that need, like, 'Let's check in after school so I can understand how I can support you.'

Participants were then given 2 minutes of quiet reflection with the critical prompts on the handout and 8 minutes to discuss with their peers in pairs. Following a lively discussion period, we resumed the whole group conversation to share and process. This was aided by an online sticky-note board with columns for each *what*, *why*, *where*, *how* category, which both the facilitator and participants had access to. The facilitator also transcribed ideas as participants shared. Participants discussed the need to make expectations clear to students at the start of the course, and shifting language from “office hours” to “student hours” citing student hesitancy with the former. This suggestion was balanced with the need to maintain professional boundaries with students who may or may not respect appointments. They also discussed the need to understand students' backgrounds both in discipline and culture and how learning can be “catered” to their needs. Finally, “Deweyism” as a teaching approach informed one participant's “*what*” with the role of “true reflection connecting to experience”

and the intentional time it takes to cultivate. For the *why* participants mentioned mutuality, compassion, equity, anti-elitism, and modelling self-efficacy as the teacher. (See learning artefact).

Following this initial reflection and discussion period with the heuristic, the facilitator prompted the group to focus on the contextualised element of *where* (*locus of engagement*). The participants recognised the influence the title “doctor” or “professor” can hold and carefully considered power implications, acknowledging inherent hierarchy while welding it to open doors.

Participant 1: It’s the role, the title as ‘professor,’ that I see as also ‘influencer’ and I’m very aware of that. and it’s a position that we are able to influence others and I need to make sure I’m acting out of a place of integrity.

Participant 2 uses their position as degree director to forge “community partnerships” and ensure better representation in their program. *Participant 4* uses their position to ensure students participate in extracurricular activities. *Participant 3* considered how their title can also support “community engagement” in the classrooms and in their research.

Next, I prompted the group to focus on the contextualised element of *how* and to consider general teaching guidance, inclusivity-specific recommendations and approaches based on their loci of engagement. The group engaged in further ideation and populated the online idea board with several strategies. These included pedagogical training, self-reflection, peer evaluation, experiential learning, increased collegial dialogue, and fostering criticality.

Final reflections on the engagement include the appreciation of hearing others’ perspectives outside of one’s geographical region, and the intentional self-reflection aspect of the activity.

Participant 2: I think what’s nice is to do this consciously. A lot of times we do this on-site or we just kind of just do it. But I think this time now, the need, this is what I do, this is the reason why I do it. It would be nice to see this conscious conversation in the bigger context of where we work.

Participant 3: I agree because, as you said, most of us when we work, we just do it normally without even thinking about it. And sometimes it’s because it’s a norm that comes from above, that it’s a policy, institutional level. And you have to do it until you do it in the best way that you can, but without really thinking about why. I think self-reflection is always really important.

As for actionable next steps, *Participant 3* planned on bringing the conversation back to their department to pose the question, “When we do our planning, are we thinking about this?” *Participant 2* stated, “I’m actually going to take the conversation back to the students. Just so that they’re more conscious of the approaches and why and also so that they have a constant space to just talk about that.”

I attained all participants’ permissions to record the session before I began the workshop. I used an AI transcribing software to transcribe the recording and manually edited the transcript for accuracy against the audio. This workshop was designed to not only be professionally supportive to the attendees, but also to glean insights into practitioners’ thoughts and challenges, which may inform and build sensitivities in further research. This

workshop may be replicated by instructional coaches and academic developers in other contexts to support faculty self-reflection. Finally, this workshop lends itself to more formal data collection in the future.

Workshop as Method

While Denzin & Lincoln's (2017) tome does not designate a particular chapter to workshop-as-method, workshops exist in and serve a variety of contexts and purposes. These include sources of insight, idea generation, process artefacts, and ethnographic data collection. Lincoln et al. (2018) cite a "workshop participant in the early 1980s" who helped capture the essence of "illegitimate questions" with the phrase "Catholic questions directed to a Methodist audience" (p. 234). Krog (2018) gained a clearer understanding of participants outside of the researchers' experience and culture in South Africa by attending workshops. Spry (2018) developed a deepened reflexivity and sense of relational positionality as a researcher as a result of a workshop. Workshops were the method of ideation among colleagues which led to the formation and emergence of Critical Race Theory (CRT) (Donnor & Ladson-Billings, 2018). Wyatt et al. (2018) facilitated "collaborative writing" to elicit "collective biographies" (p.1280). Torre et al. (2018) engaged in a participatory action research-based "mapping process" aimed at examining social, environmental, and political obstacles to "refugee return" (p. 879). Workshops can provide a means of producing new ideas, processes, and artefacts. They can inform researcher identity and sensitivity to both participants and subject matter. The workshop format can also serve as the data collection method itself, providing participants novel or less restrained opportunities for self-expression. Workshops present the potential to be co-constructive, as a tool and extension of the researcher, to generate ideas and knowledge in situ, collaboratively with the participants.

Workshops support both ideation and innovation among practitioners. This is particularly valuable amidst contested and multifarious conceptions of Inclusive Pedagogy that may have direct implications for professional practice. Much of the literature provided is aimed at academic staff as remedial or instructive, rather than produced by practitioners on the ground. Workshops can flip this script, allowing for a more organic barometer of real practices and challenges that empower participants to express situated meanings. Workshops re-centre the practitioner from audience to co-author to articulate what the *what* looks like to them in their contexts. As Charmaz et al. (2018) put it, "[W]e conduct research *with* our participants instead of *on* them" (p. 758). Another potential feature of the workshop is knowledge co-creation and dissemination. This workshop was designed to support self-reflection, and a pleasantly unintended extension of the workshop was the participants' plans to continue this reflective conversation with their colleagues and students.

Certain limitations should be considered. In the context of an interview, the researcher, however reflexive, retains a majority power share in conducting the conversation. They choose the questions posed, the follow-up prerogatives, when to end the engagement, etc. In a workshop format, participants have more autonomy and perhaps more authenticity to explore ideas most interesting or important to them (Ørngreen & Levinsen, 2017). These may diverge from the researcher's initial research questions and the paths to apparent tangents may appear unclear as the researcher can not be fully privy to multiple synchronous discussions. This may be mitigated by recording and transcribing each individual group's conversation (though this may impede the free flow of ideas- feeling self-conscious, slower turn-taking) and/or inviting additional researchers to be in the room. The researcher must decide if the additional measures contribute to the richness of data and outweigh risks of reducing the naturalness of

participant interaction and expression. The research must consider and deliberate on this dimension of data collection. The degree of researcher control may be less of a limitation than a potential reflexive choice. As Charmaz et al. (2018) state, “Enacting a reflexive stance can mean risking vulnerability, relinquishing control, embarking on an uncertain path, and embracing ambiguities” (p. 758).

Conclusion

Inclusive Pedagogy has been described as “confusing” (Stentiford & Koutsouris, 2021, p. 2257) and “elusive” (Lawrie et al., 2017, p. 9; Livingston-Galloway & Robinson-Neal, 2021, p. 30; Stentiford & Koutsouris, 2021, p. 2245; Tupan-Wenno et al., 2020, p. 7). My heuristic paired with this type of reflective professional development might aid practitioners in making sense of the “fragmentation” (Stentiford & Koutsouris, 2021, p. 2257) and concretising their approaches. This workshop sought to problematize conceptions of Inclusive Pedagogy and invited participants into deeper reflexivity in its practice. The modality of the workshop presented a potential avenue for future research with this subject and population. Furthermore, workshop-as-method presents an interesting approach to gathering and co-creating data for scholar-practitioners.

Acknowledgements

Thanks to DE for editing input and to the University of Glasgow for the travel grant to attend this conference.

Appendix A: Workshop Handout

Locating your inclusive practice, a reflective heuristic

a workshop with Anna Carissa Rozzo

2504285R@student.gla.ac.uk | anna.locuslearning@gmail.com

What is your working definition of “inclusive pedagogy”? How would you explain it to someone outside of education?

<i>Relatively Constant</i>		<i>Context-Specific</i>	
What	Why	How	Where
<i>Definitions, understandings, conceptual frameworks</i>	<i>Normative or sociological rationale</i>	<i>Recommendations for practice, implementation; Pedagogical tools and teaching philosophies</i>	<i>Locus of engagement; Disciplinary home, Theoretical base</i>
<p>What are the needs of all students? Certain groups of students in your context? What are the needs of your students?</p> <p>What beliefs, knowledge, actions or designs do you consider key to the practice of inclusive pedagogy? In which areas would you like to grow?</p>	<p>What is your <i>why</i>? How do you articulate your rationale, motivation, and/or position towards inclusive pedagogy?</p> <p>Which normative or axiological framework is most compelling to you?</p>	<p>How is this implemented in your context? What tools or approaches do/will you employ?</p>	<p>1. Where are you practising? Is this a community or systems effort, a campus-wide initiative, a department, a classroom?</p> <p>2. What theoretical or disciplinary lens do you bring to this practice?</p>

Appendix B: Learning Artefact

:Padlet

Anna Carissa Rozzo • 10d

Reflective Heuristic

Idea board for conference workshop

What	Why	How	Where
Deweyism	cognizant of hierarchy	community dialogue (interdepartmental)	classroom, researcher (community engagement), dr. title = door opener
student-centered (ability, culture)	self motivation, self efficacy	self-awareness around disagreements	extracurricular + curricular activities
students' backgrounds and disciplines	education → thrive, social mobility, access	self-reflection, goal-setting,	director or degree program + classroom, creating partnerships in community
setting boundaries	equity & potential to achieve individual aspiration (beyond classrooms)	counseling, coaching	influence as a professor (stewardship / mindfulness of sway)
"student hours"	self-awareness through interactions with others	increasing self-and peer evaluation	MTSS (California)
provide expectations	learning about others	sharing our how's with others	Freire/ Critical Pedagogy
to be acknowledged		reconcile policy and practice	anti-bias education
		training of trainers of pedagogy	
		Experiential learning	

References

- ACUE. (2020). *Inclusive and Equitable Teaching: ACUE Curriculum Crosswalk* (p. 20). Association of College & University Educators. https://www.dickinson.edu/download/downloads/id/12169/acue_inclusive_and_equitable_teaching_crosswalk.pdf
- ACUE & SOVA. (2021). *Success & Equity Through Quality Instruction: Bringing Faculty into the Student Success Movement* (p. 67). Association of College and University Educators. https://acue.org/wp-content/uploads/2021/09/SSTFToolkit_ACUE_Final.pdf
- Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., Norman, M. K., & Mayer, R. E. (2010). *How Learning Works: Seven Research-Based Principles for Smart Teaching* (1st edition). Jossey-Bass.
- Arao, B., & Clemens, K. (2013). From Safe Spaces to Brave Spaces: A New Way to Frame Dialogue Around Diversity and Social Justice. In Lisa M. Landreman (Ed.), *The Art of Effective Facilitation: Reflections From Social Justice Educators* (pp. 135–150). ACPA-Stylus.
- Barnett, R. (2020). Leading with Meaning: Why Diversity, Equity and Inclusion Matters in US Higher Education. *Perspectives in Education*, 38(2), 20–35. <https://doi.org/10.18820/2519593X/pie.v38.i2.02>
- Beattie, I. R. (2018). Sociological Perspectives on First-Generation College Students. In B. Schneider (Ed.), *Handbook of the Sociology of Education in the 21st Century* (pp. 171–191). Springer International Publishing. https://doi.org/10.1007/978-3-319-76694-2_8
- Bourdieu, P., & Passeron, J.-C. (1990). *Reproduction in Education, Society and Culture*, 2nd Edition (R. Nice, Trans.; 2nd edition). Sage Publications.
- The California Department of Education. (2023, February 21). *Definition of MTSS - Multi-Tiered System of Supports (CA Dept of Education)*. The California Department of Education. <https://www.cde.ca.gov/ci/cr/ri/mtsscomprti2.asp>
- Charmaz, K., Thornberg, R., & Keane, E. (2018). Evolving Grounded Theory and Social Justice Inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (Fifth edition, pp. 720–776). SAGE Publications, Inc.
- Chiu, M. M., & Khoo, L. (2005). Effects of Resources, Inequality, and Privilege Bias on Achievement: Country, School, and Student Level Analyses. *American Educational Research Journal*, 42(4), 575–603. <https://doi.org/10.3102/00028312042004575>
- Clotfelter, C. T., Ladd, H. F., & Vigdor, J. (2005). Who teaches whom? Race and the distribution of novice teachers. *Economics of Education Review*, 24(4), 377–392. <https://doi.org/10.1016/j.econedurev.2004.06.008>

- Collier, P., & Morgan, D. (2008). Is That Paper Really Due Today? Differences in First-Generation and Traditional College Students' Understanding of Faculty Expectations. *Higher Education*, 55, 425–446. <https://doi.org/10.1007/s10734-007-9065-5>
- Danowitz, M. A., & Tuitt, F. (2011). Enacting Inclusivity Through Engaged Pedagogy: A Higher Education Perspective. *Equity & Excellence in Education*, 44(1), 40–56. <https://doi.org/10.1080/10665684.2011.539474>
- Denzin, N. K., & Lincoln, Y. S. (Eds.). (2017). *The SAGE Handbook of Qualitative Research* (Fifth edition). SAGE Publications, Inc.
- Dewsbury, B. M., Swanson, H. J., Moseman-Valtierra, S., & Caulkins, J. (2022). Inclusive and active pedagogies reduce academic outcome gaps and improve long-term performance. *PLOS ONE*, 17(6), e0268620. <https://doi.org/10.1371/journal.pone.0268620>
- Donnor, J. K., & Ladson-Billings, G. (2018). Critical Race Theory and the Postracial Imaginary. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (Fifth edition, pp. 350–382). SAGE Publications, Inc.
- Eddy, S. L., & Hogan, K. A. (2014). Getting Under the Hood: How and for Whom Does Increasing Course Structure Work? *CBE—Life Sciences Education*, 13(3), 453–468. <https://doi.org/10.1187/cbe.14-03-0050>
- Finley, A., & McNair, T. (2013). Assessing Underserved Students' Engagement in High-Impact Practices. With an Assessing Equity in High-Impact Practices Toolkit. In *Association of American Colleges and Universities* (p. 44). Association of American Colleges and Universities. <https://eric.ed.gov/?id=ED582014>
- Florian, L. (2008). INCLUSION: Special or inclusive education: future trends. *British Journal of Special Education*, 35(4), 202–208. <https://doi.org/10.1111/j.1467-8578.2008.00402.x>
- Florian, L., & Black-Hawkins, K. (2011). Exploring inclusive pedagogy. *British Educational Research Journal*, 37(5), 813–828. <https://doi.org/10.1080/01411926.2010.501096>
- Florian, L., & Spratt, J. (2013). Enacting inclusion: A framework for interrogating inclusive practice. *European Journal of Special Needs Education*, 28(2), 119–135. <https://doi.org/10.1080/08856257.2013.778111>
- Hammond, Z. (2015). Culturally responsive teaching and the brain: Promoting authentic engagement and rigor among culturally and linguistically diverse students. Corwin.
- Harper, S. R., & Griffin, K. A. (2010). Opportunity Beyond Affirmative Action: How Low-Income and Working-Class Black Male Achievers Access Highly Selective, High-Cost Colleges and Universities. *Harvard Journal of African American Policy*, 17, 18.

- Hernández-Torrano, D., Somerton, M., & Helmer, J. (2020). Mapping research on inclusive education since Salamanca Statement: A bibliometric review of the literature over 25 years. *International Journal of Inclusive Education*, 0(0), 1–20. <https://doi.org/10.1080/13603116.2020.1747555>
- Hockings, C. (2010). *Inclusive learning and teaching in higher education: A synthesis of research* (p. 67). EvidenceNet. https://www.plymouth.ac.uk/uploads/production/document/path/2/2735/Inclusive_teaching_and_learning_in_HEsynthesis_.pdf
- Hogan, K. A., & Sathy, V. (2022). *Inclusive Teaching: Strategies for Promoting Equity in the College Classroom* (First edition). West Virginia University Press.
- Iturbe-LaGrave, V., Sponsler, L. E., Paguyo, C. H., & Alvarez, L. D. C. (2021). The Pedagogical Imperative of Changing the Culture of Teaching. *Journal of the Professoriate*, 12(1), 150–180.
- Krog, A. (2018). In the Name of Human Rights: I Say (How) You (Should) Speak (Before I Listen). In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (Fifth edition, pp. 845–854). SAGE Publications, Inc.
- Ladson-Billings, G. (2006). From the Achievement Gap to the Education Debt: Understanding Achievement in U.S. Schools. *Educational Researcher*, 35(7), 3–12. JSTOR.
- Lawrie, G., Marquis, E., Fuller, E., Newman, T., Qiu, M., Nomikoudis, M., Roelofs, F., & van Dam, L. (2017). Moving towards inclusive learning and teaching: A synthesis of recent literature. *Teaching and Learning Inquiry*, 5(1). <https://doi.org/10.20343/teachlearningqu.5.1.3>
- Lehmann, W. (2007). “I just didn’t feel like I fit in”: The role of habitus in university dropout decisions. *Canadian Journal of Higher Education*, 37(2), Article 2. <https://doi.org/10.47678/cjhe.v37i2.542>
- Lewis, A., & Norwich, B. (2004). *Special teaching for special children? Pedagogies for inclusion* (1st edition). Open University Press.
- Livingston-Galloway, M., & Robinson-Neal, A. (2021). Re-Conceptualizing Inclusive Pedagogy in Practice in Higher Education. *Journal of the Scholarship of Teaching and Learning for Christians in Higher Education*, 29–63. <https://doi.org/10.31380/sotlched.11.1.29>
- Losberg, J., & Zwozdiak-Myers, P. (2021). Inclusive pedagogy through the lens of primary teachers and teaching assistants in England. *International Journal of Inclusive Education*, 0(0), 1–21. <https://doi.org/10.1080/13603116.2021.1946722>
- Mickelson, R. A., Bottia, M. C., & Lambert, R. (2013). Effects of School Racial Composition on K–12 Mathematics Outcomes: A Metaregression Analysis. *Review of Educational Research*, 83(1), 121–158. <https://doi.org/10.3102/0034654312475322>

- Moriña, A. (2020). Approaches to Inclusive Pedagogy: A Systematic Literature Review. *Pedagogika*, 140(4), Article 4. <https://doi.org/10.15823/p.2020.140.8>
- Ørngreen, R., & Levinsen, K. (2017). Workshops as a Research Methodology. *The Electronic Journal of eLearning*, 15(1), 80–71.
- Pallas, A. M., Neumann, A., & Campbell, C. M. (2017). *Policies and Practices to Support Undergraduate Teaching Improvement*. American Academy of Arts & Sciences. https://acue.org/wp-content/uploads/2018/08/CFUE_Undergraduate-Teaching.pdf
- Phinney, J. S., & Haas, K. (2003). The Process of Coping Among Ethnic Minority First-Generation College Freshmen: A Narrative Approach. *The Journal of Social Psychology*, 143(6), 707–726. <https://doi.org/10.1080/00224540309600426>
- Rapp, A. C., & Corral-Granados, A. (2021). Understanding inclusive education – a theoretical contribution from system theory and the constructionist perspective. *International Journal of Inclusive Education*, 0(0), 1–17. <https://doi.org/10.1080/13603116.2021.1946725>
- Rouse, M. (2008). Developing Inclusive Practice: A role for teachers and teacher education? *Education in the North*, 16(1), 1–20. <https://doi.org/10.26203/j15x-ym95>
- Sanger, C. S. (2020). Inclusive Pedagogy and Universal Design Approaches for Diverse Learning Environments. In C. S. Sanger & N. W. Gleason (Eds.), *Diversity and Inclusion in Global Higher Education: Lessons from Across Asia* (pp. 31–71). Springer. https://doi.org/10.1007/978-981-15-1628-3_2
- Smith, D. L., & Felch, S. M. (2016). *Teaching and Christian Imagination*. Wm. B. Eerdmans Publishing Co.
- Spry, T. (2018). Autoethnography and the Other: Performative Embodiment and a Bid for Utopia. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (Fifth edition, pp. 1090–1128). SAGE Publications, Inc.
- Stentiford, L., & Koutsouris, G. (2021). What are inclusive pedagogies in higher education? A systematic scoping review. *Studies in Higher Education*, 46(11), 2245–2261. <https://doi.org/10.1080/03075079.2020.1716322>
- Stephens, N. M., Townsend, S. S. M., Markus, H. R., & Phillips, L. T. (2012). A cultural mismatch: Independent cultural norms produce greater increases in cortisol and more negative emotions among first-generation college students. *Journal of Experimental Social Psychology*, 48(6), 1389–1393. <https://doi.org/10.1016/j.jesp.2012.07.008>
- Theobald, E. J., Hill, M. J., Tran, E., Agrawal, S., Arroyo, E. N., Behling, S., Chambwe, N., Cintrón, D. L., Cooper, J. D., Dunster, G., Grummer, J. A., Hennessey, K., Hsiao, J., Iranon, N., Jones, L., Jordt, H., Keller, M., Lacey, M. E., Littlefield, C. E., ... Freeman, S. (2020). Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math. *Proceedings of the National Academy of Sciences*, 117(12), 6476–6483. <https://doi.org/10.1073/pnas.1916903117>

- Torre, M. E., Stoudt, B. G., Manoff, E., & Fine, M. (2018). Critical Participatory Action Research on State Violence: Bearing Wit(h)ness Across Fault Lines of Power, Privilege, and Dispossession. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (Fifth edition, pp. 855–896). SAGE Publications, Inc.
- Tupan-Wenno, M., van Marlen, J., & Aumaj, S. (2020). *Rethinking Pathways towards Inclusion in Education* (1; p. 110). Knowledge Innovation Centre.
<https://multincluder.eu/wp-content/uploads/sites/23/2020/05/Multincluder-Analysis-publication-2.pdf>
- Whitehead, D. M. (2015). Global learning: Key to making excellence inclusive. *Liberal Education*, 101(3), 6–14.
- Whitley, S. E., Benson, G., & Wesaw, A. (2018). *First-Generation Student Success: A Landscape Analysis Of Programs And Services At Four-Year Institutions* (p. 84). Center for First-generation Student Success, NASPA–Student Affairs Administrators in Higher Education, and Entangled Solutions.
<https://firstgen.naspa.org/files/dmfile/NASPA-First-generation-Student-Success-FULL-REPORT.pdf>
- Wyatt, J., Gale, K., Gannon, S., & Davies, B. (2018). Creating a Space in Between: Collaborative Inquiries. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (Fifth edition, pp. 1276–1306). SAGE Publications, Inc.
- Yosso, T. J. (2005). Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race Ethnicity and Education*, 8(1), 69–91.
<https://doi.org/10.1080/1361332052000341006>

Contact email: 2504285R@student.gla.ac.uk

***UAE Female K-12 Students:
Decision Influences on Bachelor's Degrees Choices***

Mohammad Amin Kuhail, Zayed University, United Arab Emirates
Haseena Al Katheeri, Zayed University, United Arab Emirates
Joao Negreiros, Zayed University, United Arab Emirates

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

One of the most crucial decisions that students make in their lives is the major choice as it affects students' job opportunities and the labor market's structure. Many adolescents, who will one day meet the need of knowledge-based economies, have the goal of attending a university but lack the means to do so. In order to do this, it is necessary for adolescents to make the choices necessary to pick a certain line of work, employment, or organization to join. In the UAE, higher education has seen steady growth. However, the factors influencing students' choice of higher education major remains unexplored. In this study, we conducted a survey with first and second-year undergraduate students in the UAE to understand the personal, social, and financial factors influencing students' major choice. The study shows that personal factors such as passion and skills influence students' choice. Implications and future work are discussed. It is observed that students appreciate working in several industries and across many societal sectors. The study also shows little correlation between bachelor's degrees and job profiles. We recommend that universities and employers should provide K–12 students, their families, and K–12 educators with correct information regarding bachelor's degrees to combat misperceptions about engineering work and its practitioners and to prepare them to navigate their education and join the workforce as employers increasingly expect graduates to have experience and skills such as creativity and design, oral and written communication, teamwork and leadership, interdisciplinary thinking, business management and entrepreneurship, and multicultural understanding.

Keywords: College Access, Decision Factors; Specialty Selection, UAE Students

iafor

The International Academic Forum
www.iafor.org

1. Introduction

Access to university is the dream of many youths who will provide to the present demand of knowledge-based economies. For that, decisions to select in a specific career, job or organization must be carry out by adolescences. These factors may be inner to the individual, such as skills or personal interests or peripheral, like families influences or global economy factors. Activities that increase exposure to, understanding of or experiences in engineering and arts, for instance, play a role in these decisions too. To examine the factors that influence the decision making of bachelors at K–12 is the focus of the present writing.

There are at least two compelling reasons why any nation should be concerned about bachelor's diversity challenge: the creativity and innovation costs of unused skills and talent, and equity/social justice. [1]

In terms of the theoretical model (Fig 1), the social cognitive career theory (SCCT) tries to identify the dynamics that affect an individual's educational and career decisions as well as potential points for interventions to increase the likelihood that individuals will complete a university degree and use those skills and knowledge gained in their education throughout their careers.

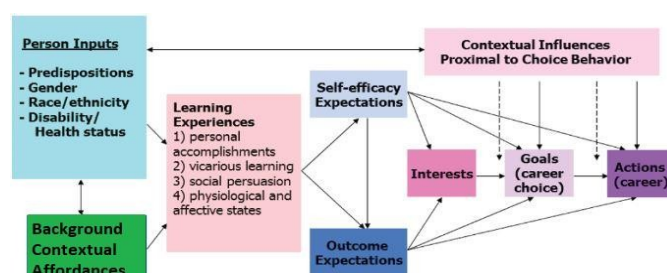


Fig. 1. Diagram of social cognitive career theory. [2]

It takes account of individual differences (person inputs like gender, race/ethnicity, health, personality traits) and background contextual affordances (home and school environment and experiences, family socioeconomic status) that affect opportunities to learn a set of tasks associated with a field (e.g., math and problem solving associated with engineering), including one's learning experiences. People learn by performing a task themselves (personal accomplishment or mastery experiences) or by observing a friend or role model accomplish the task (vicarious learning) also include encouragement from others (social persuasion) or feelings of excitement about performing the task (physiological states). Learning experiences in turn shape self-efficacy expectations and outcome expectations, which then shape interests, goals and actions. Internal and external factors (person inputs and contextual influences) affect the elements of the SCCT model as well as how they interact with one another. They may serve as supports or barriers to an individual's decisions throughout the pathway. [1]

The present research focus on Emirate's females of K-12 students whose communication media is Arabic and/or English only. It will not follow any theoretical framework. Instead, it will be based on the responses of a survey for a descriptive and inferential statistical assessment (letting the data speak for themselves).

The main research question that is addressed is which factors have the greatest influence on UAE female students' choice in selecting a bachelor's degree.

This paper is divided into 5 sections, including the present introduction. Section 2 highlights some of the state-of-the-art associated to the decision factors for universities' candidates while section 3 underlines Zayed University global settings of the students interviewed. Descriptive, T-tests, regression and structured equation modeling are presented in the following section while the last section depicts global conclusions.

2. Prior Research

The state of the art concerning factors that influence bachelor's choice and related topics is quite vast. In 1992, [3] did a survey from 2,497 ninth-grade students and their parents to test the model using LISREL (statistical software for structural regression modeling) regarding family and high school experience influences on the post-secondary educational plan of ninth-grade students. Parents' expectations exerted the strongest influence throughout their model. As well, parents' education, student gender, high school GPA and high school experiences also contributed significantly to explaining students' aspirations.

By using the same software, [4] accomplished a sample of 703 male students and 718 female students while their parents responded to two sets of questionnaires regarding high school experiences and expectations about college. Endogenous variables examined included parents' expectation regarding higher education for their children, parents' savings for college, students' discussion of college with their parents and students' aspiration for post-secondary education. Their model explained 30.8% of the variance in students' aspiration for males and 36.8% for females.

Using a national longitudinal sample of 5,257 young people who were pursuing a bachelor's degree, [5] studied how credits in intensive high school mathematics courses affected their completion versus non-completion of the degree. Finishing one unit in any of four intensive math courses more than doubled the likelihood that participants would later complete their bachelor's degree.

To increase STEM (science, technology, engineering and mathematics) participation studies and careers, some countries have promoted inclusive STEM high schools. [6] compiled higher education records in 23 inclusive STEM high schools and 19 comparison schools without a STEM focus. A key conclusion should be stressed by their analysis: Students overall and from under-represented groups who had attended inclusive STEM high schools were significantly more likely to be in a STEM bachelor's degree program two years after high school graduation. For students who entered two-year colleges, on the other hand, attending an inclusive STEM high school was not associated with entry into STEM majors.

In a recent view, [7] examined the mediating role of STEM-oriented self-efficacy beliefs on the relationship between implicit ability beliefs and STEM intention. Using a Likert-type questionnaire to measure ability beliefs, self-efficacy (individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments) and intention to opt for a STEM degree of secondary school students in their fifth grade (n=483), a positive relation between implicit STEM ability beliefs and the intention to opt for a STEM field bachelor's degree was found. That is, incremental STEM ability beliefs predicted positive self-efficacy beliefs and increased STEM intention.

This perspective is confirmed by. [8] Self-efficacy most strongly influenced graduate school intention: for every one-unit increase in students' self-efficacy, they were over 8 times more

likely to plan to enroll in a master's program and 13 times more likely to enroll in a PhD program, relative to not attending graduate school.

In the context of the United Arab Emirates (UAE), the interest of women in STEM higher education has increased rapidly. Yet, women are globally underrepresented in STEM college programs [9] in Ireland. According to the authors, of the 22% points raw gap, about 13% points is explained by differential subject choices and grades in secondary school. Subject choices are more important than grades: "we estimate male comparative advantage in STEM (as measured by subject grades) explains about 3% points of the gender gap. Additionally, differences in overall achievement between girls and boys have a negligible effect. Strikingly, there remains a gender gap of 9% points even for persons who have identical preparation at the end of secondary schooling. However, this gap is only 4% points for STEM-ready students. We find that gender gaps are smaller among high-achieving students and for students who go to school in more affluent areas."

The author in [10] endorses these results in Finland and Russia by indicating that there is a traditional gender gap regarding STEM subjects in every dimension, which favors females in biology and males in technology and engineering. STEM stereotypes among students—due to low exposure to STEM professions at school—can explain students' low interest despite high self-efficacies.

For the evaluation factors affecting the choice of dentistry as a career as well as the choice of future specialty among senior dental students registered in British University of Egypt (BUE), [11] accomplished a questionnaire form during the academic year 2016/2017. Appealing conclusions were stated by these researchers: (A) 67% of the students chose dentistry according to their own will, 20.1% due to family pressure while the remaining 12.9% were due to their high school grades. (B) Fixed prosthodontics was the most favored specialty among the students who aimed for further postgraduate education (23.8%) while endodontics ranked as the second most popular specialty (22.7%) and Oral surgery came in the third rank (11%). (C) There was a statistically significant difference between males and females in choosing fixed prosthodontics as well as oral pathology ($p\text{-value} \leq 0.001$). (D) Based on multiple regression analysis, 67% of their respondents think they were given sufficient inspiration and guidance to decide on future, while 39% of these students were guided by faculty staff members, which constituted the highest influence rather than recommendations from practicing dentists, family members or friends.

In contrast, [12] presents a study in Nigeria to understand postgraduate students' choice criteria for universities selection. Findings from their study revealed four key factors: the desire to study for a postgraduate degree; the facilities of the University, including its geographical location; the courses on offer; influence of other stakeholders like parents, siblings and friends. For these authors, this influence of stakeholders aligns with the fundamental values in a collectivist culture like Nigeria.

Using self-determination theory, [13] highlight the motivational experiences of seven low-income, first-generation students and their parents on the path to college. Specifically, results showed that students' self-determination was enhanced when parents were involved in college planning, served as positive examples, set high academic standards early and fostered students' sense of career volition. Motivation was undermined when families limited students' choices, did not set clear expectations for college going, provided little feedback or emphasized family obligations.

In many countries, entrance to higher education is determined by the performance of students in secondary school and/or the scores obtained in national exams. The relative weight of these two scores on the admission decision is a relevant policy topic, given its implication on who is admitted to university. By using the dataset of bachelor students from Portuguese higher education institutions with detailed information about their characteristics and past achievement results, [14] measured the academic achievement and reaching the main finding that the scores given by teachers in secondary school are better predictors of subsequent performance than the access exam scores.

To explore the impact of higher education institutions digital marketing on student decision making process became the research focus of. [15] A qualitative research approach was employed in this study through semi-structured interviews, observation and documentation as data collection methods in a large public university in Indonesia. Creswell's analysis model was conducted and carried out inductively and interpreted with sentences that are logical and easily understood. Findings confirm the university marketing management engages with digital media since it has now become a trend in all the businesses around the globe. Mostly, students engage social media to seek information about university before choosing the right one.

At last, the authors in [16] presented a study to investigate the effects of several demographic and academic factors, such as gender, age, nationality, high school major (arts vs science) and high school score, on the academic performance of undergraduate students majoring in statistics in the UAE (142 female and 46 males). The researchers indicate that gender, age and nationality have no significant impacts on the academic performance of undergraduate students in statistics bachelor's degree program, while high school major and high school score do.

3. Institutional Background

The United Arab Emirates is a federation of seven states: Abu Dhabi, Dubai, Sharjah, Ras Al Khaimah, Ajman, Umm Al Quwain and Fujairah. The country's main cities and urban centers are located mainly along its coast. The country is about the size of Austria and it has a population of about 9.9 million people, including expatriates (in 2020). The official language is Arabic, but English is also widely spoken and understood.

Zayed University (ZU) is a public university established in 1998. The university offers 17 majors and 10 minors at undergraduate level and 10 master's degrees.

ZU has both male and female Emirate students. Yet, in Abu Dhabi campus, male and female are on separate campuses whereas the Dubai campus only hosts female students.

4. Analysis of Results

A survey was conducted with 68 female students at first and second year in ZU in Abu Dhabi and Dubai. 53 of the students are bilingual (Arabic and English) and, for the remaining 15, English is the main learning language. All the students are UAE nationals living in Dubai (13) or Abu Dhabi (55), in private (37) or governmental (31) high schools (Fig. 2). Globally, the students hold good marks (mean of 89.5% with a standard deviation of 6.1%). The majority selected a bachelor's in science (47) instead of a bachelor's in arts (21) although their

12th GPA is quite similar. All variables follow a Gaussian distribution (non-significant Kolmogorov - Smirnov p-value).

For the question “Have You Decided Your Major When in High School?” [1–Not sure ... 5–Very sure], the average equals 3.26 leading to the impression that these candidates hold some convictions about their bachelor’s degree to pursue at university level. Yet, the student with high passion presents higher conviction on which degree to pursue and testified by the Pearson correlation of 0.441.

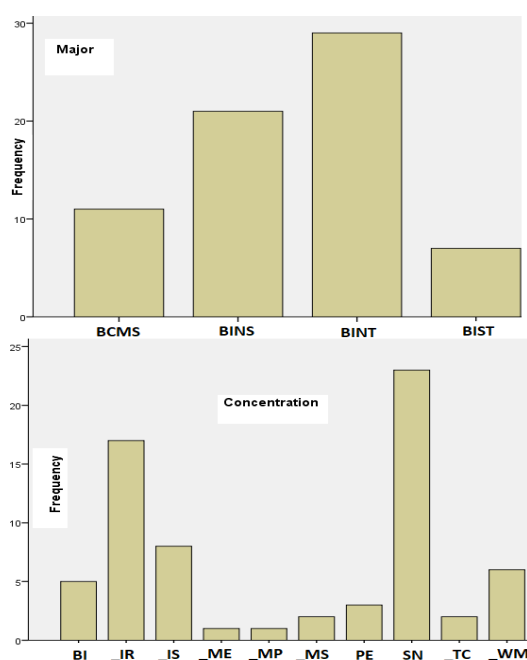


Fig. 2. Frequencies of the 4 bachelor majors (Communication and Media Sciences, Information Systems, Information Technology, International Studies) and 10 concentrations (Business Intelligence, International Relations, Information Systems, Marketing & Entrepreneurship, Media Production, Political Economy, Security and Network, Tourism & Culture, Web & Mobile Development).

Based on the same computation mean, career advancement (4.21), job responsibilities (4.13), alignment with UAE future vision (4.19) and future demand (4.22) are the main powerful factors that these pupils take into consideration when choosing their bachelor. Curiously, career advancement holds a Pearson correlation of 0.418 with the capability to work at home. On the other hand, friends (1.78), workshops (1.53) and expert discussion (1.91) are the least influencers factors of all.

Others descriptive characteristics of this sample follows next: (A) Passion and Internet information averages for the four majors is close to 4.1; (B) With the exception of the Bachelor of Communication and Media Sciences, the capability to work at home is central; (C) For all majors, parents’ advice holds a low influencer ranking of importance; (D) International Studies candidates seek a prestigious career with Business Opportunities features; (E) Only Information and Technology Systems take into consideration the celebrities’ aspect; (F) Dubai students (93%) hold a better 12th grade average than their Abu Dhabi (88%) counter partners. As well, pupils of private high schools (94%) have a high 12th grade mean than government (86%) ones. The independent T-Test certify about this statistical difference for a 95% level of confidence (the Pearson correlation of 12th grade and type of

high schools is -0.442) although this statement is not confirmed when comparing both states with the learning language factor; (H) Flexibility in terms of time and space should also be highlighted for these female UAE youngsters when it comes the choice of their careers.

Several regression attempts were accomplished but no appealing results were achieved apart from the following one: the estimation of the 12th Grade (dependent variable) based on EmiratesResidency and SchoolType (independent variables) holds a fair R^2 of 25.6%: $12\text{Grade} = 0.923 - 0.05 \times \text{SchoolType} + 0.039 \times \text{EmiratesResidency}$. No multicollinearity (VIF) was found among these independent variables and, globally, this is a good model as confirmed by the high F statistics (11.159). All T independent tests for each beta were also significant for a 95% level of confidence. The Durbin-Watson residual test equals 2.117 (no first order correlation). This denotes that student at UAE federal high schools hold, in average, a lower score of 5 points compared with their private institutions. Moreover, Dubai schools' beats Abu Dhabi ones by 3.9 points, in average.

Structured equation modeling (SEM) is a multivariate technique to test and evaluate multivariate causal relationships. Somehow, it is a combination of two statistical methods: confirmatory factor analysis (CFA) and path analysis. CFA has an objective to estimate the latent variables. Path analysis, on the other hand, aimed to find the causal relationship among variables by creating a path diagram. Its evaluation is based on a set of fit indices:

- The acceptable RMSEA (root mean square error of approximation) should be less than 0.06;
- The comparative fit index (CFI) should be close to 0.95 or higher;
- The Tucker-Lewis index (TLI) of >0.90 is considered acceptable;
- CMIN/DF is the minimum discrepancy divided by its degrees of freedom. Ratios between 1 and 3 are considered excellent.

SEM was run to examine the correlations and causal relationships among 5 latent variables (school, bachelors, job features, personal influencers and bachelor choice) and 36 initial observable measures: Degree, Major, Concentration, Desired major, Desired concentration, Match code (Desired VS Reality), 12Grade, Language Education, School type, Emirates residence, Major decision at high school, Passionate, Skills, Career advancement, Work home, Man-woman, Parents advice, Siblings influence, Friends guide, Prestigious, Celebrity, Social media, Income, Business opportunities, Expert discussion, Family discussion, Internet information, Guides-brochures, Workshops, Future demand, Job responsibilities, Flexible, Interviews alumni, Scientific research, Demanding competitiveness and Alignment UAE vision.

As part of CFA, factor loadings (standardized regression weights) were assessed for each item with a 95% significancy. From the original full model, numerous model revisions were performed to fit the model to the given data. In the end, one latent variable (school) and twenty-one input variables were removed due to low factor loadings (less than 0.5).

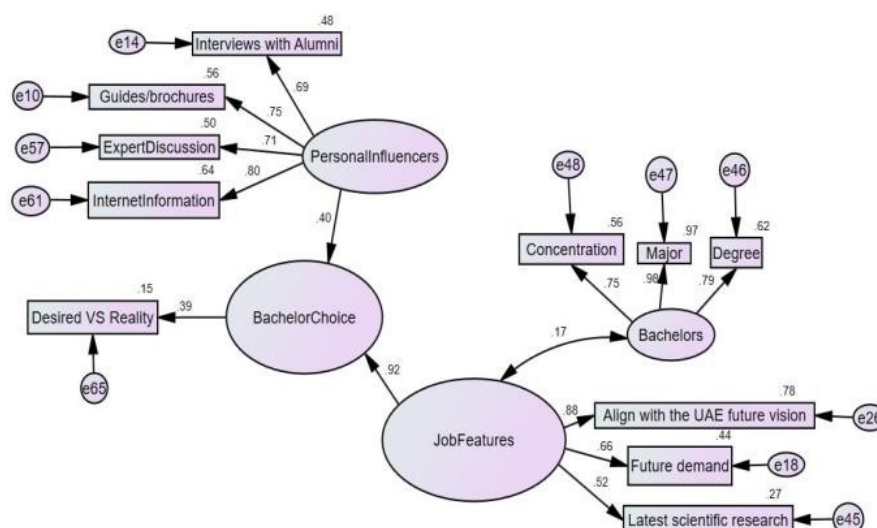


Fig. 3. Structured equation modeling computed by SPSS AMOS 23.

Due to the relative low number of samples (200 is considered the minimum, quite often), the model fitness is not perfect: CMIN/DF=2.85, CFI=0.88, RMSEA=0.09; TLI=0.82. For reference, the upper right percentage associated to each rectangle represents the R^2 , the measure of fitness of the proposed model to the observed data in the context of regression analysis while small circles represent the error associated to each measure.

According to Fig. 3 and attested by the statistical validity indexes of Table 1, three striking inferences can be stated: (A) The school latent variable was removed (p -value>0.05) including Language Education, School type and Emirate's residence observable variables. This signifies that the learning high school environment does not affect the bachelor choice process for these K-12 females; (B) The job inner features are the most noticeable factor regarding which bachelor to apply soon and enroll. At the same time, income and business opportunities, for instance, are not listed as the most prominent consideration by these universities' candidates. Yet, further confirmation on this topic is required; (C) Based on their personal factors, the absence of the parents and sibling variables was, somehow, a surprise because of the solid ties among family members; (D) The relationship between bachelors and jobs profile is quite low (17%) leading the idea that a specific work employment can be full field by a variety of degrees, majors and concentrations.

	CR	AVE
PersonalInfluencers	0.709	0.466
JobFeatures	0.843	0.585
Bachelors	0.881	0.715

Table 1. Model Validity Measures: The convergent validity (average variance extracted - AVE) should be greater than 0.5.

Regarding the construct reliability (CR), no issues for the present model since all values are greater than 0.7.

5. Conclusions

Knowledge is foundational to technological innovation and development, driving long-term economic growth. Therefore, and to ensure national competitiveness and quality of life, it is central to understand and to continuously adapt and improve the educational and career pathways in countries including the UAE.

The work preference of the students focuses on many different industries and across all sectors of society. Although future levels of career and work satisfaction were not covered here, certainly the right choice of the bachelor at this early life stage of every teenager will help to achieve both aspects. Regarding the main research question, inner personal and external job features influence the decision making of student's bachelors mostly for this population. Therefore, it is essential to help students form a well-informed decision of their major. In fact, the authors have contributed a platform that helps provide information to students desiring to select their major. [17]

Faculty and employers should provide K–12 students, their families and K–12 educators, accurate information about bachelor's degree, both to counter inaccurate stereotypes of the nature of engineering work and the people who do it, for instance, and to prepare students to navigate their education and enter the workforce.

Beyond strong technical skills, more and more employers expect graduates to have experience and competence in professional areas such as creativity and design, oral and written communication, teamwork and leadership, interdisciplinary thinking, business management and entrepreneurship and multicultural understanding. [1] This perspective might answer to the low relationship between bachelors and job profiles for the present model.

Acknowledgments

We would like to thank the students who contributed to the success of this work.

Funding

This work was supported by Zayed University, UAE, under the RIF Research Grant Number R20131.

References

- [1] National Academy of Engineering. (2018). *Understanding the Educational and Career Pathways of Engineers*. Washington, DC: The National Academies Press. doi: <https://doi.org/10.17226/25284>
- [2] Lent RW, Brown SD, Hackett G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior* 45:79–122.
- [3] Hossler D, Stage FK. Family and High School Experience Influences on the Postsecondary Educational Plans of Ninth-Grade Students. *American Educational Research Journal* (1992). 29(2):425-451. doi:10.3102/00028312029002425
- [4] Stage, F.K., Hossler, D. Differences in family influences on college attendance plans for male and female ninth graders. *Res High Educ* 30, 301–315 (1989). <https://doi.org/10.1007/BF00992606>. Trusty, J., & Niles, S. G. (2003). High-School Math Courses and Completion of the bachelor's degree. *Professional School Counseling*, 7(2), 99–107. <http://www.jstor.org/stable/42732549>
- [5] Means, Barbara. Effectiveness of Inclusive STEM High Schools. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2019-11-29. <https://doi.org/10.3886/E115783V1>
- [6] Van Aalderen-Smeets, SI, Walma van der Molen, JH, Xenidou-Dervou, I. Implicit STEM ability beliefs predict secondary school students' STEM self-efficacy beliefs and their intention to opt for a STEM field career. *J Res Sci Teach*. 2019; 56: 465– 485. <https://doi.org/10.1002/tea.21506>
- [7] Borrego, M., Knight, D.B., Gibbs, K., Jr. and Crede, E. (2018). Pursuing Graduate Study: Factors Underlying Undergraduate Engineering Students' Decisions. *J. Eng. Educ.*, 107: 140-163. <https://doi.org/10.1002/jee.20185>
- [8] Judith M. Delaney, Paul J. Devereux, Understanding gender differences in STEM: Evidence from college applications. *Economics of Education Review*, Volume 72, 2019, Pages 219-238, ISSN 0272-7757, <https://doi.org/10.1016/j.econedurev.2019.06.002>
- [9] Tomperi, P.; Kvivesen, M.; Manshadi, S.; Uteng, S.; Shestova, Y.; Lyash, O.; Lazareva, I.; Lyash, A. Investigation of STEM Subject and Career Aspirations of Lower Secondary School Students in the North Calotte Region of Finland, Norway, and Russia. *Educ. Sci.* 2022, 12, 192. <https://doi.org/10.3390/educsci12030192>
- [10] Noha S. Kabil, Gehan G. Allam, Ola M. Abd El-Geleel, Motivational reasons for choosing dentistry as a professional career & factors affecting specialty choice among final year dental students, *Future Dental Journal*, Volume 4, Issue 2, 2018, Pages 308-313, ISSN 2314-7180, <https://doi.org/10.1016/j.fdj.2018.04.002>

- [11] Adefulu, Adesoga, Farinloye, Temitope and Mogaji, Emmanuel (2019). Factors influencing postgraduate students' university choice in Nigeria. In: Mogaji, Emmanuel, Maringe, Felix and Hinson, Robert Ebo, (eds.) Higher Education Marketing in Africa - Explorations on Student Choice. Springer, Cham, Switzerland (In Press).
- [12] Allison M. Mitchall & Audrey J. Jaeger (2018). Parental Influences on Low-Income, First-Generation Students' Motivation on the Path to College, *The Journal of Higher Education*, 89:4, 582-609, DOI: 10.1080/00221546.2018.1437664
- [13] Cerdeira, JM, Nunes, LC, Reis, AB, Seabra, C. Predictors of student success in Higher Education: Secondary school internal scores versus national exams. *Higher Educ Q.* 2018; 72: 304– 313. <https://doi.org/10.1111/hequ.12158>
- [14] Andriani KUSUMAWATI (2019)," Impact of Digital Marketing on Student Decision-Making Process of Higher Education Institution: A Case of Indonesia", *Journal of e-Learning and Higher Education*, Vol. 2019 (2019), Article ID 267057, DOI:10.5171/2019.267057
- [15] Yousef, D.A. (2019). "Determinants of the academic performance of undergraduate students in statistics bachelor's degree program: A study in an Arabic setting", *Quality Assurance in Education*, Vol. 27 No. 1, pp. 13-23. <https://doi.org/10.1108/QAE-12-2016-0087>
- [16] Kuhail, M. A.; Al Katheeri, H.; and N., Joao, (2021). "MyMajor: Assisting IT students with major selection", *Global Journal of Engineering Education, WIETE*.

Contact emails: Mohammad.Kuhail@zu.ac.ae
Haseena.AlKatheeri@zu.ac.ae
z10690@zu.ac.ae

Environmental Education in Indonesia Secondary School Teachers' Perspective: A Systematic Review

Adhitya Amarulloh, Monash University, Australia

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Environmental education (EE) as a means to implement natural awareness and eco-friendly behavior among students is influenced by the teacher's perspective towards it. In the previous Indonesian school-based curriculum (KTSP), EE is incorporated and mentioned distinctly as a subject. However, the alternation of KTSP into the 2013 curriculum has removed EE as a unit in Indonesian public schools. Therefore, the EE perspective among teachers has changed. Therefore, this study aims to discuss the teacher's perspective towards EE, in this study will be more specified in the secondary school context. A systematic literature review of various studies of EE in the teaching realm is conducted. Curriculum, classroom implementation, and the challenges and opportunities of EE in the teacher's context are the aspects that will be discussed. Several studies mentioned that senior teachers have a profound comprehension of EE compared to new teachers due to their previous knowledge of EE incorporation in the KTSP curriculum. However, despite the lack of experience, some teachers have incorporated EE in the class regardless of teaching experience. Nevertheless, the challenges still impose the EE implementation in the secondary school context. In conclusion, due to the curriculum alteration, this study opines that the secondary school teachers' perspective towards EE has changed, affecting the EE implementation in the class. However, the opportunities for EE implementation are still present and could be improved through well-established cooperation among the responsible parties.

Keywords: The 2013 Curriculum, Environmental Education, Secondary School, Teachers' Perspective, the KTSP Curriculum

iafor

The International Academic Forum
www.iafor.org

Introduction and Background

The global climate crisis has reached a profound level which become a severe concern and forced society to be aware of it, including teachers, as the frontline of the education system through environmental education (EE) to plant environmental awareness among the students. Stapp (1969, p. 34) explained the definition of EE “Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution.” The term EE has been used since the 1970s in Indonesia, and it is similar to ESD in Western countries' context (Nomura, 2009; Parker, 2016). Hence, in this essay, the term EE is used. Before Indonesia's national curriculum, EE in the school-based curriculum (KTSP) is a separate subject. However, in the new curriculum, the 2013 curriculum and the emancipated curriculum (*Merdeka Belajar* curriculum), EE as a subject is being removed and incorporated into some subjects, namely natural sciences and geography. It changes the EE learning process and teachers' perspectives towards it. Therefore, this essay argues that the alteration changed the teachers' perspective towards EE. This essay will convey and elaborate on the Indonesian teachers' perspective towards EE in secondary school.

Environmental education is essential to the student's development since nature has changed and might be dramatically changed in the future. Hence, teachers need to equip students with comprehended environmental awareness. Jorgenson et al. (2019) states that it seems that today's environmental issues are highly likely the effect of the accumulation of several problems in two hundred years. Accordingly, Indonesia is a mega-biodiversity country, like the knife. It has two distinct sides, the edges and the spine. It would bring numerous advantages when it exploits in the proper means, yet it will be a catastrophe when it is overexploited and unpreserved. Thus, the sense of belonging to nature is a pivotal trait for human beings. Caring for and preserving nature have to be implemented in human behavior, especially at a young age (Adlong & Dietsch, 2015). Hence, environmental issues are not merely a local concern, but it is a global matter. While for the young generation, their awareness and actions might be critical aspects that either preserve or destroy nature in the present and the future.

EE could be one of the answers to the SDGs in education and the environmental sector. Through education, it is expected to lead students to be skillful individuals as EE drives them to be more aware of their surroundings, especially concerning sustainability. As a concept, EE is education for sustainable development (ESD) in the Indonesian context and has been implemented in the curriculum since the 1970s (Djuwita & Benyamin, 2019; Nomura, 2009). Referring to Nomura (2009), the EE concept has similarities to ESD in Western countries, yet unlike ESD. EE is more focused on individual behavior towards nature, while ESD also indicates economic and political aspects in the lesson. In the USA, the ESD has been introduced and delivered (Jorgenson et al., 2019). While in Australia, environmental education for sustainability (EEfS) has been introduced for over 30 years (Almeida et al., 2018; Tilbury, 2004) despite the different terms of environmental education. In some European countries, like the Czech Republic, the term Environmental and Sustainability Education (ESE) is the known term for ESD (Cincera et al., 2022). In Ireland's case, the term Environmental Education (EE) has been used to deliver lessons of environmental issues related (O'Malley & Pierce, 2022). Ultimately, it has a similar aim: to cater to and equip students with environmental awareness.

In order to achieve that goal, the teacher, as a frontline of the education system, has a pivotal role. While curriculum and schooling are part of the education foundation, teachers interpret and deliver it into practice. Additionally, Mastrilli (2005) and Schatz (1996) emphasised that teachers as an educator are not only equipped with pedagogical skills but also possess concern and awareness of environmental problems, especially in their surroundings, a school, for example. Another critical point is that teachers also have to master the characteristic of the EE (Nurwidodo et al., 2020) so they can convey it effectively. Several learning methods have already been implemented to deliver EE in the classroom, such as the school gardening (Situmorang & Tarigan, 2018) and brainstorming local issues (Dagamac & Darmawan, 2021) could be alternative methods in EE learning. Hence, teachers are supposed to be mastering the planning and leading of the EE learning process.

Yet, Indonesia's teachers have different experiences regarding teaching EE, especially in secondary school. Some teachers have difficulty interpreting the EE point in the curriculum (Dagamac & Darmawan, 2021; Utomo, 2005), while others could manage it (Prihantoro, 2014; Wakhidah et al., 2022). On the one hand, EE has already been incorporated into the learning process (Dagamac & Darmawan, 2021; Situmorang & Tarigan, 2018; Warju et al., 2017), but on the other, it is barely implemented or not at all (Kusmawan et al., 2009; Parker & Prabawa-Sear, 2019). Moreover, EE has challenges and opportunities in its learning and implementation in Indonesia's secondary schools that occurred in different circumstances. Therefore, this essay will discuss teachers' perspectives in terms of EE interpretation in the 2013 curriculum, the implementation of EE in the classroom and finally, the EE challenges and opportunities. This essay will be finalised with recommendations from the literature.

Indonesian Teachers' Perspective Towards Environmental Education in Secondary School

Teachers and the 2013 Curriculum in the Environmental Education Context

Some teachers have hardness to interpreting the EE concept in the curriculum. On the one hand, teachers voice that the EE in the curriculum is unclearly stated and confuses them (Dagamac & Darmawan, 2021). Because in the 2013 curriculum, EE is not a subject, it is incorporated into the learning objectives of some subjects, namely science and geography. Although it is stated, Parker (2016) and Parker and Prabawa-Sear (2019) explain that the instruction from the curriculum is still vague and indescribable. On the other hand, some teachers believe that the curriculum has a strong message on implementing EE in the learning process (Prihantoro, 2014; Wakhidah et al., 2022). So they could incorporate the EE in the classroom and use a specific method to engage students in EE learning, however, even when the teacher is able to interpret the EE in the curriculum. In another case, some teachers have a tendency to implement the curriculum they are familiar with. It is in line with Utomo (2005) study, which mentioned that teachers are more comfortable using the curriculum that they already master and are familiar with in the classroom. Yet, the teachers opine that they know the core competency of the new curriculum. Thus, interpreting the curriculum and implementing EE in the classroom is a challenge for EE to incorporate into the learning process.

Based on the literature, the curriculum mentions the core competency *to care* for nature, yet this is still an abstract term due to the broad definition of caring the nature. In spite of the teacher's pedagogy skills and teaching experience, interpreting the EE concept in the curriculum still becomes an issue to implement in the classroom. Also mentioned by Parker

(2016) that the 2013 curriculum almost lacks the EE concept, but it contained caring for nature as a core competency in the learning objectives. Hence, it is one of the problems contributing to the teacher's comprehension of EE interpretation in the curriculum. Moreover, science teachers in Palembang thought that the curriculum could be changed and cater to a specific subject that concerned EE (Dagamac & Darmawan, 2021). Since the curriculum is the root of the educational component, a suitable curriculum should be imposed to create contextual learning of EE at the secondary level.

The Implementation of Environmental Education in the Learning Process

Implementation of EE in the classroom is challenging if the teachers have little teaching experience. For instance, young teachers have difficulty implementing the EE in the 2013 curriculum Dagamac and Darmawan (2021); other than struggling to interpret EE in the curriculum, young teachers also have issues adapting EE into the classroom context (Hernawan et al., 2021). However, despite the vague context of EE in curriculum and learning objectives in secondary school, some teachers already attempted to incorporate the EE concept into the module and learning process, especially senior teachers with long teaching experience. Science teachers in Palembang have already incorporated the EE context in their learning process, especially in the science and geography (Dagamac & Darmawan, 2021), while in Jakarta, teachers already compile EE into the lesson planning and deliver the EE into the extracurricular activity, namely through scouts (Amini, 2015) and science club activities (Nada et al., 2021). The implementation of EE has been conducted due to some teachers' experience in delivering EE subjects in previous Indonesia's curriculum, which is the school-based curriculum (KTSP). Therefore, EE implementation in the classroom might be influenced by the teaching experience. To some extent, the curriculum in this context has a minor influence on the EE learning process. Because in spite of the unclarity of EE in the curriculum, senior teachers are still able to incorporate EE in the class.

The implementation of EE into class activities has numerous methods, but still, there is an issue in some cases. For example, a finding of (Kusmawan et al., 2009) study indicates that some teachers still teach in the conventional method without adjusting or improving the learning activity in terms of the EE approach. Moreover, teachers still lack EE comprehension and the skill to incorporate it into the subjects (Dagamac & Darmawan, 2021; Parker & Prabawa-Sear, 2019). Thus, they are unsure how to deliver the EE concept in the lesson or do it in the lecture method without adapting unique approaches. However, another study mentions that in Palembang, teachers bring a local issue to stimulate pupils and involve them in problem-solving conditions by asking several questions to initiate the discussion (Dagamac & Darmawan, 2021). While Kusmawan et al. (2009) study illustrates a learning process to expose students to their surrounding area, chemistry teachers try to engage their students in local community and field research activities to investigate and observe the local environmental issues. These studies mentioned how teachers have already immersed the EE concept in the learning process and improvised the context of EE by their own understanding. It shows that Indonesia's teachers already possessed proper EE comprehension so that they could apply it in the classroom.

Furthermore, the implementation of EE in Indonesia's schools has a remarkable program that was created by the government. It is called *Adiwiyata* (green school program). A study suggests that the green school program has a minor effect on improving students' and teachers' natural awareness (Djuwita & Benyamin, 2019). Moreover, the teachers' perspective towards nature preservation is a character they already possessed before the green

school program was held in the school (Calhoun, 2007). However, in the green school program, one of the assessed criteria is the teacher's understanding of environmental issues and the implementation of environmental awareness in the classroom. Thus, the schools joining this program must equip their teachers with comprehensive EE knowledge. The study of teachers in the green school program shows that teachers in the school who join the program possess a better understanding of the EE implementation in the class and an awareness of the environmental problems and nature preservation (Warju et al., 2017). The studies also indicate that the characteristic of green school teachers in terms of environmental awareness is excellent (Warju et al., 2017; Situmorang and Tarigan, 2018). Therefore, EE implementation through a green school program is an activator to induce natural awareness in the learning process since the trait of it is already planted inside the human mind.

Despite the self-initiation of EE implementation in the classroom by teachers in secondary school, some cases illustrate the hardship of teachers to incorporate EE in the learning process. Therefore, this essay supports the notion from Parker (2016) that EE implementation in the classroom is a learning component that needs to be enlightened since the 2013 curriculum only implies it in several subjects and does not integrate it into the core competency (Parker, 2016). Hence, it affects teachers' understanding of it and hinders its implementation in the classroom. Because self-regulated and highly motivated teachers are still a minimum number in Indonesian secondary schools (Kusmawan et al., 2009; Parker, 2016), providing a comprehend and appropriate guidelines to the teacher might be an alternative to aid teachers in EE implementation. Nevertheless, some teachers have tried to engage the classroom activity by incorporating the EE concept into the learning process.

Challenges and Opportunities of Environmental Education

EE implementation in secondary school has various obstacles. For instance, In (Cholil & Parker, 2021; Dagamac & Darmawan, 2021) study shows that teachers delivered the three main challenges in implementing EE, whether in the school or society, and these three challenges are (1) Regulation; (2) Indonesians' traits; and (3) Students' attitude. These studies mentioned that the Indonesian government have a tendency to act when the situation of the environmental problem gets worse, so prevention or preservation is rarely offered by the government. While Indonesian and its young generation, the students, have sufficient theoretical knowledge regarding the issue, the practical implementation and knowledge still need to be improved (Debrah et al., 2021; Zaman, 2014). The young generation, especially, is unable to open their mind to the local issue. On the contrary, also mentioned the opportunity for EE application in school, such as (1) Teachers' initiative to take the environmental issue into account (Dagamac & Darmawan, 2021); (2) The green school program (Dagamac & Darmawan, 2021; Warju et al., 2017). Therefore, the role of the teacher to plant environmental awareness in the students in their early development is crucial so the young generation could be more open mind and aware towards their surroundings.

Despite the opportunities for EE implementation in secondary school, the challenges of this process are higher. For instance, the initiation of incorporating EE in the classroom have been conducted in prestigious school with experienced teachers (Parker, 2016; Parker & Prabawa-Sear, 2019), such as private green school and highly reputed public school. On the other hand, it might be challenging to implement EE in the local school where experienced and skilful teachers are most likely inadequate. Whilst the green school program could gain student attainment on the environmental issue, the teacher also could stimulate an active learning process in the actual situation (Warju et al., 2017). Albeit, another study stated that

green school programs have a minor effect on the environmental awareness of students and the school staff (Parker & Prabawa-Sear, 2019). Therefore, EE implementation is not merely a teacher's duty, but it is correlated with other aspects, from government policy to societal norms. Another point that is worth noting, families are also a pivotal factor in making the EE implementation could be done both inside and outside the school.

Environmental Education in the Global Context

In The UK, ESD has been implemented and systematically regulated by the government. However, it is more government policy initiatives that may not have been based on broader educational debates and thinking (Bourn, 2008). While in Germany, the curriculum has specified ESD throughout early childhood to higher education and varied among states and institutions (Singer-Brodowski et al., 2019) In Australia, the EfS has been assigned by the state & federal government while in the field, educator could innovate the method, namely community engagement (Wilson, 2012). Reflecting on the other countries' EE integration in the curriculum, it shows that EE has been part that the government and the educators take into account. On the contrary, the Indonesian government's decision to remove EE from the latest curriculum shows a different concern in the Indonesian education system. Even though the local and national environmental crisis has been on the verge in these past years, the government is still more focused on the students' hard skills to soft skill, such as environmental literacy and awareness.

Conclusion

As the frontline of the education system, teachers should be able to implement the EE concept into the learning process. However, the hindrance to incorporating EE in the classroom still occurs in secondary school. Due to the clarity issue of EE in the 2013 curriculum, teachers are unable to interpret the EE and the EE is only incorporated into some subjects, namely science and geography. Thus, teachers encounter difficulty in implementing EE in the class. Even though senior teachers with a long teaching experience have a minor issue regarding EE interpretation in the curriculum, it is different to the young teachers' context. Young teachers have difficulty because they lack EE teaching experience since EE is not a subject in the 2013 curriculum, unlike the senior teachers who already gained EE teaching experience when the KTSP curriculum was implemented. Therefore, the gap in prior experience in teaching EE is different between the two groups. The issue is worsening due to the unclarity of EE explanation in the 2013 curriculum.

In spite of the opportunity and challenges of the EE learning process in secondary school, some teachers already attempted to incorporate EE in the classroom. Innovating the method to deliver EE into the class, teachers engaged the students in the EE learning to introduce nature awareness and preservation. Furthermore, the green school program contributes to the EE practical activities in the school. However, the challenges hinder the process of EE implementation, namely the removal of EE subjects in the 2103 curriculum. Hence, EE is not a priority learning objective, and teachers tend to neglect it in the learning process. Due to the hindrance and challenges in the EE learning process. Finally, this essay opines that the teachers' perspective towards EE has changed, and it affects the EE implementation in the class.

Recommendation

For teachers: Delivering EE in the 2013 curriculum is not a mandate; equipping students with environmental awareness is significant for their future and their behavior towards nature.

For schools: Implementing EE in the classroom needs support from the school. For instance, building competence and confidence in the teaching context is a program that could be offered by schools. Hence, teachers' capabilities would be updated and sharpened.

For stakeholders: Removing EE as a subject in the 2013 curriculum is backwards since EE has a comprehensive lesson and an effective method to plant environmental awareness to the students. Therefore, this essay believes that EE in the 2013 curriculum should be separated into a subject.

Acknowledgement

The Indonesia Endowment Funds for Education (LPDP) has made a significant contribution to support the study of the author at Monash University. Hence, the author could conduct the study.

References

- Adlong, W., & Dietsch, E. (2015). Environmental education and the health professions: framing climate change as a health issue. *Environmental Education Research*, 21(5), 687-709. <https://doi.org/10.1080/13504622.2014.930727>
- Almeida, S. C., Moore, D., & Barnes, M. (2018). Teacher Identities as Key to Environmental Education for Sustainability Implementation: A Study From Australia. *Australian Journal of Environmental Education*, 34(3), 228-243. <https://doi.org/10.1017/aee.2018.40>
- Amini, R. (2015). Outdoor based environmental education learning and its effect in caring attitude toward environment. *Jurnal Pendidikan IPA Indonesia*, 4(1). <https://doi.org/10.15294/jpii.v4i1.3500>
- Bourn, D. (2008). Education for sustainable development in the UK: Making the connections between the environment and development agendas. *Theory and Research in Education*, 6(2), 193-206. <https://doi.org/10.1177/1477878508091112>
- Calhoun, C. J. (2007). *Classical Sociological Theory*. Blackwell.
- Cholil, S., & Parker, L. (2021). Environmental education and eco-theology: insights from Franciscan schools in Indonesia. *Environmental Education Research*, 27(12), 1759-1782. <https://doi.org/10.1080/13504622.2021.1968349>
- Cincera, J., Kroufek, R., & Bogner, F. X. (2022). The perceived effect of environmental and sustainability education on environmental literacy of Czech teenagers. *Environmental Education Research*, 1-18. <https://doi.org/10.1080/13504622.2022.2107618>
- Dagamac, N. H., & Darmawan, M. D. (2021). Situation of Environmental Education in Senior High School Programs in Indonesia: Perspectives from the Teachers of Palembang. *Interdisciplinary Journal of Environmental and Science Education*, 17(3). <https://doi.org/10.21601/ijese/9605>
- Debrah, J. K., Vidal, D. G., & Dinis, M. A. (2021). Raising Awareness on Solid Waste Management through Formal Education for Sustainability: A Developing Countries Evidence Review. *Recycling*, 6(1).
- Djuwita, R., & Benyamin, A. (2019). Teaching Pro-Environmental Behavior: A Challenge in Indonesian Schools. *Psychological Research on Urban Society*, 2(1). <https://doi.org/10.7454/proust.v2i1.48>
- Hernawan, A. H., Darmawan, D., & Ali, M. (2021). Environmental Education Based on Local Values: Its Integration in the Indonesian Elementary School Curriculum. *Journal of Human University Natural Sciences*, 48(10). <http://jonuns.com/index.php/journal/article/view/774>

- Jorgenson, S. N., Stephens, J. C., & White, B. (2019). Environmental education in transition: A critical review of recent research on climate change and energy education. *The Journal of Environmental Education*, 50(3), 160-171. <https://doi.org/10.1080/00958964.2019.1604478>
- Kusmawan, U., O'Toole, J. M., Reynolds, R., & Bourke, S. (2009). Beliefs, attitudes, intentions and locality: the impact of different teaching approaches on the ecological affinity of Indonesian secondary school students. *International Research in Geographical and Environmental Education*, 18(3), 157-169. <https://doi.org/10.1080/10382040903053927>
- Mastrilli, T. (2005). Environmental Education in Pennsylvania's Elementary Teacher Education Programs: A Statewide Report. *The Journal of Environmental Education*, 36(3), 22-30. <https://doi.org/10.3200/JOEE.36.3.22-30>
- Nada, H. N., Fajarningsih, R. U., & Astirin, O. P. (2021). Environmental education to build school members' character. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 7(1), 43-52. <https://doi.org/10.22219/jpbi.v7i1.14283>
- Nomura, K. (2009). A perspective on education for sustainable development: Historical development of environmental education in Indonesia. *International Journal of Educational Development*, 29(6), 621-627. <https://doi.org/10.1016/j.ijedudev.2008.12.002>
- Nurwidodo, N., Amin, M., Ibrohim, I., & Sueb, S. (2020). The role of eco-school program (adiwiyata) towards environmental literacy of high school students. *European Journal of Educational Research*, 9(3), 1089-1103. <https://doi.org/10.12973/eu-jer.9.3.1089>
- O'Malley, S., & Pierce, J. (2022). Mainstream or margins? The changing role of environmental education in Irish primary school curricula, 1872 to 2021. *Journal of Outdoor and Environmental Education*. <https://doi.org/10.1007/s42322-022-00118-w>
- Parker, L. (2016). Religious environmental education? The new school curriculum in Indonesia. *Environmental Education Research*, 23(9), 1249-1272. <https://doi.org/10.1080/13504622.2016.1150425>
- Parker, L., & Prabawa-Sear, K. (2019). *Environmental education in Indonesia: Creating responsible citizens in the Global South?* Routledge.
- Prihantoro, C. R. (2014). The perspective of curriculum in Indonesia on environmental education. *International Journal of Research Studies in Education*, 4(1). <https://doi.org/10.5861/ijrse.2014.915>
- Schatz, C. (1996). When Bambi Meets Godzilla: Bringing Environmental Education and Outdoor Recreation Together. *Journal of Environmental Education*. <https://files.eric.ed.gov/fulltext/ED404088.pdf>

- Singer-Brodowski, M., Brock, A., Etzkorn, N., & Otte, I. (2019). Monitoring of education for sustainable development in Germany – insights from early childhood education, school and higher education. *Environmental Education Research*, 25(4), 492-507. <https://doi.org/10.1080/13504622.2018.1440380>
- Situmorang, R. P., & Tarigan, S. D. (2018). Cultivating students' environmental awareness by creating bottle garden in school: A qualitative study. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 4(3), 263-270. <https://doi.org/10.22219/jpbi.v4i3.6785>
- Stapp, W. B. (1969). The Concept of Environmental Education. *Environmental Education*, 1(1), 30-31. <https://doi.org/10.1080/00139254.1969.10801479>
- Tilbury, D. (2004). Environmental Education for Sustainability: A Force for Change in Higher Education. In P. B. Corcoran & A. E. J. Wals (Eds.), *Higher Education and the Challenge of Sustainability: Problematics, Promise, and Practice* (pp. 97-112). Springer Netherlands. https://doi.org/10.1007/0-306-48515-X_9
- Utomo, E. (2005). *Challenges of curriculum reform in the context of decentralization: The response of teachers to a Competence-Based Curriculum (CBC) and its implementation in schools* University of Pittsburg <http://d-scholarship.pitt.edu/10185/>
- Wakhidah, N., Erman, E., & Tan, I. (2022). Examining environmental education content on Indonesian Islamic religious curriculum and its implementation in life. *Cogent Education*, 9(1). <https://doi.org/10.1080/2331186x.2022.2034244>
- Warju, Harto, S. P., Soenarto, & Hartmann, M. D. (2017). Evaluating the Implementation of Green School (Adiwiyata) Program: Evidence from Indonesia. *International Journal of Environmental & Science Education*, 12(6), 1483-1501. <http://www.ijese.net/makale/1914.html>
- Wilson, S. (2012). Drivers and Blockers Embedding Education for Sustainability (EfS) in Primary Teacher Education. *Australian Journal of Environmental Education*, 28(1), 42-56. <http://www.jstor.org/stable/26420534>
- Zaman, A. U. (2014). Measuring waste management performance using the 'Zero Waste Index': the case of Adelaide, Australia. *Journal of Cleaner Production*, 66, 407-419. <https://doi.org/https://doi.org/10.1016/j.jclepro.2013.10.032>

Contact email: adhitya.amarulloh@outlook.com

Rethinking Inclusive Education in Portugal

Nuno Fraga, University of Madeira, Portugal
Gorete Pereira, University of Madeira, Portugal
Maria José Camacho, University of Madeira, Portugal

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

After the Salamanca Statement, UNESCO (2017) reiterated the challenge that every student matters and matters equally. Therefore, the policies, practices and culture of inclusion must dictate the guarantee of equity, coating with authenticity an education aimed at “for all,” “with all” and “by all,” through political decision-makers, educational agents and of societies that have the duty and mission not to let the fundamental values inherent in human coexistence fade away. In this context, being able to learn, relate and cooperate with others is particularly important, in the context of the growing complexity of contemporary societies. The school plays an important role in valuing learning for a democratic experience, which has led to the adoption of new forms of collaborative work, justified by the resulting benefits. The narrative of the educational policy, in the field of Inclusive Education, has enabled the understanding of the pedagogical space, beyond the walls of the school. The vision of a school that doesn’t close in on itself and that finds spaces for pedagogical and curricular emancipation in its glocal territory presents itself as a future scenario for education. This essay is a critical reflection, based on a hermeneutic approach that, structured in pedagogical thinking, underpins Inclusive Education in Portugal, and juxtaposes it with the potential of teachers' collaborative work and the assumption of the territory as an educational space. It insists, therefore, on the mobilization of knowledge that conveys several possibilities of together (UNESCO, 2021) imagining other possible scenarios for an education with equity.

Keywords: Inclusive Education, Collaborative Work, Education Policy, Portugal

iafor

The International Academic Forum
www.iafor.org

Introduction

The inclusive school is an unshakable right. However, constructing an inclusive school demands the collaboration of different decision-makers and actors to ensure it becomes a reality, effective, and efficient. Therefore, the dynamism inherent in the educational process and knowledge should not be exhausted in terms of individualistic performance but should be based on collaborative, dialoguing, and enlightened practices. These practices lead to horizons of exploratory exercises that allow students to blossom and link transforming skills. These skills offer them the possibility of intertwining theoretical and practical elements, which constitute their present expectations, with the teachings from actors and scenarios that have laid the foundation of the past, leaving us a legacy prodigal in possibilities.

In this sense, we agree with Hannoun (1997) when he states:

The educator is a navigator who studies his route by all the scientific means at his disposal, but who, before leaving, freely chose the direction to take and bet on it. Navigating implies obedience and a wagered choice: obedience to the weight of the means to carry out the route and personal choice of the route (...). This is reflection and choice. The instruments of the first are observation, induction, deduction, and other verification; the second is a matter of extra-rational decision (...) (p. 163)

Indeed, the last few decades of contemporary times have been prodigal in the struggle for Inclusion, judging by the emphasis on intentions, speeches, recommendations, and regulations and by the efforts made to put it into practice, in a harmonious and effective way.

Gradually, the philosophy of inclusion dictated the choice of effective and efficient care measures. In this regard, Correia (2008) declared:

The existence of a process that allows adequate responses to the needs of students with special needs (SEN) is the first step towards their educational success. In this sense, any process that we intend to implement, must make the collaborative work between regular education teachers, special education teachers, other education professionals and parents based on reliable interventions, proven by research, that facilitate the individualization of teaching, the implementation of strategies that meet the abilities and needs of these students and the monitoring of their performance, considering their global functioning. (p. 21)

The Potential of Collaborative Work and the Rationale for Inclusion

Collaborative work and its potential, particularly in the school space, have gained notoriety as strategies to improve the performance of school institutions.

This emerging process is referred to in several legal regulations, which highlight the necessity of collaborative work between teachers. For instance, Law 137/2012, of July 2, approves the regime of autonomy, administration, and management of public establishments of pre-school education and basic and secondary education. Considering the development of the educational project, the structures that collaborate with the pedagogical council and the director are established in the internal regulations in order to promote collaborative work and “the articulation and curriculum management must promote cooperation between teachers.” (Portugal, 2012, articles n.º 42 and n.º 43, point 1).

Law n.º 55/2018, of July 6, which establishes the basic and secondary education curriculum and the guiding principles of learning assessment, highlights in its guiding principles the “valuation of collaborative and interdisciplinary work in planning, carrying out, and evaluating teaching and learning” (Portugal, 2018). This new legal framework aims to promote educational quality and efficiency, stating that different forms of the organization of pedagogical dynamics can be implemented. Notably, these include those that assume collaborative work, the exchange of knowledge and experiences, through collaboration practices between teachers from the same year or cycle, from different cycles and levels of education, and from different subject areas, as well as temporary exchanges between teachers from the same area or subject area (Portugal, 2018).

This vision is also reinforced by Law n.º 54/2018, of July 6, which establishes the legal framework for inclusive education in Portugal. In terms of the lines of action for inclusion, it sets out that:

Schools must include in their guiding documents the lines of action for the creation of a school culture where everyone finds opportunities to learn and the conditions to fully realize themselves, responding to the needs of each student, valuing diversity, and promoting equity and non-discrimination in access to the curriculum and progression through compulsory education. (Portugal, 2018a)

In this framework of inclusive education, it should be noted that support measures for learning and inclusion should be developed in a collaborative work logic and co-responsibility with special education teachers, depending on the specificities of the students (Portugal, 2018a). This collaborative effort (UNESCO, 2021) is reinforced by the UNESCO report, *Reimagining our futures together: a new social contract for education* (2021), when it states in the field of proposals for renewing education that: “teaching should be further professionalized as a collaborative endeavor where teachers are recognized for their work as knowledge producers and key figures in educational and social transformation” and that “schools should be protected educational sites because of the inclusion, equity and individual and collective well-being they support – and also reimagined to better promote the transformation of the world towards more just, equitable and sustainable futures” (UNESCO, 2021, p. 4).

Nevertheless, evidence points to difficulties in implementing collaborative work among teachers, in part due to individualistic practices, which have long typified teaching work. These practices are built and rooted in the professional and organizational culture of teachers and schools (Roldão, 2007). This teaching isolation originates from factors such as the architecture of schools, the structure of their schedules, work overload, and the history of the teaching profession itself (Fullan & Hargreaves, 2000).

According to Pacheco (1998), the teacher’s pedagogical action in a single teaching regime also contributed to this teaching individualism. It's based on pedagogical practices that took place in the refuge of their classroom, with their students, their own methods, their manuals, and their “lack of multidisciplinary competence” (p. 161).

Today, emerging collaborative cultures create and sustain “more fulfilling and productive work environments. By empowering teachers and reducing the uncertainties of their work – which would otherwise have to be faced in isolation – these cultures also increase student success” (Fullan & Hargreaves, 2001, p. 90).

The authors underscore the importance of collaborative work and planning among teachers, who, by sharing and developing their skills together, can optimize their pedagogical action, instead of dealing in isolation with the demands of the educational context. Sebarroja (2001) appreciates shared work and asserts that “the main driving force of change are the teachers who work in a coordinated and cooperative manner in schools” (p. 29).

Also, Silva (2002) admits that “the probability of successfully solving a problem in cooperation is much greater than individually, as knowledge and specialties are shared during this interaction and the articulation of different proposals promotes a more adequate solution” (p.49). Hopkins (2005) considers that the school should promote collaborative work with the objective of “School Improvement”, which promotes the academic success of students and facilitates change and improvement in the school.

The school committed to innovation and change is, therefore, challenged to promote a culture of collaboration, understood as a teacher’s professional development strategy, and which, according to Hargreaves (1998), leads to “a greater willingness to experiment and to take risks” (p. 209). For the author, the orthodoxy of change brings together collaboration and collegiality, and encourages the sharing of knowledge among teachers, as well as the expansion of skills, an increase in their professional development.

Identity Pathways of Inclusive Education in Portugal: The Case of the Autonomous Region of Madeira

Sustained by the previous assumptions, we wanted to situate the route taken by the Autonomous Region of Madeira, considering the peculiarity of political, operational, and cultural decisions and the positive effects that it triggered in the field of inclusion.

We begin by highlighting the creation of the Regional Directorate for Special Education and Rehabilitation (DREER) (the only one in Portugal) with the mission of supervising Special Education and Rehabilitation services in Madeira. The guiding beliefs of the decision-makers in DREER are: Ideology (in the determination and binding of ideals and principles); Policy (in support of regulations, measures and options); Social structure (in welcoming and legitimizing means); Places (in the singularity of contexts and influence on action); Culture (in the dissemination of attitudes, choices and commitments); Paradigms (in the relationship between knowledge and change) and Practices (in establishing and consolidating responses).

The history of Special Education in Madeira was triggered by the need to welcome and look at the differences that segregated Madeiran children and young people. Afterwards, its protagonists were weaving the indelible threads of a web that was as fragile as it was vigorous, in the harmony of their daring. Associating it with the symbolic image of Galeano (2015) we can say that we find in it the exercise of a Microscopic look - seeing what we cannot see with the naked eye and that deserves to be looked at; and at the same time a Telescopic look - to look, from the hole of our keyholes, at the grandeur into which small and insignificant things can transform.

And, because, as Gedeão (1971) stated, “(...) there are no two identical leaves in all of creation; either less vein or too many cells, there are certainly no two sheets alike (...)” (p. 65) gradually, DREER focused its gaze on otherness, not to demean or exclude those with special needs, but to build tolerance and awareness, constituted in primacy that mobilized dreams and desires, arising from people and from the recommendations of international organizations.

In fact, it is from this body, led by political and educational decision-makers, that proactive actions have been adjusted and implemented to the local reality, based on international dictates and recommendations regarding inclusion. To this end, they surrounded themselves with specialized human resources, in different functional and knowledge areas, conceived and encouraged the appropriation of instruments, rules and regulations, around which they founded ideals and driving forces, optimizing, in our opinion, the very sharp motto that the Council for Exceptional Children (USA) launched in 2017: “All Educators. Every Child. No Limits.”

Aiming to be viewed in a holistic way, Special Education services have established their foundations in the attention and acceptance of difference, in the belief that inclusion, conveyed in the different domains of family, social, economic, and cultural life, brings out the value and benefits of a fairer and more supportive society for all, in the promotion of equal opportunities, based on non-discrimination of those with special needs. Referring to this “Education for All” Camacho (2016) states:

As a dynamic process and receptacle for the multiple transformations that contemporary societies are instilling in it, inclusion demands that we revisit the paths taken, in an attempt to rediscover the roots that made it sprout, from a set of unsuspected utopias, which elected the school for all as an institution that includes all people, accepts differences, supports learning, and responds to individual needs. (p. 32)

In order to establish and promote inclusive education in Madeira, and drawing from the experience acquired and honed in the light of scientific studies and appeals from international bodies in the area of education and human rights, measures and regulations were resized to confront and eradicate the pedagogical indifference of some practices. These practices were based on the philosophy of the masterful lesson and the concept of the ideal student, as a guaranteed standard of success. Among others, we highlight the following norms: Public Law (94/42/1975), USA; Warnock Report (1978), UK; Jomtien Conference (1990), Thailand; Declaration of Salamanca (1994), Spain; Charter of Luxembourg (1996); Declaration of Madrid (2002), Spain.

To this end, among many other measures, action-research projects were launched within regular education establishments. These projects sought to push aside perfunctory assistance and didactic facilitation, which were countless times coated with drastic and obstructive curricular adaptations that hindered access to the skills and knowledge that the academic path promised. In addition, transdisciplinary intervention was chosen as a proposed course of action, opening its staff to professionals from key areas, namely, speech therapists, occupational therapists, physiotherapists, psychologists, social service technicians, psychometricians, dieticians, specialized teachers, and those from other areas, such as music education, physical education, visual education, and manual and workshop work.

We can assert that, in doing so, they fulfilled what was established in the Salamanca Statement (UNESCO, 1994) by participants at the World Conference on Special Needs Education: Access and Quality:

- To ensure that special needs education forms part of every discussion dealing with education for all in various forums,
- To mobilize the support of organizations of the teaching profession in matters related to enhancing teacher education as regards provision for special educational needs,

- To stimulate the academic community to strengthen research and networking and to establish regional centers of information and documentation; also,
- To serve as a clearinghouse for such activities and for disseminating the specific results and progress achieved at country level in pursuance of this Statement. (p. xi)

A year later, in 1994, the World Congress on Special Educational Needs was held by the Spanish Government, in collaboration with UNESCO. The event resulted in the Salamanca Statement, to which Portugal was also a signatory. This statement constituted an ideal for welcoming everyone into the school, promoting genuine inclusion.

The Salamanca Statement demonstrates how, despite the rarity or even non-existence of other similar services, regional decision-makers did not shy away from taking decisive action for those who clearly needed Special Education services as an alternative to regular education. This approach aligned with the guidelines issued by UNESCO at the time, which called upon the governments of various countries to include, in their decisions and policies, the integration of diverse individuals, acknowledging their right to equal opportunities and normalization.

In our effort to unpack the key ideas previously explored, we recognize that the milestones and events through which DREER consolidated its Special Education model were not a matter of mere chance. Rather, they were founded on political, social, and economic choices. These choices, coupled with the study and monitoring of emerging developments, especially in Europe, gradually shaped a distinctive organizational path. This was evident in the guiding principles of the service they proposed, as well as in the goals they aimed to achieve.

Surprisingly, and reinforcing what we have just stated, we found a letter from Gaston Mialaret addressed to the leaders of Madeira following his visit to the island:

(...) De retour en France, nous tenons à vous exprimer toute notre reconnaissance pour l'accueil que vous nous avez réservé lors de notre bref séjour à Madère (...) J'ai pu apprécier la qualité du travail effectué par l'équipe constituée par vous-même et trois de vos collègues.

En tant qu'organisateur du 6ème Congrès International de l'Association Internationale de Pédagogie Expérimentale de Langue Française (...) je serai heureux de **pouvoir profiter de votre expérience et de vos réflexions** en ce qui concerne les problèmes qui font l'objet du thème du Congrès.

Pourriez-vous demander à votre Gouvernement que l'équipe constituée par vous-même et vos trois collègues soient délégués comme représentants de l'île de Madère à notre Congrès?

Ci joint une invitation officielle pour le Congrès (...) j'espère avoir le plaisir de vous recevoir à CAEN en juillet 1987 (...) (Mialaret, 1987)

Conclusion

Conclusively, from the enthusiastic and significant action of decision-makers and educational actors, to which were added consequent decision-making, regulations, responses, and measures, the political-practice-culture triad was materialized and disseminated. It was equated

in different ways, through diverse protagonists, according to the concepts, principles, and philosophy of intervention that the different eras dictated.

As Silva and Fraga (2022) point out,

It is essential to admit that the educational action and the act of teaching imply making decisions, taking risks, assuming responsibilities on the part of teachers, which are not just of a technical nature. For the democratization of schools, the participation of conscious, free, and responsible subjects in the democratic decision-making process is essential, but the assumption of territories, their idiosyncrasies, and local processes of territorialization of public education policies must also be claimed. (p. 124)

It is understood that the history of inclusive education in Madeira was built, above all, from the autonomy conquered by the Region, mediated by the critical readings that it intends to construct, considering the global recommendations and policies in the field of special education and the idiosyncrasies of its educational, social, and cultural territory. People make the difference within organizations, so the role of leaders is presented as a relevant factor in the transformation of policies, institutions and specifically the processes and practices that intend to substantiate a system and an inclusive and democratic school.

We reinforce, therefore, that the narrative of the educational policy, in the field of Inclusive Education, has enabled the understanding of the pedagogical space, beyond the walls of the school. The vision of a school that doesn't close in on itself and that finds spaces for pedagogical and curricular emancipation in its glocal territory presents itself as a future scenario for education.

Acknowledgements

This research was funded in whole or in part by the Fundação para a Ciência e a Tecnologia, I.P. (FCT, Funder ID = 50110000187) under Grant (UIDB/04083/2020).

References

- Camacho, M. J. (2016). Estratégias de inclusão na escola e na sala de aula. In *Revista Diversidades* 48, 30-32. (in Portuguese)
- Correia, L. M. (2008). *A escola contemporânea e a inclusão de alunos com NEE. Considerações para uma escola com sucesso*. Porto Editora. (in Portuguese)
- Fullan, M., & Hargreaves, A. (2000). *A escola como organização aprendente: buscando uma educação de qualidade*. (2.a ed.). Artes Médicas. (in Portuguese)
- Fullan, M., & Hargreaves, A. (2001). *Por que é que vale a pena lutar? O trabalho de equipa na escola*. Porto Editora. (in portuguese)
- Gedeão, A. (1971). *Poesias completas*. Lisboa: Ed. Portugália. (in Portuguese)
- Hannoun, H. (1997). *Educação: Certezas e apostas*. Ed. UNESP. (in Portuguese)
- Hargreaves, A. (1998). *Os professores em tempo de mudança: o trabalho e a cultura dos professores na idade pós-moderna*. McGraw-Hill. (in Portuguese)
- Hopkins, D. (2005). *School Improvement for real*. Routledge/Falmer.
- Mialaret, G. (1987). Carta dirigida ao professor Eleutério em 16 de março de 1987.
- Pacheco, J. (1998). Fazer a Ponte. In J. Franco (Org.). *Experiências Inovadoras no Ensino: Inovação Pedagógica*. Instituto de Inovação Educacional, 159-180. (in Portuguese)
- Portugal. (2012). Decreto-Lei n.º 137/2012, de 2 de julho. Procede à segunda alteração do Decreto-Lei n.º 75/2008, de 22 de abril, que aprova o regime jurídico de autonomia, administração e gestão dos estabelecimentos públicos da educação pré-escolar e dos ensinos básico e secundário. (in Portuguese)
- Portugal. (2018). Decreto-Lei n.º 55/2018, de 6 de julho. Estabelece o currículo dos ensinos básico e secundário e os princípios orientadores da avaliação das aprendizagens. (in portuguese)
- Portugal. (2018a). Decreto-Lei n.º 54/2018, de 6 de julho. Estabelece o regime jurídico da educação inclusiva. (in Portuguese)
- Roldão, M. (2007). Função docente: natureza e construção do conhecimento profissional. In *Revista Brasileira de Educação*, 12 (34), 94-103. (in Portuguese)
- Sebarroja, J. (2001). *A aventura de inovar. A mudança na escola*. Porto Editora. (in Portuguese)
- Silva, J. (2002). *Cooperação entre professores: Realidade(s) e desafios*. Dissertação de Mestrado não publicada. ISPA. (in Portuguese)

Silva, S., & Fraga, N. (2022). O regime de autonomia e administração das escolas: do plano das intenções declaradas ao plano das ações. O caso da Região Autónoma da Madeira. *Revista Lusófona de Educação*, 55, 109–125.
<https://doi.org/10.24140/issn.1645-7250.rle55.07> (in Portuguese)

UNESCO. (1994). *The Salamanca Statement and Framework for Action on Special Needs Education*.

UNESCO. (2021). *Reimagining our futures together: a new social contract for education*.

Contact email: nfraga@staff.uma.pt

***Exploring AI in Education:
A Quantitative Study of a Service-Oriented University Chatbot***

Mascha-Lea Fersch, University of Applied Sciences Ansbach, Germany
Sigurd Schacht, University of Applied Sciences Ansbach, Germany
Betiel Woldai, University of Applied Sciences Ansbach, Germany

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The following paper presents the evaluation of an artificially intelligent assistant system (DIAS) with a service-oriented chatbot as a central communication element. The conversational AI (Artificial Intelligence) is supposed to increase information transparency in higher education environments and thus support students, teachers, and administrative staff. The exploratory study had two objectives: first, we intended to find out about the usability and utility of the DIAS chatbot using the CUQ (Chatbot Usability Questionnaire) score and benchmark the results against other conversational agents. Secondly, we were interested in possible effects among the different variables of interest, which could contribute to further theory development of chatbots in education. The results show that the DIAS chatbot scored above average, and can support students in finding relevant information, particularly if they use the assistant frequently. Positive aspects included the intuitive use, a welcoming persona (expressed in design & language) and easy navigation. The negative feedback showed potential for improvement particularly in content quality and handling dialogue mistakes, which is a general shortcoming of conversational AI at this development stage. The results can be used as a guidance for future research and theory building. However, they must be considered carefully due to several study limitations.

Keywords: Digital Learning, Service-Oriented Chatbot, Study Assistant, Educational Chatbot, AI

iafor

The International Academic Forum
www.iafor.org

Introduction

Artificial intelligence (AI) can help to address various challenges in education such as an increasingly unstructured supply of information and educational resources (Schurz et al., 2021), and complement traditional learning formats to promote important future skills like media and information competencies (Mebis, 2018). The DIAS project at Ansbach University of Applied Sciences created a digital assistant, who steers information in a targeted manner among other components. In addition to an AI-based chatbot as the central communication element, the virtual guidance system also includes planning, study analysis, and motivation applications. DIAS offers students added value through a robust information platform and the opportunity to effectively plan and pursue their studies, while simultaneously creating more resources for individual support by relieving the burden of email traffic for the administration. While the first stage of the project evaluation was dedicated to finding out why and how digital assistants can be successful in educational settings (Fersch et al., 2022), the main objective of this study was to explore user experiences with the DIAS chatbot among a larger sample group (n=103) and benchmark the results against other conversational agents. Specifically, we wanted to learn about students' usability issues when using the DIAS chatbot to optimize the current chatbot version continually. In addition to usability aspects, we were interested in the perceived utility of the chatbot for students based on the project's objective to give students better control over their study situation and reduce the frustration and time spent gathering information. Furthermore, we intend to explore and structure the results to detect possible effects, which might contribute to the theoretical development of the research field. In the following we will present a theoretical background to chatbots in education, before explaining the DIAS chatbot component in detail. Consequently, we will highlight the methodology of this study, present and discuss the results and finally explain limitations and potential for future research.

Theoretical Background

Definitions and Classifications

Chatbots are “digital systems that can be interacted with entirely through natural language via text or voice interfaces. They are intended to automate conversations by simulating a human conversation partner and can be integrated into software such as online platforms, digital assistants, or be interfaced through messaging services” (Wollny et al., 2021, p.2). Conversational AI in the educational sector can provide interactive learning, ranging from knowledge tests to encouragement, learning advice, and reminder functions. A particular benefit of digital assistants in educational environments is the personalized learning experience, as they can individually adapt to the student's way and speed of learning (Clarizia et al., 2021). As a 24-hour support service, chatbots can facilitate academic information flow and meet the students' needs anytime (Alexander et al., 2019). DIAS can be classified as a “service-oriented” (Pérez et al., 2020) chatbot and according to the framework of Wollny et al. (2021) assumes an assisting pedagogical role, intending to increase the efficiency of education through answering FAQs, hence making information fast and easily available for students and teachers. Unlike teaching-oriented chatbots, service chatbots do not impart subject-specific knowledge, e.g. on language learning (Pérez et al., 2020).

Evaluation of Educational Chatbots

Literature suggests different quality criteria for educational assistants such as humanity, affect and accessibility (Radziwill & Benton, 2017; Smutny & Schreiberova, 2020), as well as learning success, acceptance, motivation, usability, technical correctness, psychological factors and further beneficial factors (Hobert & Meyer von Wolff, 2019) among other factors. Pérez-Marín (2021) defined a classification framework containing pedagogical and social aspects for chatbot design. Shawar and Atwell (2007) suggest choosing the evaluation criteria and methodology based on the user needs and the specific goal of the application, not necessarily on established standards.

The successful use of conversational AI in an educational context has been empirically proven in prior research (Pérez et al., 2020). Most publications concern teaching-oriented chatbots, of which we will present a selection in the following. In an evaluation of 47 educational chatbots, conversations with each were conducted and reviewed based on the aspects of teaching, humanity, affect and accessibility. The authors identified ten chatbots, which performed best in the beforementioned criteria. However, they also mentioned that chatbot development is still in the initial stage and cannot fully meet expectations (Smutny & Schreiberova, 2020). Verleger and Pembridge (2018) evaluated a chatbot interface for a computer programming course by reviewing and categorizing answers in the system's database, followed by a qualitative focus group study. Their results indicate the need for better development of the chatbot database before launch, as many students ceased using it due to the low response rate. Using conversational AI in language teaching can increase course performance compared to traditional teaching models. Among other aspects, study participants praised the intelligent tutor's easy usability and flexibility. (Vázquez-Cano et al., 2021). Also in mentoring processes, intelligent, digital assistants can be applied successfully. Thus, students who received feedback and guidance in reading and writing tasks during their self-study time reported a positive perception of the chatbot assistance (Neumann et al., 2021). Benotti et al. (2017) evaluated their chatbot programming platform with two observational studies based on the student's engagement such as participation, task completion and self-reported interest. Diachenko et al. (2019) report positive feedback from students and teachers who participated in an automated university course including a teaching-oriented chatbot.

Fewer empirical studies have been conducted on service-oriented chatbots in the educational field. Dibitonto et al. (2018) researched requirements for a possible future university chatbot through a low-level dialog system on the Facebook Messenger platform, LiSA, which served as a survey tool and a presentation/foretaste of the potential future university chatbot. Questions about the student's expectations and satisfaction with LiSA were also evaluated. The majority of users were satisfied or indifferent with the chatbot itself and found the conversation experience (of the survey) to be interesting and enjoyable. Students mostly wished for information, especially notifications on lessons, events, and other campus activities. The authors also highlighted the importance of a chatbot personality to react to potential loops and dialogue mistakes, which might trigger rude answers from users. Another study found that administrative effort can be reduced, and matriculation is more likely to be finished on time when using an AI-based assistant with personalized messaging (Page & Gehlbach, 2017). In an approach to evaluate a candidate service chatbot, Santoso et al. (2018) tested the system by measuring the number of correct answers to requests by the researchers. Galko et al. (2018) tested standard UX metrics such as error rate and post-session testing with a relatively small sample group of five people for a service chatbot to facilitate the university

application process. They compared the results to the traditional application form and reported an improvement in user experience. The chatbot Jill Watson was developed to answer common FAQs in computer science courses. During the two-year usage of the AI assistant the research team mainly reported positive feedback on the chatbot. However, they also expressed ethical issues of the conversational agent especially when addressing underrepresented females in the male-dominated course (Eicher et al., 2018). A focus group on the DIAS chatbot in April 2022 showed that students particularly appreciate a vivid persona, appealing design, accurate, guided, direct answering, and optional push-messaging (Fersch et al., 2022). Educational chatbots are currently in a stage in which research is growing and expectations of the technology are high. However, there is still little practical experience (Smutny & Schreiberova, 2020; Wollny et al., 2021). While most of the research on educational chatbots deals with design questions concerning e.g. personality and pipeline, fewer studies have been published on the actual utility of chatbots in education (Wollny et al., 2021). Furthermore, most studies evaluating educational chatbots were conducted with an insignificant sampling population (Okonkwo & Ade-Ibijola, 2021).

DIAS Chatbot Development

A conversational AI represents the communication/information component of the DIAS system. In the first development phase, teaching and administrative staff collected quality-assured standard answers, which were integrated into the conversational AI in a rule-based approach. In the second phase, the chatbot will be trained for AI-based answer generation to deal with individual (non-standard) questions based on a self-uploading knowledge base. The chatbot's design, character traits, and conversational tone were based on a pre-developed persona, which aims to create a more personalized conversation experience (Braun & Alt, 2020). As an additional feature the DIAS chatbot also offers scientifically based learning advice in the following categories: concentration, productivity, and memorization e.g. "When compiling your notes, you should place the most important learning content at the beginning and end. The information positioned there can (usually) be better retained by your memory." The chatbot can currently be accessed at all times on the university's website, and will be integrated into messaging apps for more convenient use.

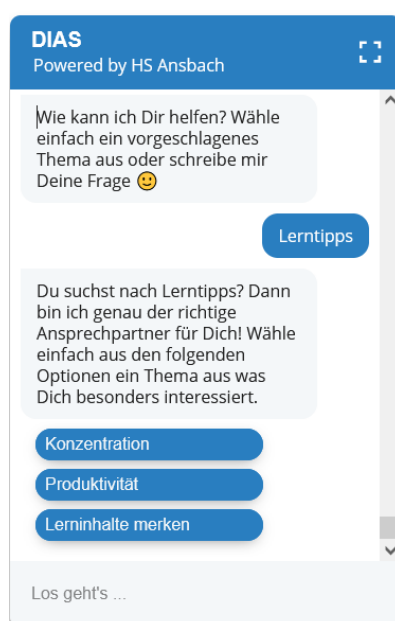


Figure 1: DIAS chatbot conversation

Methodology

Research Design

We used a questionnaire consisting of questionnaire instructions, content questions, open questions, and statistical information (see appendix table 1). For the content questions we decided to use an established psychometric scale, to ensure higher reliability and validity than single items and to make the study results comparable with similar studies. In the educational sector we could identify only one similar, quantitative study from Neumann et al. (2021), which used the System Usability Scale (SUS) for evaluation. However, as Larbi (2022, p.3) states – the SUS is “not recommended for usability testing of conversation-driven systems since they exploit other design principles”. Two other studies from non-educational backgrounds were found to have developed and validated scales to assess the quality of conversational agents (Borsci et al., 2021; Holmes et al. 2019). For this study we decided to use the Chatbot Usability Questionnaire from Holmes et al. (2019), since it has been previously applied in other studies (Larbi et al., 2021; Larbi et al., 2022), thus providing a benchmark for comparison of results. The translation of the English scale was done with the forward and backward translation technique (Toma et al., 2017). Table 1 in the appendix lists the German translation of the Chatbot usability questionnaire. The questionnaire consists of 16 items with eight positive and eight negative statements and is rated on a 5-point Likert scale (from strongly disagree to strongly agree). The CUQ can be compared to the SUS as scores are likewise calculated out of 160 and normalized to 100, with an average benchmark score of 68 (Holmes et al., 2019; Larbi et al., 2022). Apart from the CUQ questionnaire we added two questions on how DIAS facilitates academic information flow (easier and faster access to information) and questions on age, semester, occupation, frequency of use and interaction duration.

Participants & Procedure

Participants were recruited directly through the chatbot on the university’s homepage, as well as through social media announcements and printed handouts to students. The survey link was made accessible after users had interacted with the chatbot. As an incentive, participants could register for a lottery with several prizes, raffled among all subscribers. The survey was available for five weeks in October and November 2022.

Data Analysis

The exploratory data analysis was executed with the software SPSS. CUQ scores were calculated using the CUQ Excel Sheet provided by Ulster University (Holmes & Bond). For the thematic analysis of the open-ended answers the software F4Analyse was used. The data were coded, and grouped into categories, before being reviewed and adapted by other team members to ensure objectivity. Outliers, redundancies, and inconsistencies in the data set were analyzed using several procedures. Missing values in the data set were marked as missing.

Results

In total 113 completed and uncompleted answers were returned, of which ten were empty and therefore had to be deleted. Valid data was finally available for a subset ranging from 103 to 93 participants across the variables of interest.

Of the 85 respondents who indicated an occupation, 90,6% were in their bachelor studies, one person was an employee of the university and 8,2% were in their master studies. Most participants (45,2%) were in their first term at university and between 18 and 24 years (83%).

Most participants (70,9%) used the chatbot less than once a month. However, at the time of the survey the semester had just started and many of the participants, being in their first term, used the chatbot for the first time. 18% use the chatbot once a month, 9,7% once a week and 1% every day. In 78,6% of the cases the chatbot interaction took less than 5 minutes, and the rest of the participants interacted between 5-10 minutes with DIAS.

91,4% of respondents partly agree, agree or strongly agree that the chatbot delivers useful and informative responses. Of those 65,1% think that the chatbot enables them a faster access to useful information, and 78,3% perceive it easier to access information with the chatbot.

Exploratory Analysis

The histogram of the CUQ score shows a slightly skewed distribution (see figure 3). The Kolmogorov-Smirnov test was significant for all variables except the CUQ score, indicating a deviation from normal distribution for most of the data ($p < .05$). Outliers detected in the boxplots (figure 2) were not removed, as they were not considered to be measurement or data entry errors (Field, 2009).

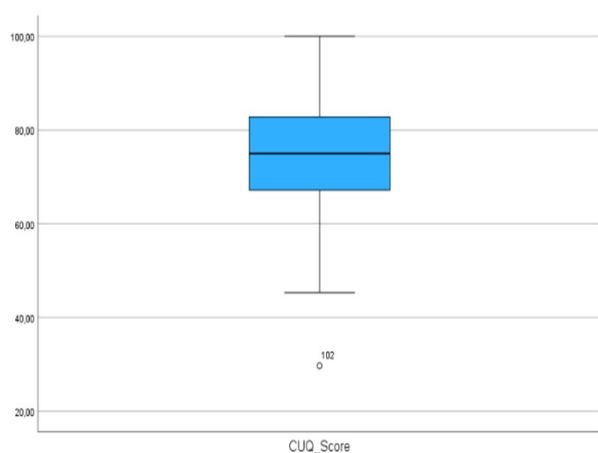


Figure 2: Boxplot of the CUQ score

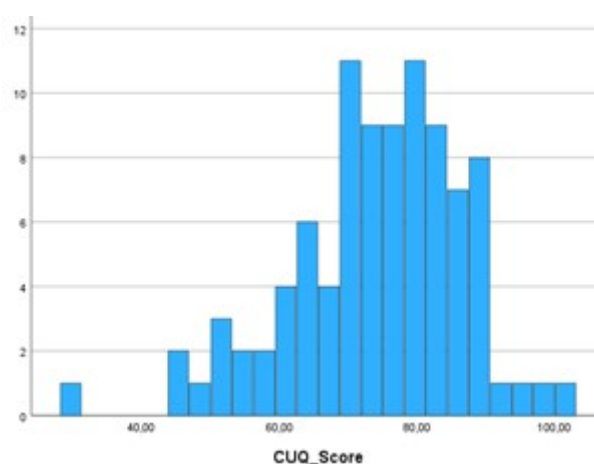
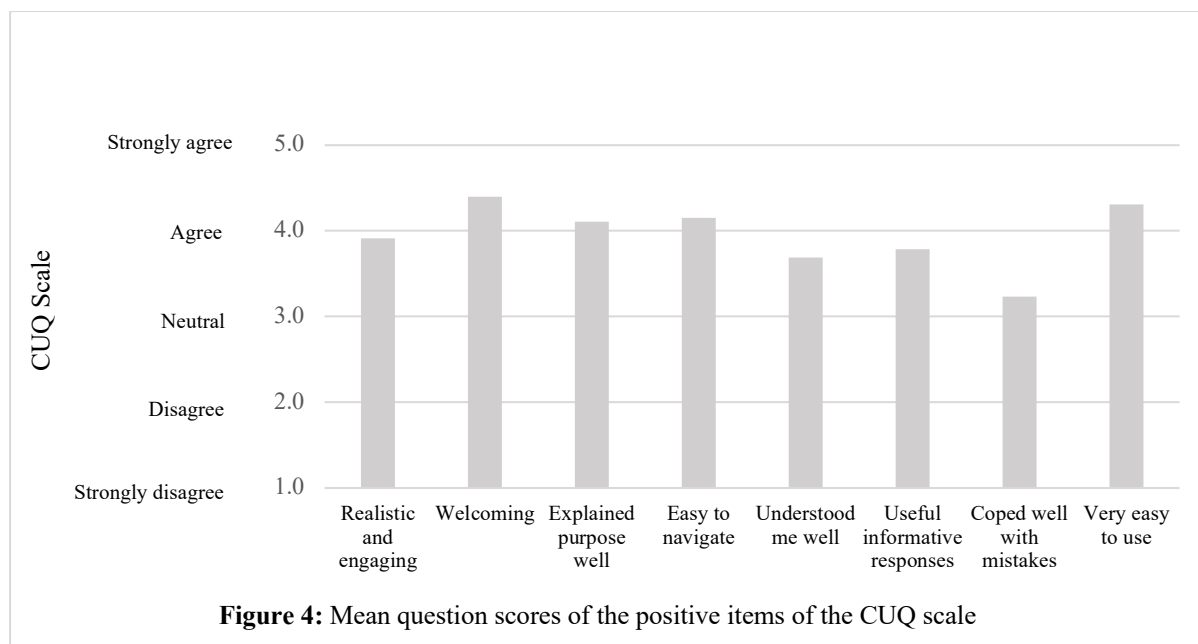
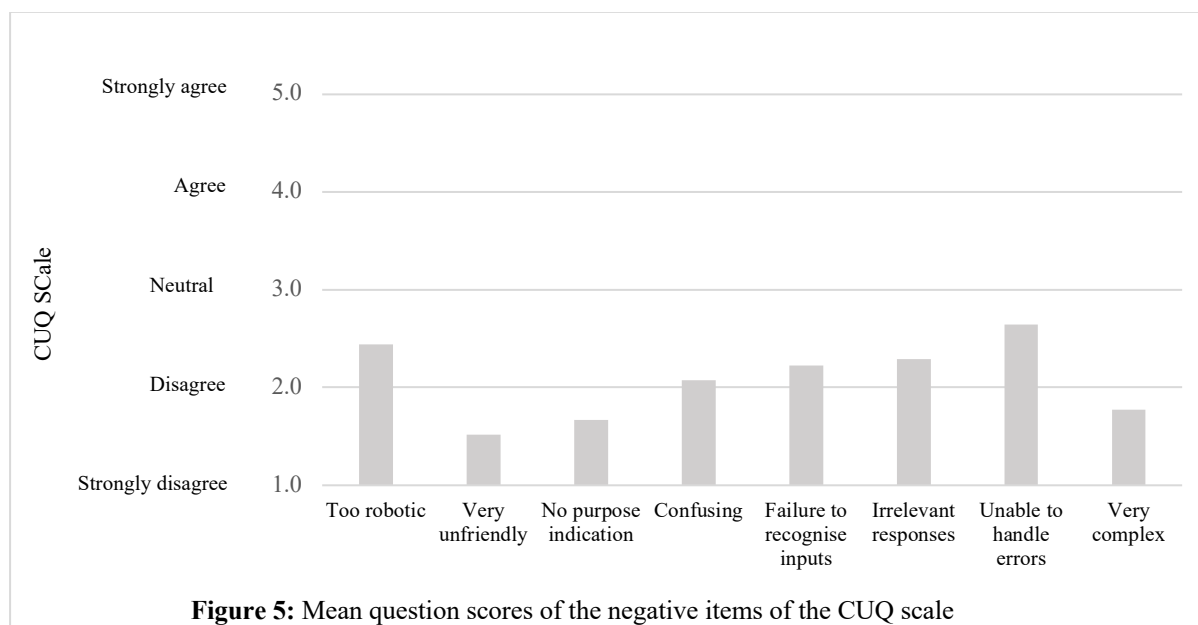


Figure 3: Histogram of the CUQ score

Based on the CUQ Score Calculation (Holmes & Bond), we analyzed the data of the 93 participants, who filled in the relevant questionnaire part. The analysis resulted in a mean CUQ score of 73,37, which is above the benchmark value of 68 (Holmes et al., 2019). Comparing the CUQ score of 73,37 with the benchmark of 68 in a one-sample t-test, the difference was strongly significant ($p < .001$). Compared to the usability study of a Social-Media Chatbot by Larbi et al. (2022) the DIAS chatbot scored 16 points higher. This difference was also significant ($p < .001$). The lowest score was 29,7, and the highest score was 100 (the highest possible score), with a median of 75.



Among the positive aspects of the CUQ questionnaire the ease of use achieved the highest average ranking, followed by a welcoming way and an easy navigation (see figure 4). In general, questions relating to positive aspects all received similar ratings. Coping well with mistakes received the lowest average score of 3, 2.



For the negative aspects (see figure 5) the questions whether DIAS can handle errors and whether the chatbot seemed too robotic received the highest average ranking, meaning that participants tended to agree more with these statements than with the other negative aspects. The handling of errors corresponds with the comparatively lower score for “coped well with mistakes” among the positive aspects. The questions concerning unfriendliness and complexity had the lowest average ranking, again corresponding with the opposite poles of positive aspects. As we cannot assume a normal distribution for all variables except the CUQ

score, and wanted to analyze ordinal data, correlations between the different variables were calculated using Kendall's tau (Field, 2009).

Variable	Mean	s.d.	1	2	3	4	5
1 Semester	3,05	2,150	1				
2 Age group	2,18	0,416	0,077	1			
3 Frequency of Use	1,42	0,748	-,223*	-0,047	1		
4 Interaction duration	1,21	0,412	-0,104	-,244*	0,093	1	
5 CUQ_Score	73,37	12,605	0,030	-0,071	0,086	-0,089	1

* $p < .05$, ** $p < .01$ two-tailed tests, for the correlation results of all CUQ items please consult the appendix

Table 1: Means, Standard Deviations and Correlations of Selected Variables Included in the Study

When looking at the correlations between the different variables (see table 1 and appendix table 2), there was a significant relationship between the frequency of use and the perceived usefulness of responses ($\tau = .185$, $p < .05$). Furthermore, the semester of the student participants was significantly related to the frequency of use ($\tau = -.223$, $p < .05$). Interaction duration was related to a realistic and engaging perception of DIAS ($\tau = -.199$, $p < .05$) and to the age group ($\tau = -.244$, $p < .05$).

Open-Ended Question Feedback

The positive and negative feedback gained through open questions at the end of the questionnaire was classified into the following categories, partly based on the first qualitative study of the DIAS system (Fersch et al., 2022): general aspects, the benefit/utility of the chatbot, conversation management, design & language, further functions, and content (divided into content concerning study programs and examination/semester timetable). Furthermore, participants made several suggestions for possible new features of the chatbot.

The following table shows selected examples from the open-question section:

Category / Subcategory	Example
Positive Feedback	
General	“nice idea, helpful” “he is cute”
Utility	“the learning tips are really good” “Helps to find certain things on the website quickly” “support around the clock”
Conversation management	“easy to use” “intuitive use, linking of websites”
Design & Language	“I particularly like the way of expression” “You have the feeling that you are not chatting with a bot, but with a human being” “The look is very appealing”

Negative Feedback	
Content - general	<p>“If he does not find an answer to the search terms, then he should also clearly note this and offer suggestions”</p> <p>“Provide even more information”</p>
Content– study programme	<p>“My degree programme [...] was not recognised - not even when I selected it from the suggestions”</p>
Content– examination/ semester timetable	<p>“Couldn't answer all my questions or answered them incorrectly (e.g. when is the examination period in the winter semester)”</p>
Conversation management	<p>“Direct access to the respective module manual”</p> <p>“At the beginning, perhaps another subdivision, in which area you are looking for something”</p>
Design & Language	<p>“I think the text is too long for a chat message”</p> <p>“Gender[-neutral] language, feels foreign when chatting. I personally don't find it nice to read in "casual" environments either”</p>
Suggestions for new features	<p>“The possibility to search for specific professors, currently he does not answer to "Professor *name*”</p> <p>“Be able to display images (e.g. contact cards/site plan) directly in the chat”</p> <p>“Search function for rooms. e.g. where is room 50.1.2?”</p>

The answers to the open questions reflect the CUQ scores on their different dimensions. Participants appreciated the quick access to university-related information, the 24/7 support, the learning tips and the ease of use. Participants also highlighted an appealing design and the informal way of speaking adapted to the linguistic habitus of students. However, a major shortcoming of DIAS concerns content quality. Several participants mentioned that the chatbot did not recognize their answer or question in general or specifically concerning their study program and examination/semester dates. Apart from positive and negative feedback, there were also some valuable suggestions for new features such as a search function for rooms and professors/employees of the university and the ability to display images in the chat window.

Discussion

In comparison with both the benchmark of the CUQ score (Holmes et al., 2019) and a similar study by Larbi et al. (2022), the DIAS chatbot achieved significantly higher results, suggesting that the chatbot is perceived comparatively well by the sample group. In particular, the friendly and welcoming character of DIAS (expressed in design and language), intuitive use, and easy navigation were praised. This can also be attributed to the previous focus group discussion of the prototype version. Based on the results from this discussion, the beforementioned aspects could be improved continuously from an early development stage (Fersch et al., 2022).

Regarding utility, most respondents strongly agreed, agreed, or partly agreed that DIAS delivers useful, appropriate, and informative information. Of those the majority also thinks that the chatbot enables them a faster and easier access to relevant information. We assume these perceptions will increase over time, as the chatbot data set is further developed and enriched. This is also backed up by the open feedback where participants highlighted for example the “support around the clock” and the better overview of the partly crowded

information on the website through the chatbot. This positive feedback suggests that DIAS facilitates information flow and fulfills its role as a service-oriented chatbot, thus supporting the project's objective to give students better control over their study situation and reduce the frustration and time spent searching for information. At the same time, it also implies a relief for student service and study counseling, however, this has yet to be evaluated.

Considering the frequency of use and aspects of utility, a positive relationship exists between the perception of useful, informative responses and the frequency of use. This might be due to the fact that the more often a user interacts with DIAS, his or her ability to ask questions in a way that DIAS will understand them increases, and consequently the chatbot delivers better or more valuable answers. Furthermore, the frequency of use is lower in higher semesters, which seems logical as the service-oriented chatbot can more likely provide support to students who have just started at university.

Despite the positive feedback, there is still some improvement potential, which can mostly be deducted from the open-ended questions. Particularly, content quality can be further improved, as well as the handling of input that DIAS does not recognize or expect. Regarding navigation, design & language the open feedback was divided: while some participants mentioned the answer text to be too much, others commented that it has just the right scope. Direct access to relevant websites was partly appreciated and partly criticized, as some participants appreciated the links to different websites, others wished for more links. Participants also made valuable suggestions for additional features such as an in-chat search for employees/ professors and rooms. Like other publications (see chapter on the theoretical background), our study reflects the general shortcomings of conversational agents at this stage of development, particularly concerning the reaction to dialogue mistakes (Dibitonto et al. 2018).

Limitations and Future Research

The study underlies some restrictions which also offer potential for future research. For once, we relied on an ad hoc sample, and the characteristics of the target population were not exactly reflected in the sample group. Therefore, our results do not allow any conclusions to be drawn about the population as a whole and only serve as a critical assessment of correlations in the sample and as a basis for future studies with probability sampling methods.

In addition, there was no formal validation of the German CUQ questionnaire version. Although forward and backward translation can ensure a high degree of translation equivalence, a formal validation would further improve internal validity. The English version has been validated according to the authors (Holmes and Bond), however, with a relatively small number of participants (n=26). For an extensively validated instrument, future research might be advised to refer to the studies by Borsci et al., (2021 & 2022).

Furthermore, while our study also included some items on the utility of the chatbot, it focused on the chatbot's usability. To our knowledge there is no established, validated questionnaire which comprehensively surveys the utility of chatbots in an educational context. However, utility can give more information about whether a system actually provides necessary features, instead of whether these features are usable (Johannessen & Hornbæk, 2014). A possible utility questionnaire should be specifically adapted to the educational context and consider the difference between service-oriented and teaching-oriented chatbots, an aspect which should usability questionnaires should reflect too. Another suggestion would be to

consider ethical dimensions in a potential new questionnaire. A qualitative conversational agent should also respond to a diverse audience and be free from any biases towards minorities, particularly in an educational context.

In total, future research can use this exploratory study to establish and test new theories on using service-oriented chatbots in education. As a practical implication of the study, the DIAS system will be further improved, particularly regarding a better reaction to mistakes or misunderstandings. Furthermore, the research team intends to repeat the survey in due time to find out how the CUQ score, as well as the frequency and length of interactions with the conversational agent will develop and whether these parameters will increase over time. The suggestions for additional features will be tested and if possible, implemented with other ideas from the initial focus group on the chatbot prototype (Fersch et al., 2022).

Conclusion

The main objective of this study was to explore user experiences with the DIAS chatbot, benchmark the results against those of other conversational agents and detect possible effects, which might contribute to the theoretical development of the research field. We can conclude that DIAS received an above-average ranking in comparison with the benchmark and with another chatbot. Most participants perceived the answers to be informative and useful. Positive aspects included the intuitive use, a welcoming persona (expressed in design & language) and easy navigation. The negative feedback showed potential for improvement particularly in content quality and handling dialogue mistakes. In addition, we found that the chatbot is more frequently used by first-year students in the sample group and the perceived usefulness of responses increases as the frequency of use increases. With these findings we hope to have contributed to the still scarce empirical literature on service-oriented educational chatbots and to a further development of the field of applied AI in teaching and learning.

Appendix

English Questionnaire Version		German Translation
Positive aspects		
Q1	The chatbot's personality was realistic and engaging.	Die Persönlichkeit des Chatbots war realistisch und einnehmend.
Q3	The chatbot was welcoming during initial setup.	Der Chatbot war einladend bei Gesprächsbeginn.
Q5	The chatbot explained its scope and purpose well.	Der Chatbot hat seinen Umfang und seinen Zweck gut erklärt.
Q7	The chatbot was easy to navigate.	Der Chatbot war einfach zu navigieren.
Q9	The chatbot understood me well.	Der Chatbot hat mich gut verstanden.
Q11	Chatbot responses were useful, appropriate, and informative.	Die Antworten des Chatbots waren hilfreich, angemessen und informativ.
Q13	The chatbot coped well with any errors or mistakes.	Der Chatbot kam gut mit fehlerhaften Eingaben oder Irrtümern zurecht.
Q15	The chatbot was very easy to use.	Der Chatbot war sehr einfach zu bedienen.
Negative aspects		
Q2	The chatbot seemed too robotic.	Der Chatbot wirkte zu roboterhaft.
Q4	The chatbot seemed too roboti	Der Chatbot wirkte sehr unfreundlich.
Q6	The chatbot failed to recognize a lot of my inputs	Der Chatbot gab keinen Hinweis zu seinem Zweck.
Q8	It would be easy to get confused when using the chatbot.	Die Nutzung des Chatbots könnte leicht zu Verwirrung führen.
Q10	The chatbot failed to recognize a lot of my inputs.	Der Chatbot hat viele meiner Eingaben nicht erkannt.
Q11	Chatbot responses were not relevant.	Die Antworten des Chatbots waren nicht relevant für mich.
Q13	The chatbot seemed unable to handle any errors.	Der Chatbot schien nicht in der Lage zu sein, mit fehlerhaften Eingaben umzugehen.
Q15	The chatbot was very complex.	Der Chatbot war sehr komplex.

Table 1: Chatbot Usability Questionnaire (Holmes, 2019) including the German translation

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16
1 Realistic and engaging	3,91	0,816	1														
2 Too robotic	2,44	0,972	-,326**	1													
3 Welcoming	4,40	0,739	,328**	-,183*	1												
4 Very unfriendly	1,52	1,274	0,053	0,084	-0,042	1											
5 Explained purpose well	4,11	0,714	0,116	-0,102	,236*	0,038	1										
6 No purpose indication	1,67	0,948	-,204*	0,078	-,242*	0,144	-,309**	1									
7 Easy to navigate	4,15	0,884	0,101	-0,112	0,145	0,064	,239*	-0,178	1								
8 Confusing	2,08	1,003	-,216*	0,146	-,249**	0,018	-,266**	,345**	-,524**	1							

References

- Alexander, B., Ashford-Rowe, K., Barajas-Murphy, N., Dobbin, G., Knott, J., McCormack, M., Pomerantz, J., Seilhamer, R., & Weber, N. (2019). *Educause Horizon Report: 2019 higher education edition*. EDUCAUSE.
- Benotti, L., Martinez, M. E. & Schapachnik, F. (2018). A Tool for Introducing Computer Science with Automatic Formative Assessment. *IEEE Transactions on Learning Technologies*, 11(2), 179–192. <https://doi.org/10.1109/tlt.2017.2682084>
- Borsci, S., Malizia, A., Schmettow, M., Van Der 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(1), 95–119. <https://doi.org/10.1007/s00779-021-01582-9>
- Borsci, S., Schmettow, M., Malizia, A., Chamberlain, A. & Van Der Velde, F. (2022). A confirmatory factorial analysis of the Chatbot Usability Scale: a multilanguage validation. *Personal and Ubiquitous Computing*. <https://doi.org/10.1007/s00779-022-01690-0>
- Braun, M., & Alt, F. (2020). Identifying personality dimensions for characters of digital agents. *Character Computing*, 123–137. https://doi.org/10.1007/978-3-030-15954-2_8
- Clarizia, F., Colace, F., Lombardi, M., Pascale, F., & Santaniello, D. (2018). Chatbot: An Education Support System for Student. In A. Castiglione, F. Pop, M. Ficco & F. Palmieri (Eds.), *Cyberspace Safety and Security: 10th International Symposium*, CSS (pp.291-302), Amalfi, Springer.
- Diachenko, A. V., Morgunov, B. P., Melnyk, T., Kravchenko, O. & Zubchenko, L. V. (2019). The Use of Innovative Pedagogical Technologies for Automation of the Specialists' Professional Training. *International journal of higher education*. <https://doi.org/10.5430/ijhe.v8n6p288>
- Dibitonto, M., Leszczynska, K., Tazzi, F. & Medaglia, C. M. (2018). Chatbot in a Campus Environment: Design of LiSA, a Virtual Assistant to Help Students in Their University Life. *Springer International Publishing eBooks*, 103–116. https://doi.org/10.1007/978-3-319-91250-9_9
- Eicher, B., Polepeddi, L. & Goel, A. (2018). Jill Watson Doesn't Care if You're Pregnant. *Proceedings of the 2018 AAAI/ACM Conference on AI, Ethics, and Society*. <https://doi.org/10.1145/3278721.3278760>
- Field, A. (2009). *Discovering Statistics Using SPSS*. (3rd ed.). SAGE Publications.
- Fersch, M. L., Schacht, S., Woldai, B., Kätzel, C. & Henne, S. (2022). Digital Learning Assistants in Higher Education Environments: A Qualitative Focus Group Study. *BCE Official Conference Proceedings*. <https://doi.org/10.22492/issn.2435-9467.2022.28>

- Galko, L., Porubän, J. & Senko, J. (2018). Improving the User Experience of Electronic University Enrollment. *International Conference on Emerging eLearning Technologies and Applications*. <https://doi.org/10.1109/iceta.2018.8572054>
- Hobert, S., & Meyer von Wolff, R. (2019). Say Hello to Your New Automated Tutor – A Structured Literature Review on Pedagogical Conversational Agents. *Wirtschaftsinformatik und Angewandte Informatik*, 301–314. <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1199&context=wi2019>
- Holmes, S. & Bond, R. *The Chatbot Usability Questionnaire (CUQ)*. Ulster University. <https://www.ulster.ac.uk/research/topic/computer-science/artificial-intelligence/projects/cuq>
- Holmes, S., Moorhead, A., Bond, R., Zheng, H., Coates, V. & McTear, M. F. (2019). Usability testing of a healthcare chatbot: Can we use conventional methods to assess conversational user interfaces? *European Conference on Cognitive Ergonomics*. <https://doi.org/10.1145/3335082.3335094>
- Johannessen, G. H. J. & Hornbæk, K. (2014). Must evaluation methods be about usability? Devising and assessing the utility inspection method. *Behaviour & Information Technology*, 33(2), 195–206. <https://doi.org/10.1080/0144929x.2012.751708>
- Larbi, D., Denecke, K. & Gabarron, E. (2022). Usability Testing of a Social Media Chatbot for Increasing Physical Activity Behavior. *Journal of Personalized Medicine*, 12(5), 828. <https://doi.org/10.3390/jpm12050828>
- Larbi, D., Gabarron, E. & Denecke, K. (2021). Social Media Chatbot for Increasing Physical Activity: Usability Study. *Studies in health technology and informatics*. <https://doi.org/10.3233/shti210604>
- Mebis (2018) „E-Learning“ und „Blended Learning“. Mebis – Landesmedienzentrum Bayern. Retrieved June 22, 2022, from <https://www.mebis.bayern.de/p/26271>
- Neumann, A. T., Arndt, T., Köbis, L., Meissner, R., Martin, A., de Lange, P., Pengel, N., Klamma, R. & Wollersheim, H. W. (2021). Chatbots as a Tool to Scale Mentoring Processes: Individually Supporting Self-Study in Higher Education. *Frontiers in Artificial Intelligence*, 4. <https://doi.org/10.3389/frai.2021.668220>
- Okonkwo, C. W. & Ade-Ibijola, A. (2021). Chatbots applications in education: A systematic review. *Computers & Education: Artificial Intelligence*, 2, 100033. <https://doi.org/10.1016/j.caeai.2021.100033>
- Page, L. C. & Gehlbach, H. (2017). How an Artificially Intelligent Virtual Assistant Helps Students Navigate the Road to College. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2940297>
- Pérez, J. Q., Daradoumis, T. & Puig, J. M. M. (2020). Rediscovering the use of chatbots in education: A systematic literature review. *Computer Applications in Engineering Education*, 28(6), 1549–1565. <https://doi.org/10.1002/cae.22326>

- Pérez-Marín, D. (2021). A Review of the Practical Applications of Pedagogic Conversational Agents to Be Used in School and University Classrooms. *Digital*, 1(1), 18–33. <https://doi.org/10.3390/digital1010002>
- Radziwill, N. & Benton. M.C. (2017). Evaluating Quality of Chatbots and Intelligent Conversational Agents. *arXiv: Computers and Society*. <https://arxiv.org/pdf/1704.04579>
- Santoso, H. A., Winarsih, N. A. S., Mulyanto, E., Saraswati, G. W., Sukmana, S. E., Rustad, S., Rohman, M. S., Nugraha, A. & Firdausillah, F. (2018). Dinus Intelligent Assistance (DINA) Chatbot for University Admission Services. *2018 International Seminar on Application for Technology of Information and Communication*. <https://doi.org/10.1109/isemantic.2018.8549797>
- Schurz, K., Schrumpf, J., Weber, J., Lübcke, M., Seyfeli, F. & Wannemacher K. (2021). Towards a User-Focused Development of A Digital Study Assistant Through a Mixed Methods Design, In D.G., Sampson, D. Ifenthale, I. Pedro, M.L. Mascia, (Eds.), *18th International Conference on Cognition and Exploratory Learning in Digital Age (CELDA 2021)*. IADIS Press. https://doi.org/10.33965/celda2021_2021081006
- Shawar, B. A. & Atwell, E. (2007). Different measurements metrics to evaluate a chatbot system. *North American Chapter of the Association for Computational Linguistics*. <https://doi.org/10.3115/1556328.1556341>
- Smutny, P. & Schreiberova, P. (2020). Chatbots for learning: A review of educational chatbots for the Facebook Messenger. *Computers & Education*, 151, 103862. <https://doi.org/10.1016/j.compedu.2020.103862>
- Toma, G., Guetterman, T. C., Yaqub, T. M., Talaat, N. & Feters, M. D. (2017). A systematic approach for accurate translation of instruments: Experience with translating the Connor–Davidson Resilience Scale into Arabic. *Methodological innovations*, 10(3), 205979911774140. <https://doi.org/10.1177/2059799117741406>
- Vázquez-Cano, E., Mengual-Andrés, S. & López-Meneses, E. (2021). Chatbot to improve learning punctuation in Spanish and to enhance open and flexible learning environments. *International Journal of Educational Technology in Higher Education*, 18(1). <https://doi.org/10.1186/s41239-021-00269-8>
- Verleger, M. & Pembrige, J. J. (2018). A Pilot Study Integrating an AI-driven Chatbot in an Introductory Programming Course. *Frontiers in Education Conference*. <https://doi.org/10.1109/fie.2018.8659282>
- Wollny, S., Schneider, J., Di Mitri, D., Weidlich, J., Rittberger, M. & Drachsler, H. (2021). Are We There Yet? - A Systematic Literature Review on Chatbots in Education. *Frontiers in Artificial Intelligence*, 4. <https://doi.org/10.3389/frai.2021.654924>

Contact email: mascha-lea.fersch@hs-ansbach.de

***Cultural Institutions as Spaces for Education:
Artistic Expressions in Initial Teacher Training at the University of Madeira***

Ana França Kot-Kotecki, Center for Research in Education–University of Madeira, Portugal

Valdemar Sousa, Center for Research in Education–University of Madeira, Portugal

Natalina Cristóvão, Center for Research in Education–University of Madeira, Portugal

The Paris Conference on Education 2023

Official Conference Proceedings

Abstract

This communication aims to highlight the formative and artistic role of three socio-cultural institutions in the island territory of the Autonomous Region of Madeira, Portugal, as spaces that preserve various local cultural aspects while promoting artistic education, inclusion and citizenship from a perspective of education for all — basic elements in the training of future education professionals. Our choice for these non-formal learning environments was based on their characteristics and potentialities, as privileged fields of knowledge and involvement with the local community and culture. In this process, the pedagogical practice evokes the access to education and culture as basic components for the integral development of the individuals — a complex act of dialogues of artistic expressions, meanings and citizenship practices. In order to understand the main aspects underlying the elaboration of the projects of these spaces we questioned the people in charge of each institution as partners in the initial teacher training of the University of Madeira. Of the main results we emphasize that the artistic experience promotes appreciation for the arts, culture and heritage, in addition to promoting cultural diversity. Cultural institutions play a relevant role in education because through them our students have the opportunity to get to know better the local culture and themselves in relation to others, expanding their worldviews.

Keywords: Teacher Training, Artistic Expressions, Culture, Citizenship

iafor

The International Academic Forum

www.iafor.org

Introduction

Non-formal learning environments, due to their characteristics and potential, are considered privileged fields in the training and involvement of and with the local community of education professionals. In this analysis, we highlight the access to education and culture, considered by us as basic components of the integral formation of the individual, a complex act of dialogues of artistic expressions, meanings and citizenship practices¹.

In this line of thought, we can say that we are the result of what we learn in all vital circumstances, which include learning environments with very different characteristics. From the most informal learning contexts — with all the circumstances of human contact that occur daily — to the most formal learning contexts, learning plays a fundamental role. To this end, the intercrossed dialog of the respondents to the questions we asked was important for the understanding of the trajectory that we propose to address in this text.

The Role Of Socio-Cultural Institutions: Education, Culture and Inclusion

When approaching the role of cultural institutions as educational spaces promoters of art and culture we need to clarify some concepts, namely *culture* and *inclusion*. According to Laland (2017), culture is the sum of knowledge and technologies learned and disseminated over time in a given community. Culture is an interactive and dynamic network of continuous adjustments and improvements of the complex knowledge, artifacts and social institutions that already exist, which generates countless creative variations. Artistic expressions are then an integral part of culture. Regarding inclusion, we consider it to be a "process that helps overcome barriers that limit the presence, participation and achievements of students" (UNESCO, 2019, p. 13).

Situating dimensions such as citizenship and inclusion in dialogue with artistic expressions implies a look at the institutions that promote them. In this context, we analysed three institutions that fit the definition of museum presented below by the scope that UNESCO attributes to it.

UNESCO defines "museum" as a non-profit, permanent institution, available to all, which is "in the service of society and its development which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment" (UNESCO, 2007). This definition is not limited to the institutions that we traditionally know as museums but in fact it is transversal to other sociocultural spaces such as:

Non-profit institutions or organisations undertaking conservation research, education, training, documentation and other activities related to museums and museology; (...) cultural centres and other entities that facilitate the preservation, continuation and management of tangible or intangible heritage resources (living heritage and digital creative activity). (UNESCO, *idem*)

¹ This research is financed by FCT, with the project reference: UIDB/04083/2020.

These places are essential to meet the cultural needs of citizens, *i.e.* social groups, the public and individuals working in the creation of leisure activities, festivals, demonstrations, among others. Thus, the inclusive role of institutions is of great importance for civic education because through them citizens can be active, informed and culturally participatory individuals in society.

Socio-Cultural Spaces: Citizenship Practices

Citizenship has been understood from two perspectives: the *formal*, consisting of the individual's connection with the state, related to his/her legal status acquired at birth; the *cultural*, which concerns the individual's social integration into the community, acquired in the informal context of life (Beaman, 2016; Delanty, 2003). In liberal democracies, *formal* citizenship ensures that the individual legally enjoys rights, accessible to him/her only he/she knows them and can evoke them (Pawley, 2008). According to Delanty (2013), knowledge of legal rights is generally set on a formal learning context.

Cultural citizenship, in turn, facilitates the creation of a relationship of reciprocity between the individual and the community in which he/she is inserted, by assenting to socially established norms, values, practices and behaviours but also questioning them (Beaman, 2016). Such citizenship develops through learning that equates the *self* and the relationship of the *self* with *others*; citizen's identity is constructed by his experiences and beliefs, and occurs both in the private sphere and in the relationship with others. Their cultural integration highlights personal and collective differences. Thus, the socio-cultural spaces under analysis, in addition to being promoters of education and culture, contribute to the formation of socially constructed citizenship.

The possibility of participation within social institutions stimulates the inclusion of the public in the institution and in the learning provided there through educational projects. According to Delanty (2003), the type of learning and citizenship promoted by the institutions under study do not have to follow the language of formal citizenship: they are neither disciplinary nor imposed, therefore they fall within the domain of non-formal and optional education.

We consider that citizenship — and, consequently, inclusion — is developed in the informal context of daily life. It is the co-participation in the creation and recreation of cultural manifestations, with which the community creates meanings for its ways of life that generates inclusion (Kocoska & Petrovski, 2015). In this way, cultural institutions assume a leading role in establishing dialogues that underlie the process of social inclusion, where various actors promote the negotiation of their differences. This process provokes the interconnection of individuals' life stories with broader cultural discourses — where the consensuses predetermined by society are questioned and in the end the reconstruction of the *self* in relation to *others* is promoted.

In this discussion, inclusion in a community involves the development of two types of citizenship: *formal* and *cultural*. However, the interdependence of both, given the tendency towards pedagogical informality and proximity to everyday life, cultural citizenship is extremely relevant in the formation of citizens.

Informal, Non-formal and Formal Education — Exploring Concepts

As mentioned above, citizenship, and consequently inclusion, is developed in the informal context of daily life. We corroborate with Patrício (2004), when he says that:

We learn in any circumstance. We learn in the family circumstance, with mother, father, siblings, grandparents, aunts, uncles, cousins (...). We learn in the street circumstance. The street is society flowing. The street is the outside of the family (...). If we were to take from each of us what we have learnt in the family and in the street, there still would be, and there still is, a borderline. The family is a world, but the street is a world... (p. 13)

More than ever, today there are so many opportunities for learning in the most diverse contexts in which the individual moves. Learning takes place on many sides and in many circumstances, and is less and less dependent on limited physical contexts, on the canons written in textbooks or on the focused action of teaching resources. In this regard, Rogers (2004) clarifies some elements that help us to situate the issue of learning in those contexts. For him, when it is the individual who circumscribes his learning, namely learning what he wants, when he wants and also stopping when he wants, we are facing a context of informal education. In this context, informal learning can be defined as "any activity involving the pursuit of understanding, knowledge or skill that takes place outside the curricula of educational institutions, or the courses or workshops provided by educational or social agencies" (Livingstone, 1999, p. 51). In other words, the category of informal learning includes all learning that takes place outside the formal and non-formal curriculum of educational institutions and programmes.

Rogers (2004), on the other hand, argues that when the individual is in a pre-existing learning programme, but adapted to his/her circumstances, we speak of non-formal education. Thus, non-formal education refers to all organised educational programmes that take place outside the formal school system and are usually short-term and voluntary. This includes a wide variety of programmes, namely courses, study visits, second language programmes, yoga classes, painting courses, workshops, among others. Trilla (1993) reinforces this idea by arguing that this type of education seems to refer to "all those institutions, activities, means, spheres of education which although not school-based have been created to fulfil certain educational objectives" (p. 21). Though it is generally aimed at adults, non-formal education can also be aimed at children and adolescents (*e.g.* joining a scout group, music lessons during the weekend, among others). As in informal education, there are teachers (monitors) and a curriculum with various degrees of flexibility.

Finally, when we are faced with an externally "imposed" learning programme dominating our autonomy we are in a formal education context. This is confined to the institutional ladder and ranges from pre-school to postgraduate education. Among its characteristics, the fact that it is highly institutionalized stands out; it includes a compulsory period called "basic education" (which varies from country to country and usually ranges from 6 to 12 years). Formal education functions through the implementation of a prescriptive curriculum — State approved — with explicit objectives and assessment processes through examinations and tests, depending on the hiring of certified teachers and institutional activities largely supervised by the Ministry of Education. It is propaedeutic in nature (in the sense that each level prepares learners for the next and that to access to a certain level requires satisfactory completion of the previous level); it is a hierarchical system, usually with ministries of

education at the top and students at the bottom; at the end of each level graduates receive a diploma or certificate that allows them to be accepted at the next level, or qualifies them to enter the labour market (Rogers, 2004).

In view of the above, we understand that both formal and non-formal learning environments enhance deliberate learning and implicit learning and, in this case, socio-cultural institutions are spaces of relevant non-formal environments for lifelong learning.

The Cultural Institutions of the Study

A consultation of the website *Cultura Madeira - Atlas of Madeira Culture*² reveals the existence of more than one hundred cultural institutions and organisations in the Autonomous Region of Madeira (ARM). The choice proved to be easy, considering the partnership work already carried out by us in the context of the initial training of teachers and other education professionals, namely in the Curricular Units of Musical Expression, Dramatic Expression, Plastic Expression, Education through Art, Interdisciplinary Seminar of Expressions and Didactics of Expressions. Thus, we've interviewed the leaders of three institutions — the Xarabanda Musical and Cultural Association (XMCA), the Frederico de Freitas Museum House (FFMH) and the Funchal Experimental Theatre Association (FETA) — in order to assess some data that we consider relevant for this exploratory study.

Xarabanda Musical and Cultural Association

This Association came to be by the hands of a group of friends who shared interests in traditional and popular musical culture and cultural issues, and recognized its value and importance. By the 1980's, the local Conservatory excluded from its syllabus the Madeiran culture — everything that was popular was ignored and relegated to the background, so the friends formed the musical group "Algozes," which sought to collect and spread the traditional poetic-musical heritage of Madeira and Porto Santo.

After several years of performances, throughout Portuguese territory, and the recording of an LP (1989), the need arose to transform an informal group into an identity that could dedicate itself to a broader project within the scope of traditional Madeiran culture, giving birth to the XMCA, whose new name made the public understand the essence of the Association: to guarantee the perpetuation of tradition, through the collection, systematisation and dissemination of elements of Madeiran culture, permeating the regional and even the national level. And that is how the XMCA was founded in 1990, continuing the work of collecting and disseminating traditional Madeiran music and, also, teaching regional chordophones of popular tradition, promoting training actions; raising awareness of regional popular and traditional music; organising and editing a songbook of Madeiran oral tradition. Among its various works, it began publishing a regular magazine, with the collaboration of anthropologists, musicians, historians and others.

In 2002, the XMCA was declared a "Public Utility Institution," for the work it developed in the field of collecting and disseminating Madeira's musical, cultural and popular heritage, as

² *Cultura Madeira* is a platform that includes all the information on the cultural offer in the ARM and allows access to the socio-cultural institutions existing in the region. Available at <https://cultura.madeira.gov.pt/atlas-da-cultura-%E2%80%93-entidades-culturais>

well as for its merit recognised at regional, national and international level. Among distinctions and awards, it has continued its work, financially supported by the Regional Directorate for Cultural Affairs (RDCA), for the implementation of projects, in collaboration with the Regional Directorate for Education (RDE), through the secondment of teachers.

Frederico de Freitas Museum House

The FFMH is located in the former Casa da Calçada, residence of the Counts of Calçada, in a building dating back to the 17th century. It was remodelled successively, and in 1941 it was rented to Dr. Frederico de Freitas, a lawyer and collector. There, this resident took the opportunity to organise the house to accommodate his multiple collections. After his death, the house was acquired by the Regional Government and subsequently transformed into a museum, presenting the estate of its last resident. At the end of the 20th century, the FFMH was organised into three distinct spaces: the Casa da Calçada (which presents the former tenant's decorative and utilitarian objects, that includes a wide variety of regional and foreign decorative art, sculpture, painting, furniture, ceramics, glass and metals, among others); the temporary exhibition area (which presents exhibitions and initiatives that provide other approaches to the museum and its estate); and the Casa dos Azulejos (dedicated to the exhibition of the tile collection, , which crosses several centuries and cultures).

This museum has an educational service, whose aim is to facilitate communication with different audiences and to publicise its collection. The structure of this Educational Service is closely linked to the specificities of the FFMH. In fact, its work is based on three thematic axes: the house, the collector and his collections. In Casa da Calçada, for example, the way the exhibition of Decorative Arts is distributed — by several rooms — motivates several routes, in the form of thematic visits such as "From the Kitchen to the Table," "Romanticism in the House" and "A Journey through Tiles in Portugal." In addition to these visits, the teachers of this service also develop playful, dramatic, written or plastic expression activities related to the collector, the collections and the Museum.

Funchal Experimental Theatre Association

FETA - Theatre Company began its journey in 1975, in the cultural services of Funchal Town Hall. Between 1984 and 2006 it was a Limited Liability Cooperative, until it became a non-profit Cultural Association. Its educational service promotes guided tours, shows, training workshops and artistic projects for different types of audiences.

Being also a theatre company, the Association managed for years to secure a group of actors that enabled it to take on shows dedicated to different educational institutions, always keeping in mind to raise awareness and promote theatre in the Madeira Archipelago, focusing on theatre for children and youth, as well as on itinerant work, in order to cover the different age levels. More recently (from 2018), *galeria.a* — idealised within the artistic project of the company FETA — emerges as a space for the interaction of the arts, as a producer of performing arts: Theatre, intends to boost the growth of public formation in the fruition and dissemination of artistic and cultural, through its educational service and its accessibility component.

We also highlight that FETA approaches audience training through theatre training workshops for different age groups, developing group dynamics, dramatic, body and voice expression, storytelling and character-building techniques, as it recognises the importance of

early contact with the world of theatrical art. In this way, during the training workshops part of the theatre games allows the discovery of the body, voice training, playing with space and promoting the development of critical thinking about this form of art and about the world.

Thus, FETA, in its role as an educational service, has the main objective of being an element of inclusion and socialization.

The Questions and Their Analysis

In order to better understand the action of the aforementioned institutions, we consulted each of their managers, posing them three questions: 1) What is the target audience of the institution? 2) When preparing the annual activity plan, what aspects do you consider to promote inclusion, in order to provide sociocultural opportunities for the entire community? 3) How is the articulation of the sociocultural project operationalised with local educational institutions?

Regarding the first question, in the words of XMCA's President Rui Camacho, since the beginning of the association's cultural activity, the work has been aimed at the general public. As for the FFMH, teachers Catarina Andrade and Helena Sousa, responsible for the Education and Animation Services, say that they seek to "respond to the expectations and requests of the local public and the regional community." In their words: "we try to reach everyone, creating several thematic visits aimed at different age levels, with our programme divided into: students, teachers, families, adult audiences, senior audiences and even for holidays and ephemeris" (February 1, 2022).

In turn, the head of FETA's Educational Service, teacher Ester Vieira, says that the institution's target audience is the general public. Therefore, the creative proposals and their contents reach children and youth, adults, seniors, among others. It contemplates:

General public (shows of greater scope and in wider time ranges); Children and Youth (although also aimed at the general public, they are more specifically aimed at the school public and at a functional schedule compatible with school activity); Senior public (public assigned to institutions and/or activity projects aimed at them); Public with Special Needs (public assigned to institutions and/or activity projects aimed at them); Artists (specific public in the field of performing arts or visual arts, often related to interventions in the *galeria.a*) and Teachers (specific audience attending the shows through schools or individually, often associated with trade union or associative organisations). (E. Vieira, February 7, 2022)

Considering the voices of the leaders of the three institutions participating in this study, we can affirm that the target audience of these institutions is comprehensive, since both the general public and the surrounding community are part of their objectives. On the other hand, there is a concern to include individuals of various age groups, social status, education and personal interests. They are therefore, institutions open to society, including educational and teaching institutions. In this sense, they are essential spaces for non-formal education, which complement students' knowledge in different areas and levels of education.

Regarding the second question, the president of XMCA shared that when the activity plan is drawn up, its mission is to contribute to the well-being of the entire community in order to promote training, inclusion and socio-cultural development:

We believe that the work we do is always for others. In cultural VALUES — what concerns communities: uses, customs, know-how (the intangible), solidarity, a sense of responsibility, truth, (what we are, while we are "the depositary generation of that important heritage that will allow us to preserve it. This is an indispensable condition for the affirmation of our individuality [and identity]"). (...) There has always been a concern to include (...) to value, accept, know and not ignore, regardless of age, level of education, social status, gender, city or rural area. To include forgotten areas of small towns far from the centrality, which have never had the opportunity to receive something important for their knowledge. (R. Camacho, February 5, 2022)

This leader emphasised that inclusion sometimes becomes a complex process, as it depends on factors such as the suitability of projects, availability, financial support, local conditions to fully realise it. He emphasised the importance of partnerships with different institutions in the community to develop "multicultural, comprehensive projects that go far beyond music. The aim is to integrate the local community by valuing the knowledge of each and every one" (R. Camacho, February 5, 2022).

Teachers Catarina Andrade and Helena Sousa, from FFMH, describe that they "prepare, plan and carry out thematic visits, of short and long duration, as well as complementary activities of a playful nature, written, plastic and dramatic expression. Design and create teaching materials used to stimulate curiosity, encourage learning or facilitate understanding" (February 1, 2022). They also state that they seek to establish links with other institutions through actions and meetings with teachers to raise awareness of the importance in education of the cooperation between schools and museums. We go to educational establishments, museums and other similar organizations, we present communications on the theme of "The Museum and the School", promoting the House-Museum, publicizing it, launching challenges for new activities and attracting new audiences (C. Andrade and H. Sousa, February 1, 2022).

The FFMH also seeks to cover different segments of the population by organising Free Time Occupation activities suitable for the different times of the year (Christmas, Easter, Summer) and aimed at younger audiences or intergenerational groups. This space welcomes visitors of all age groups, from 3 years old onwards, establishing visit routes specially geared to different ages or to people with special needs.

Regarding FETA, we found that they develop artistic activities for all types of audiences, creating physical, technical and different language conditions to communicate with all spectators. This socio-cultural institution carries out supervision of professional internships (artistic and technical) and internships of the Employment Institute of Madeira. It also has an educational service dynamized by teachers with activities of a technical-pedagogical nature, led by teacher Ester Vieira. It develops several projects and activities, namely:

Guided tours of *galleria.a* collective exhibitions and to the backstage spaces and their equipment, backstage conversations (which take place between the audience, artists and technicians at the end of the shows), temporary thematic workshops, permanent workshops, occasional Audience Training projects, Technical Artistic Training within the scope of Special Needs with access to people with special needs, Theatre Workshops for the Community, Performances, Street Animation, Technical Artistic Training in the field of Theatre with access to people with Special Needs. For

example, we translate plays and content into Portuguese sign language. (E. Vieira, February 7, 2022)

We highlight that FETA received and integrated in its artistic project the "OFICINA VERSUS TEATRO" (Inclusive Theatre Group) from the former Regional Directorate of Special Education. This way artistic inclusion is developed in all the programmed activities of the different artistic seasons.

An analysis of the discourses allows us to attest to the concern to include, value, accept, know, make available and involve, regardless of age, education, social status, gender and origin. On the other hand, the search for inclusion is endeavoured through the adaptation of the institutions' activities to specific segments of the population (*e.g.* by age, by family affinities). In this way, they try to create bridges through the particular aspects of the collections (the creation of thematic visits, in the case of the FFMH), potentially appealing to these segments. These institutions are concerned with inclusion through the languages of different artistic expressions, with a view to training and socio-cultural experience, for they plan activities that provide pedagogical, educational and training substance in the socio-cultural context.

FETA, on the other hand, offers a very wide range of activities, representing a fundamental field of intervention in the area of dramatic expression and theatre, both for the general public and in support of other institutions and groups in the community. Its role at the training level should be emphasised, considering also the supervision and guidance of internships in the context of the professional training of actors and other theatre professionals.

To summarise, there is a concern with the promotion of inclusion in order to provide socio-cultural opportunities for the whole community, with comprehensive multicultural projects and in some cases embodied in partnerships.

Finally, with regard to the third question, the head of XMCA states that a large part of the study visits of students from different levels of education, including the University of Madeira, to the association's space are on the initiative of the educational institutions themselves that want to know about the Material Cultural Heritage (musical instruments of Madeiran tradition) and Intangible Cultural Heritage (music of popular tradition, literature of oral transmission, among other important traditional practices that run the risk of disappearing if they are not registered, studied and disseminated in order to guarantee their maintenance) of the Region.

XMCA organises specific activities, according to the different requests of the community, free of charge, to share knowledge about our heritage. Thus:

Working groups are created to energise artistic spaces and processes. It should be noted that all of this is done free of charge through the will, KNOWLEDGE, ZEST and PASSION, in defence of cultural values: what we were in the past and what we have received as cultural heritage, what we are in the present and what we want to be in the future. (R. Camacho, February 5, 2022)

In turn, the teachers responsible for the educational services of the FFMH report that they publicise their programme by:

Sending it to the educational establishments of Madeira, senior retirement homes, day centres, parish councils, private institutions of social solidarity and community centres. We have a list of individuals who after coming or participating in some activity at the museum ask to send them the programme. Social networks (blog, Facebook and Instagram) are a free tool that reach a large number of people. We also do it through the institutional websites of RDCA and Regional Directorate for Tourism and Culture (RDTC). (C. Andrade and H. Sousa, February 1, 2022)

In this context, the teachers still value the informal testimony of visitors who pass by, to their acquaintances, by mentioning that the "role of 'word of mouth' (...) ends up bringing friends and acquaintances of our visitors to the Museum-House, who thus become a reliable source of dissemination" (C. Andrade and H. Sousa, February 1, 2022).

Regarding FETA, according to the person in charge of the educational service, it works in partnership with different educational institutions, community centres, support centres for empowerment and inclusion, RDTC, RDE, Funchal City Hall and public and private regional companies, in order to respond to the expectations of the surrounding community. The entire artistic project is made known through several kind of media, such as institutional websites, public media, among others.

For this articulation, they have the institutional support of the RDTC, RDE, Funchal City Hall (with material and human resources, and financial support). In addition to these, they have permanent support of various companies for the production, promotion and dissemination of artistic creations, programme cycle.

Considering the shared discourses, we see that the study visits of students from different levels of education — an initiative of the schools themselves with the aim of seeing, hearing and talking about Cultural Heritage (musical instruments of the Madeiran tradition, visual and decorative arts, theatre plays, music of popular tradition, literature of oral transmission, among other important artistic practices), are aspects considered by the institutions we have consulted. In turn, visits to schools to publicise the collection and the work carried out by these institutions, with a view to disseminating activities and to creating socio-cultural and leisure moments, are a common practice.

We also found that the channels of articulation with the population have as reference the formal contexts of learning — through visits to the schools or institutions under analysis, or through the realisation of artistic activities — resulting in opportunities for significant, implicit learning, closer to the daily lives of children, young people and ordinary citizens. In these circumstances, in addition to the contact with artistic and cultural practices, the public experiences real citizenship practices and consequently inclusion.

Conclusions

Access to cultural values relates to the achievement of cultural rights for citizens, raising the standards of artistic creation in the desire that the work becomes accessible to all. When art becomes culture and its values are seen by the public, there is a change and improvement of the general quality of life.

This exploratory study allowed us to understand better the role that socio-cultural institutions have at the level of our community, as well as the wealth they represent for the cultural and

social formation of individuals. Knowledge and contact with the cultural and artistic heritage of our Region, in dialogue with artistic expressions contribute to a large extent to the blurring of social inequalities and to the development and creation of citizenship practices. In this line of thought, the Eurydice Report (European Commission/EACEA/ Eurydice, 2018) states that the main objective of citizenship education is to promote the harmonious coexistence and development of individuals and communities. In relation to educational communities, citizenship education implies an active, responsible and conscious education, where students assume their responsibilities considering the local and regional dimensions with an eye to a global dimension.

From our experience as Higher Education teachers, we consider that the pedagogical processes in the field of art education, developed together with the socio-cultural institutions studied, constitute an added value in the training of future education professionals. In this context, the development of meaningful learning in non-formal environments is particularly important. In fact, arts education fosters creative and critical thinking skills, as well as increases collaboration and connection between subjects and the community, and allows students to construct and transform meanings.

Artistic experience fosters appreciation for the arts, culture and heritage, and promotes cultural diversity. Art has an aesthetic, inclusive, social and cultural significance, whose survival depends on the existence of an audience that appreciates, experiences, recreates, interprets and values it, because new creations are formed and envisioned in it. We believe that among young students, readers, exhibition visitors, spectators, future artists and educators will be born. In other words, culture and cultural institutions play a great role in civic education, because through them citizens can rise culturally, they can develop their worldviews, their views of themselves and others, their knowledge and skills and thus become active, informed and socially successful citizens.

References

- Associação Musical e Cultural Xarabanda. (s. d.). Historial do projeto Algozes / Xarabanda. Retrieved from Associação Musical e Cultural Xarabanda: <https://xarabanda.pt/xarabanda-historial/>
- Beaman, J. (outubro de 2016). Citizenship as cultural: Towards a theory of cultural citizenship. *Sociology Compass*, 10 (10), 849–857. <https://doi.org/10.1111/soc4.12415>
- Delanty, G. (2003). Citizenship as a learning process: disciplinary citizenship versus cultural citizenship. *International Journal of Lifelong Education*, 22(6), 597-605. <https://doi.org/10.1080/0260137032000138158>
- European Comission/EACEA/Eurydice. (2018). *Eurydice Brief: Citizenship Education at School in Europe – 2017*. Luxembourg: European Union Publications Office. Retrieved from Eurydice: <https://op.europa.eu/en/publication-detail/-/publication/e0f2801c-184c-11e8-ac73-01aa75ed71a1/language-en>
- Kocoska, J., & Petrovski, D. (2015 april). The Role of the Cultural Institutions in the Civic Education. *International Journal of Science and Research*, 4(4), 1458-1462.
- Laland, K. (2017). *Darwin's Unfinished Symphony: How Culture Made the Human Mind*. Nova Jérσία, Estados Unidos da América: Princeton University Press.
- Patrício, M. (2004). Aprender na Escola do Alentejo. Em J. Nico, E. Costa, P. Mendes, & L. Nico (Ed.), *II Encontro Regional de Educação — Aprender no Alentejo* (pp. 13-16). Évora: Departamento de Pedagogia e Educação da Universidade de Évora.
- Pawley, L. (março de 2008). Cultural Citizenship. *Sociology Compass*, 2(2), 594–608. <https://doi.org/10.1111/j.1751-9020.2008.00094.x>
- Pruulmann-Vengerfeldt, P., & Runnel, P. (2018). The museum as an arena for cultural citizenship: Exploring modes of engagement for audience empowerment. Em K. Drotner, V. Dziekan, R. Parry, & K. Schrøder, *The Routledge Handbook of Museums, Media and Communication* (pp. 143-158). Nova Iorque, Estados Unidos da América: Routledge.
- Rogers, A. (2004). *Non-Formal Education: Flexible Schooling or Participatory Education?* Nova Iorque, Estados Unidos da América: Springer Science.
- Rosaldo, R. (agosto de 1994). Cultural Citizenship and Educational Democracy. *Cultural Anthropology*, 9(3), 402-411. <https://doi.org/10.1525/can.1994.9.3.02a00110>
- Secretaria Regional de Turismo e Cultura. (s. d.). Atlas da Cultura – Entidades Culturais. Retrieved from Cultura Madeira: <https://cultura.madeira.gov.pt/atlas-da-cultura-%E2%80%93-entidades-culturais>
- Trilla, J. (1993). *La Educación fuera de la Escuela. Ámbitos no formales y educación social*. Barcelona, Espanha: Ariel.

UNESCO. (2006). Roteiro para a Educação Artística - Desenvolver as Capacidades Criativas para o Século XXI. Lisboa: Comissão Nacional da UNESCO.

UNESCO. (2019). *Manual para garantir inclusão e equidade na educação*. (L. Canuto, Trad.) Brasília, Brasil: UNESCO.

UNESCO. (2020). Educação artística para a resiliência e a criatividade. Retrieved from unesco.org: UNESCO (2020) https://pt.unesco.org/sites/default/files/2020_art-week-technote_por_final.pdf

UNESCO. (s. d.). Museum. Retrieved from unesco.org: <http://uis.unesco.org/en/glossary-term/museum>

A Qualitative Evaluation of an AI-Supported Quiz Application to Assess Learning Progress

Betiel Woldai, University of Applied Science Ansbach, Germany
Sophie Henne, University of Applied Science Ansbach, Germany
Mascha-Lea Fersch, University of Applied Science Ansbach, Germany
Sudarshan Kamath Barkur, University of Applied Science Ansbach, Germany
Sigurd Schacht, University of Applied Science Ansbach, Germany

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

In a current research project at the Ansbach University of Applied Science, an AI-based quiz function was created to serve as a voluntary student-oriented support offer to determine their learning progress in their respective courses by means of conducting self-assessment quizzes. The application takes lecture scripts as input and applies a question generation model to create questions that students can answer. In order to evaluate the given answers, another language model is involved to perform Natural Language Inference (NLI). Users can engage with the system via a graphical user interface currently provided via a web app. To assess preliminary feasibility and perception of the model prototype, a qualitative focus group discussion following a semi-structured interview guideline prepared by the research team according to similar studies in the education field (Sek et al. 2012) was conducted with five participants. A transcript of the discussion was prepared and analyzed using the qualitative content analysis method according to Kuckartz. Overall, the quiz function was well received by the participants of the focus group. However, the prototype still has potential when it comes to generating meaningful questions and transparently assigning categories to the given answers. Furthermore, the quiz parameters should be individually adjustable by users. In the following paper, the development of the service is illustrated by outlining the considerations for the application design and the training procedure of the language models. Afterwards, the design of the qualitative focus group is described including the presentation of the results.

Keywords: Higher Education, Conversational AI, Learning Progress, Self-Assessment Quizzes, Digital Study Assistant

iafor

The International Academic Forum
www.iafor.org

1. Introduction

With the advent of artificial intelligence (AI) in the education sector, interesting potentials for its application at universities arise in particular in the field of Natural Language Processing. The goal of the current research project at Ansbach University of Applied Science is to develop a digital, intelligent assistant for study and teaching. The digital assistant will have four main application areas: a communicator component for answering questions, conversation, and mentoring; a planner to perform time management and course planning tasks; a motivator to actively manage learning success; and an analyzer, to provide the necessary information about the student's study and learning progress. The latest focus of the project is to establish an analyzing component that can be used to automatically measure learning progress of students.

Self-assessments carried out by the students are a suitable option for this purpose. Student self-assessment refers in general to a variety of mechanisms and techniques through which students assess and evaluate their own learning progress (Panadero et al., 2016). One form of self-assessments are online quizzes to test understanding of the course content (Bognár et al., 2021). Quizzes offer a dynamic environment due to their numerous customization options with regards to size, question types, grading, time limitations etc. (Gikandi et al., 2011). The score derived from answering questions provides immediate feedback to learners and thus supports them in monitoring whether they have achieved a learning objective or a desired level of performance in a course (Ćukušić et al., 2014).

Currently, however, the questions would still have to be developed manually by the respective lecturers. Large Language Models can support in this scenario as they are increasingly used for various language-based tasks like question-answering, text generation or summarization. Due to the possibility to enhance the capacities of transformer language models more and more, a trend towards increasing the scale of language models has emerged in recent years. Thus, the architectures of these models are no longer task-specific, but task-agnostic in design. Moreover, they are trained on large datasets that are also task-unspecific as well as domain-unspecific. (Wei et al., 2022). Trained once, LLM strongly perform in zero-, one- or few-shot settings at tasks defined on-the-fly like the automatic generation of questions (Brown et al., 2020). In addition, there are also verification mechanisms using Natural Language Inference to check the answers to questions for their correctness.

The following paper describes the development of such a system, which can be used for the automatic generation of questions for self-assessment quizzes as well as for the verification of the given answers. First, the application design of the quiz function including relevant findings from the literature are pointed out in section 2. Then, in section 3, the possible architecture of such a model is presented and the process for testing is described. Afterward, a qualitative focus group with students was conducted to assess preliminary feasibility and perception of the system prototype followed by a discussion of the results in section 6. Finally, a conclusion is drawn in section 7.

2. Application Design

This chapter describes the system that can be used for the automatic generation of quizzes to measure learning progress. For the development of the design, various studies were considered that use online quizzes for the self-assessment of students.

In a research project at the University of Stuttgart, a smartphone app was designed that offers students quizzes on modules of a selected course and provides direct feedback after answering the questions (display of an overview of the number of correctly and incorrectly answered questions). The quizzes can be used on a voluntary basis. In addition, the results are not stored and evaluated, but can only be viewed by the respective student (Pauli et al., 2020).

An application developed at the University of Graz also provides students with online quizzes for individual courses, however, via the learning management system (LMS) Moodle. Students are given the opportunity to voluntarily check their level of knowledge in a lecture based on questions about course material and automatically receive a grade for their results. The quizzes can be taken several times (Schweighofer et al., 2019).

In another example, which provides online quizzes for students via the LMS MyMathLab, the authors (Sek et al., 2012) point out various features that need to be considered when developing a quiz application. These include the number of questions, the number of attempts, the question format, time limitations, and the way the results are displayed.

Based on these examples, initial requirements for a system that can be used at Ansbach University of Applied Science were collected within the research team. Overall, the quiz function is intended to serve as a voluntary student-oriented support offer to determine their learning progress in their respective courses by means of conducting quizzes regardless of possible offers provided by lecturers. Accordingly, the application contains content-related questions about a course with a prompt evaluation of the given answers. The results are only visible to the respective student. In addition, the quizzes should be able to be conducted online and thus independent of location and time.

The use of language models for the development of the application enables an automatic generation of questions. Using lecture materials such as scripts or book extracts, questions about the content should be generated. In order to evaluate the given answers, another language model be involved to perform Natural Language Inference (NLI). The NLI model classifies the given answers into three classes with the respective probabilities and thus, statements about the correctness can be made. Based on these requirements, the development of a first prototype will be described in the following section.

3. Model Architecture

The proposed system consists of two components: (1) a model for question generation and (2) a model for NLI whereas the two models are not connected and work independently. First, questions are generated given a text passage. Then, answers provided by a user are checked for their accuracy. Users can engage with the system via a graphical user interface currently provided via a web app.

3.1 Question Generation Model

For the question generation task, a pre-trained T5 model is used as a foundation. Being trained on a huge amount of unlabeled data consisting of clean English text (the Colossal Clean Crawled Corpus), the T5 model is able to perform various Natural Language Processing (NLP) downstream tasks e.g. summarization or translation (Raffel et al., 2020). Its architecture is based on an encoder-decoder transformer implementation which converts all NLP problems into a text-to-text format. In our case, a pre-trained T5-model fine-tuned on the GermanQuAD

dataset which consists of extractive question and answer pairs was used (Dehio, 2022). Given a German text, the model generates a list of questions about it. As seen from others, beam search and top_k random sampling to generated a variety of questions was used (von Platen, 2020).

3.2 Natural Language Inference

To reach the goal of verifying if given answers to a question are correct NLI is used. Natural language inference is the task of determining whether a “hypothesis” is true (entailment), false (contradiction) or undetermined (neutral) given a “premise” (Lokshyn, 2022). A pre-trained mDeBERTa-v3-base model was used trained on a large multilingual dataset containing NLI hypothesis-premise pairs (Laurer, 2022). The transformer-based architecture is able to compare a given answer with the underlying text and return a score with regards to the tree classes entailment, contradiction and neutral.

3.3 Graphical User Interface

Users can access the system via a web app that is created with the Streamlit library. Multiple user interfaces have been build. The landing page displays a menu for selecting the quiz topic (see Fig. 1).



Figure 1: Landing page of the quiz function.

After selecting the topic, the user is automatically redirected to the second interface displaying the underlying text on the basis of which the associated questions are generated (see Fig. 2).

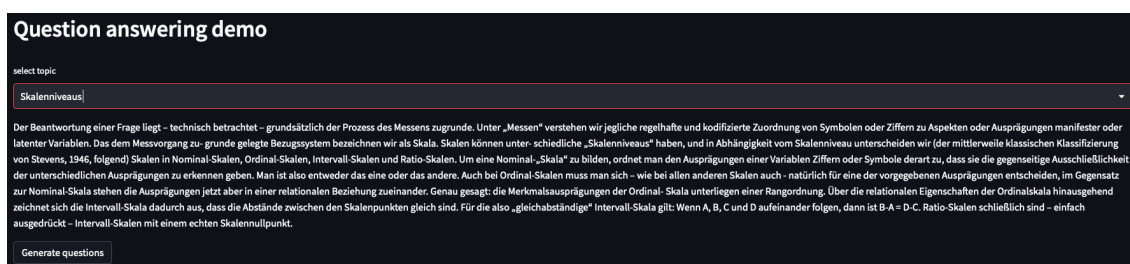


Figure 2: Display of the text used to generate the questions.

The "Generate questions" button outputs a list of 10 questions. In addition, the questions appear individually above the corresponding input field for typing in the answers (see Fig. 3).

Question answering demo

select topic
Skalenniveaus

Der Beantwortung einer Frage liegt – technisch betrachtet – grundsätzlich der Prozess des Messens zugrunde. Unter „Messen“ verstehen wir jegliche regelhafte und kodifizierte Zuordnung von Symbolen oder Ziffern zu Aspekten oder Ausprägungen manifesten oder latenter Variablen. Das dem Messvorgang zugrunde gelegte Bezugssystem bezeichnen wir als Skala. Skalen können unterschiedliche „Skalenniveaus“ haben, und in Abhängigkeit vom Skalenniveau unterscheiden wir (der mittlerweile klassischen Klassifizierung von Stevens, 1946, folgend) Skalen in Nominal-Skalen, Ordinal-Skalen, Intervall-Skalen und Ratio-Skalen. Um eine Nominal-Skala zu bilden, ordnet man den Ausprägungen einer Variablen Ziffern oder Symbole derart zu, dass sie die gegenseitige Ausschließlichkeit der unterschiedlichen Ausprägungen zu erkennen geben. Man ist also entweder das eine oder das andere. Auch bei Ordinal-Skalen muss man sich – wie bei allen anderen Skalen auch – natürlich für eine der vorgegebenen Ausprägungen entscheiden, im Gegensatz zur Nominal-Skala stehen die Ausprägungen jetzt aber in einer relationalen Beziehung zueinander. Genau gesagt: die Merkmalsausprägungen der Ordinal-Skala unterliegen einer Rangordnung. Über die relationalen Eigenschaften der Ordinalskala hinausgehend zeichnet sich die Intervall-Skala dadurch aus, dass die Abstände zwischen den Skaleneinheiten gleich sind. Für die also „gleichabständige“ Intervall-Skala gilt: Wenn A, B, C und D aufeinander folgen, dann ist $B - A = C - B$. Ratio-Skalen schließlich sind – einfach ausgedrückt – Intervall-Skalen mit einem echten Skalennullpunkt.

Generate questions

Question List

Welche Bedeutung hat die Intervall-Skala?
Wie wird das Messvorgang zugrunde gelegt?
Wie unterscheidet sich die Intervall-Skala von der Ordinal-Skala?
Was ist das Messvorgang zugrunde gelegt?
Wie werden Skalen gegliedert?
Welchen Unterschied gibt es zwischen den Skalen?
Welche Skalen unterscheiden sich von Ordinal-Skalen?
Wie heißen Ratio-Skalen?
Wie heißen Skalen?
Was ist die Grundlage des Messvorgangs?

Welche Bedeutung hat die Intervall-Skala?
Antwort:
Next

Figure 3: Output of the question list.

After typing in the answer, via the "Next" button, the scores for the three classes are displayed below the answer field (see Fig. 4).

Welche Bedeutung hat die Intervall-Skala?

Antwort:
Abstände zwischen Skaleneinheiten sind gleich

Next

Result of question:

Entailment: 99.0997 Contradiction: 0.8135 Neutral: 0.0868

Figure 4: Answer verification.

4. Testing

As pre-trained models were used, no training but testing process was required. Both models were tested manually with a human in loop. The testing of the question generation model was based on several steps. In order to select a question-answering model a small test was conducted during which various pre-trained question generation models were used to check the quality of the generated question based on the same paragraph. Once a model was selected, it was detected that the paragraph length correlated with the repetition of questions. The bigger the paragraph, the better the quality of the questions generated without repetition. The generated questions were processed to remove the repeated questions by the model programmatically. For the NLI model the paragraphs with the generated questions were evaluated manually.

5. Evaluation

In order to evaluate the quiz function from the perspective of future users, it was decided to have an initial prototype tested by students during the development process. The goal of this evaluation was to get feedback on current features of the quiz function, but also to get ideas on how the function can be better adapted to the student's needs. For this purpose, a qualitative focus group was conducted with several participants.

5.1 Participants

The participants of the study were approached through a university course and volunteered to participate in the focus group in December 2022. In total, 5 participants were recruited for the focus group consisting of three students, one professor and one scientific associate, all from the same study program. Among them there were four females and one male. Due to the limited research funds, there was no reimbursement for the focus group participation.

5.2 Data Collection

For the focus group, a semi-structured interview guideline was prepared by the research team. The semi-structured format was chosen to allow for open discussions. The questions were partly created based on prior literature research of similar studies in the educational field (Sek et al., 2012). The focus group was performed online via Zoom and moderated by two of the authors of this paper. As two specifications of the Analyzer were studied, the presentation and discussion was divided into two parts as well. In each part, the Analyzer component was first presented, after which the participants had the opportunity to test the function themselves followed by a discussion.

Question Category	Explanation	Example Question
Scope & Content	Questions concerning the scope and content quality of the questions	“Were the questions asked about the content understandable? “How did you feel about the number of questions in a section?”
Parameters	Questions concerning the different parameters of the model such as time restrictions	“Do you think there should be a time limit to answer the questions?” “When should the answers to the question be displayed?- Directly after the question or after completion of the quiz?” “Would it be helpful if you could give a due date for the quizzes on a particular topic?”
User Experience	Questions dealing with usability, navigation, and the output format	“Were you satisfied with the presentation of the results per question and overall?” “How did you perceive the navigation on the page? Did you know where to click to get the necessary information?” “How should the quiz ideally be delivered?”
Format	Questions dealing with the general output format	“What other possibilities do you know or use to check your level of learning progress?” “Would you prefer a different examination format? For example as a multiple choice test?”

Table 1: Semi-structured Interview Guideline.

5.3 Data Analysis

For data analysis we used the qualitative content analysis method (Kuckartz, 2016) in two stages according to (Schulz, 2012), since this procedure fits best to our research design. In a first step, the video recording was transcribed and reviewed several times by the research team. In a second step, the data were coded, categorized and after a final review adapted. The coding procedure was done using both an inductive and a deductive approach. As described previously the semi-structured interview guideline was based on three pre-defined categories. These

categories were then adapted during the analysis, further categories were added and others renamed. The coding process was reviewed by other team members to maximize objectivity.

5.4 Results

In general, the quiz function was well received by the participants. Positive aspects that were mentioned cover the self-explanatory design of the system, the amount of questions and the display of a rating of the given answers. Participants were in general surprised and impressed with the capability of the question generation model.

In terms of the content quality of the generated questions, the feedback was mixed. While some of the questions encourage a deeper engagement with the topic, others were deemed less useful. For example, several times the same question was issued by the model only in a different wording. However, the structure of the questions was predominantly evaluated positively.

The natural language inference model did not fully meet the expectations of the participants. While the evaluation of the answers was initially emphasized favorably, the rating according to the three classes (entailment, contradiction or neutral) does not always appear to be plausible. Suggestions for improvement included, first, an explanation of how the response was classified, and second, the output of a sample solution.

Another intention behind the focus group was to obtain ideas regarding the format of the quizzes. Among other things, the addition of a time limit during the answering of the questions or the integration of a due date was pointed out. Limiting the number of attempts to complete a quiz could be another option. Regarding the answer format, multiple-choice quizzes were discussed as an alternative to the current open-question format.

Finally, the provision to the quiz function was discussed. In particular, students would welcome the offer of a smartphone app or integration via the learning management system used at the university in order to prevent additional media disruptions.

Category and sub-category	Definition	Quote (example)
1. Positive Aspects	All text passages that include positive aspects of the quiz function	“What I particularly liked about the quiz function is the structure, where you first read up on the topic and then have it in front of your eyes and directly answer various questions about it.” (Focusgroup2.2, paragraph 8)
2. Improvement Suggestions	All text passages that show improvement options for the feature	
2.1 Comprehensibility	All text passages that include suggestions for improvement on the comprehensibility of the result as well as information value of the questions	“A suggestion would also be to clarify what exactly "good" means, what "neutral" means, and why.” (Focusgroup2.2, paragraph 17)
2.2 User Experience / Navigation	All text passages that demonstrate how user experience and navigation were perceived	“Everything that is connected to authentication would be an additional hurdle” (Focusgroup2.2, paragraph 50)
2.3 Functionality	All text passages that demonstrate suggestions for improvement on various functions	
2.3.1 Time Limit	All text passages that demonstrate how a time limit can support the preparation for the exam	“I actually think it would be cool if you could choose whether you want to have a time limit or not. Because maybe if a topic is new, it would be great to have enough time to think about it. But if it's a topic that you've already had several times and are well-prepared for, you can say that you have a time limit, just like you would in an exam.” (Focusgroup2.2, paragraph 24)
2.3.2 Number of attempts	All text passages that demonstrate how limiting the number of attempts can support exam preparation	“Maybe it is also a point that can be left open, like limiting the time, because it simulates the feeling of an exam more strongly. But I generally don't think it's bad if it would be limited.” (Focusgroup2.2, paragraph 12)
2.3.3 Sample solutions	All text passages that demonstrate how a sample solution could improve the function	“Maybe it would be really cool if there was the possibility to display some kind of sample solution.” (Focusgroup2.2, paragraph 12)
2.3.4 Examination format	All text passages that identify various exam questions to support the learning process	“It depends, whether I am in the learning phase. I think, then I would prefer to actively engage with the material or is it just before the exam and I want to check where I stand. Then, hiding it is probably better.” (Focusgroup2.2, paragraph 37)
2.3.5 Due Date	All text passages that demonstrate how setting a due date for learning content can promote the learning process	“Everyone would find that helpful.” (Focusgroup2.2, paragraph 40)

Table 2: Results from the second part of the focus group, reflecting the testing of the quiz function. Texts have been translated from German.

6. Discussion

The objective of this focus group was to assess preliminary feasibility and perception of the quiz function. The findings suggest that especially the question generation model as well as the NLI model and the structure of the quizzes need to be adapted according to the needs of the

future users. Since the question generation model does not yet offer a consistent quality of the created questions, further training of the model is necessary, possibly also on further data sets. The categorization of the NLI model must be made transparent to the user. This means that the underlying rules for the assignment of the classes would have to be displayed or hints would have to be given in order to answer a question completely correctly. Overall, more customization options are desired. Students would like more customization options, e.g., selecting answer formats, setting a time limit, setting the number of attempts to answer a question.

6.1 Limitations and Implications for Future Work

A shortcoming of the design of the focus group relates to the small sample size of the participant group. Moreover, the group was recruited from only one course and study program, which resulted in a low heterogeneity of the sample group. In contrast, this could also be seen as advantage, since one may assume a similar level of knowledge of the participants. Nevertheless, future focus groups should consider a larger, as well as more diverse participant base.

In terms of practical implications, the focus group resulted in several ideas for the further development of the quiz function, such as the proposal to integrate the application within the Learning Management System Moodle. The feature would be available in the same place as course materials. A benefit would be that Moodle offers a mobile application, with which students could access the quiz function on their smartphone. Another interesting aspect is the expansion of the model from students to teachers. For example, by supporting teachers in the creation of exam questions or the analysis of the learning progress of participants in a course.

7. Conclusion

In this paper, the use of language models to measure learning progress was assessed. The overall research goal was to develop an application that allows students to self-assess learning progress on course level. An AI-based quiz function was created using a question generation model and an NLI model. The application takes lecture scripts as an input and creates questions that can then be answered by students. The given answers are verified by the NLI model. A qualitative focus group was conducted to acquire insights about the application with regards to user experience, format, and content. Overall, the quiz function was well received by the participants of the focus group. However, the prototype still has potential when it comes to generating meaningful questions and transparently assigning categories to the given answers. Furthermore, the quiz parameters should be individually adjustable by users.

The study highlights the enormous potential that can be derived from the application of language models within the educational context. Moreover, practical implications for implementing an AI-based quiz function are described. The insights gained from the focus group will be incorporated in the further development of the quiz function.

References

- Bognár, L., Fauszt, T., & Váraljai, M. (2021). The Impact of Online Quizzes on Student Success. *International Journal of Emerging Technologies in Learning (iJET)*, 16(11), 225. <https://doi.org/10.3991/ijet.v16i11.21679>
- Brown, T. B., Mann, B., Ryder, N., Subbiah, M., Kaplan, J., Dhariwal, P., Neelakantan, A., Shyam, P., Sastry, G., Askell, A., Agarwal, S., Herbert-Voss, A., Krueger, G., Henighan, T., Child, R., Ramesh, A., Ziegler, D. M., Wu, J., Winter, C., ... Amodei, D. (2020). *Language Models are Few-Shot Learners* (arXiv:2005.14165). arXiv. <http://arxiv.org/abs/2005.14165>
- Ćukušić, M., Garača, Ž., & Jadrić, M. (2014). Online self-assessment and students' success in higher education institutions. *Computers & Education*, 72, 100–109. <https://doi.org/10.1016/j.compedu.2013.10.018>
- Dehio, N. (2022). *German-qg-t5-e2e-quad*. <https://huggingface.co/dehio/german-qg-t5-e2e-quad>.
- Gikandi, J. W., Morrow, D., & Davis, N. E. (2011). Online formative assessment in higher education: A review of the literature. *Computers & Education*, 57(4), 2333–2351. <https://doi.org/10.1016/j.compedu.2011.06.004>
- Kuckartz, U. (2016). *Qualitative Inhaltsanalyse: Methoden, Praxis, Computerunterstützung* (3., überarbeitete Auflage). Beltz Juventa.
- Laurer, M. (2022). *MDeBERTa-v3-base-xnli-multilingual-nli-2mil7*. <https://huggingface.co/MoritzLaurer/mDeBERTa-v3-base-xnli-multilingual-nli-2mil7>
- Lokshyn, O. (2022, Juni 9). Natural Language Inference: An Overview. *Towards Data Science*. <https://towardsdatascience.com/natural-language-inference-an-overview-57c0eecf6517>
- Panadero, E., Brown, G. T. L., & Strijbos, J.-W. (2016). The Future of Student Self-Assessment: A Review of Known Unknowns and Potential Directions. *Educational Psychology Review*, 28(4), 803–830. <https://doi.org/10.1007/s10648-015-9350-2>
- Pauli, P., Koch, A., & Allgöwer, F. (2020). Smartphone Apps for Learning Progress and Course Revision. *IFAC-PapersOnLine*, 53(2), 17368–17373. <https://doi.org/10.1016/j.ifacol.2020.12.2088>
- Raffel, C., Shazeer, N., Roberts, A., Lee, K., Narang, S., Matena, M., Zhou, Y., Li, W., & Liu, P. J. (2020). *Exploring the Limits of Transfer Learning with a Unified Text-to-Text Transformer* (arXiv:1910.10683). arXiv. <http://arxiv.org/abs/1910.10683>
- Schulz, M. (2012). Quick and easy!? Fokusgruppen in der angewandten Sozialwissenschaft. In M. Schulz, B. Mack, & O. Renn (Hrsg.), *Fokusgruppen in der empirischen Sozialwissenschaft* (S. 9–22). VS Verlag für Sozialwissenschaften. https://doi.org/10.1007/978-3-531-19397-7_1

- Schweighofer, J., Taraghi, B., & Ebner, M. (2019). Development of a Quiz – Implementation of a (Self-) Assessment Tool and its Integration in Moodle. *International Journal of Emerging Technologies in Learning (iJET)*, 14(23), 141.
<https://doi.org/10.3991/ijet.v14i23.11484>
- Sek, Y.-W., Law, C.-Y., Liew, T.-H., Bt Hisham, S., Lau, S.-H., & Pee, A. N. B. C. (2012). E-Assessment as a Self-Test Quiz Tool: The Setting Features and Formative Use. *Procedia - Social and Behavioral Sciences*, 65, 737–742.
<https://doi.org/10.1016/j.sbspro.2012.11.192>
- von Platen, P. (2020, März). How to generate text: Using different decoding methods for language generation with Transformers. *Hugging Face*.
<https://huggingface.co/blog/how-to-generate>
- Wei, J., Tay, Y., Bommasani, R., Raffel, C., Zoph, B., Borgeaud, S., Yogatama, D., Bosma, M., Zhou, D., Metzler, D., Chi, E. H., Hashimoto, T., Vinyals, O., Liang, P., Dean, J., & Fedus, W. (2022). *Emergent Abilities of Large Language Models* (arXiv:2206.07682). arXiv. <http://arxiv.org/abs/2206.07682>

Contact email: b.woldai@hs-ansbach.de

Tutorial Factors Associated With Dropout and Failure in Higher Education

Luz Alondra Katt Morales, Universidad Autónoma de Querétaro, Mexico

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The purpose of this work is to present the tutorial factors associated with desertion and failure identified in higher education, at the Technological University of the Southeast of Veracruz (TUSV), a non-experimental design is suggested, based on a quantitative, analytical and descriptive approach. It addresses two of the five phases proposed in the methodology for the implementation of information technologies in the academic tutorial field. The population includes male and female university students over 18 years of age, the sample is random with 375 students who answered two questionnaires. Two questionnaire-type instruments were applied, one on risk factors, which includes socioeconomic aspects, health considering the instrument validated by Campo (2014), to which aspects on drug use and experienced emotions are added, personal aspects that refer to self-regulation of learning proposed by Lenniaz Matos Fernández (2009), which has been validated and academic environment, another to know the performance of the tutor, taking into account aspects of the national model of technological tutoring. universities and polytechnics, the work of Navarro (2014) is addressed in the same way, in which three dimensions are identified: tutor tasks, methodological mastery/attitudinal aspect, and interpersonal/communicative relational skills. Data from school services on failure are analyzed, together with the data collected, elements are obtained to identify endogenous and exogenous factors associated with dropout due to failure.

Keywords: Terminal Efficiency, Risk Factors, Information Technologies

iafor

The International Academic Forum
www.iafor.org

Introduction

Higher Education Institutions (HEI) have the main function of training capable professionals, seeking effective processes to increase retention and regularity rates, which have been affected over time by factors such as desertion, failure and condition of irregularity, the efficiency of the institutions is measured by the trajectory of the formative process, the number of students who complete their studies with respect to those who enter, it is known as terminal efficiency (ET); It is a crucial measure of the ability to use the resources that society provides them, it is also a measure of their ability to train the highly qualified citizens that the nation requires for its development (López et al., 2008).

Providing quality education is a constant requirement in all countries, it is imperative to attend to the indicators, since society demands the preparation of qualified labor, for this reason the HEI have implemented tutorial programs, which constitute strategies for comprehensive training. of the student, being a guide in the university environment and for academic follow-up, which will allow taking actions to improve academic performance and attention to risk factors (Rodríguez, 2017).

The Technological University of the Southeast of Veracruz (TUSV) in accordance with the creation decree, began operations in 2003 in accordance with the national development plan, which seeks to train the individual, transmit culture contributing to a social transformation for the benefit to the community. Throughout these almost 20 years, since its creation, the TUSV has the mission of training University Senior Technicians (UST) and engineers that respond to the needs of the productive and social sector (Universidad Tecnológica del Sureste de Veracruz [UTSV], 2022). At TUSV, tutoring has been carried out based on the experience that teachers have acquired throughout their academic work. In 2017, they began to organize elements that allow control of the number of tutoring sessions, the incursion of formats in the quality management system, without major impact on student training, rather on statistical numerical compliance. It is until 2019 when work begins with the institutional tutoring plan (UTSV, 2019), whose objective is to "promote the integral formation of the student, accompaniment in the university environment that allows the development of skills, aptitudes and attitudes through of academic support and strengthening of values, as well as the decrease in dropout and failure rates through a trained group of tutors" (p.3), in this plan the types of tutoring, actors and roles, profile of the tutor, the functions of the tutor, the tutorial process and support areas involved to contribute to the student's training, such as: Scholarships, medical service, consultancies, tutorials and psychological support, and a training plan for tutors is established, however; progress has been minimal, since the scope of the plan has not been evaluated, despite the fact that there is a weekly tutorial session, the tutorial actions have not been implemented.

It is until 2019 when work begins with the institutional tutoring plan (UTSV, 2019), whose objective is to "promote the integral formation of the student, accompaniment in the university environment that allows the development of skills, aptitudes and attitudes through of academic support and strengthening of values, as well as the decrease in dropout and failure rates through a trained group of tutors" (p.3), in this plan the types of tutoring, actors and roles, profile of the tutor, the functions of the tutor, the tutorial process and support areas involved to contribute to the student's training, such as: Scholarships, medical service, consultancies, tutorials and psychological support, and a training plan for tutors is established, however; progress has been minimal, since the scope of the plan has not been

evaluated, despite the fact that there is a weekly tutorial session, the tutorial actions have not been implemented.

The ANUIES, define tutorials as a process of accompaniment during the training of students, which is specified through personalized attention to a student or a small group of students, the role of the tutor is important, since he must be a participant in the detection, orientation, channeling and monitoring of the tutorship, according to the tutorial model of the Technological and Polytechnic Universities (Coordinación de General de Universidades Tecnológicas y Politécnicas, 2017).

At TUSV there are three forms of tutoring: group, individual and in pairs. The first is that the tutor assigned to the group goes to the classroom, in the first instance to introduce himself if it is the first time that he has served as a tutor and to carry out the initial interview to collect data from the tutors (Detect); The initial interview used to be carried out in a printed document that served as a record for the quality management system; during the pandemic it was carried out in an Excel document. If the tutor repeats, the tutored group appears to interact with the students. In these subsequent sessions (Guide), general situations are addressed with the group, at the tutor's initiative, the academic situation is inquired about, or general doubts of the students are resolved, if the tutor detects a situation of conflict or a risk, he must channel it (Canalize) to the areas for support to provide advice, medical, psychological service, or scholarships.

This research is carried out to meet the need to improve the terminal efficiency index at the TUSV through a methodological design that allows determining the factors that affect dropout and failure, considering four tutorial areas: personal, health, socioeconomic and academic. Previous investigations referring to desertion, failure and their influence on terminal efficiency are analyzed, to have an overview of the explanatory studies of the causes in the institutions. The knowledge of the causes of desertion and failure of the institution itself and in its specific context, will allow modeling the endogenous or exogenous factors; to translate them into strategies that generate tutorial actions that contribute to developing policies that contribute to increasing terminal efficiency. It is important to consider what was described by Arnaud (2022), since the TUSV does not address lag and dropout factors, no dropout factors related to the vocational profile, personality, skills, economic, family, or social factors have been identified. and personal, during the pandemic health factors are added. (Katt et al., 2021), it would be useful to identify the relationship between dropout and inequality to identify factors that trigger school dropout in higher education and support from tutors.

Theoretical References

The efficiency of an educational system has been defined succinctly by the United Nations Educational, Scientific and Cultural Organization: "Degree to which educational systems manage to optimize the input/output relationship in education" (UNESCO, 2019).

In the same vein, quality in education is a matter of priority (European Union), being essential for educational training, where the process of counseling and tutorial accompaniment participate as key tools, contributing to the change of the teaching culture towards personal attention. , comprehensive multicultural and diverse (Lledó et al., 2018). The tutorials come from time immemorial, it is mentioned in Homer's *Odyssey* written in the

seventh century BC. since a character named as a mentor intervenes, who was the educator and advisor of Telemachus, the son of Odysseus (González, 2015).

Luna drafts the guide as the person whose mission is to teach the other the correct path to reach the goal, quoting Luis Vives 1492-1540 "that the teacher is not limited to teaching, and to fulfill his main function of educating he has to become a guide..." (Luna et al., 2015).

Tutoring at the National Autonomous University of Mexico dates back to the year 1553 as the Royal and Pontifical University of Mexico, where a tutor was in charge of teaching with religious foundations and cementing the faith of the tutored. By 1941, in the PhD in Chemistry at the Faculty of Chemistry, tutors were assigned to support their training as a researcher (Olvera, 2015).

Rodríguez (2021) shows a non-experimental work, where students who completed their study plan, degree of progress, school dropout, failure, type of exam were evaluated, it is concluded that progress decreases in the second and third quarters, they are recommended Strategies that include consultancies, tutorials, psychological channeling for Computer Engineering students at the UAEM Valle de México university center.

Niurys focuses on the identification of factors that determine student desertion in the computer science career in Cuba, proposes structural and content elements for IT tutorial actions that address the detected factors. It uses a mixed, non-experimental methodology with a rigorous systematization of the bibliography to obtain a theoretical model of dropout (Lázaro, 2020). For its part, the National Polytechnic Institute, as in other institutions, has identified problems of educational use, mentioning endogenous and exogenous factors, one of them; unprofessional teaching performance, distant planning and curricula (Trejo et al., 2005). From the use of Information Technology (IT) in the tutorials, the development of the tutorial action was proposed with a system of strategic actions, with organizational levels in the short, medium or long term and functions in each of the areas of the institution, development of IT mediated tutorial actions to address predictive factors of student dropout to promote retention (Lazarus, 2020).

Methodology

To identify student accompaniment by tutors, the management of the tutoring, follow-up and monitoring process is evaluated, to address personal, health, socioeconomic and academic risk factors. Two instruments are applied and analyzed; the evaluation of the performance of the tutor and tutorial areas, a methodology based on synthetic analysis is proposed, not experimental by simple sampling, with a quantitative, analytical and descriptive study to evaluate the support provided, the tasks of the tutor, the methodological domain and the Interpersonal/communication skills of the tutor to address the identified dropout factors.

The project consists of five phases (Figure 1), data collection, analysis, design, implementation and evaluation. For the data collection phase, 2 instruments are designed.

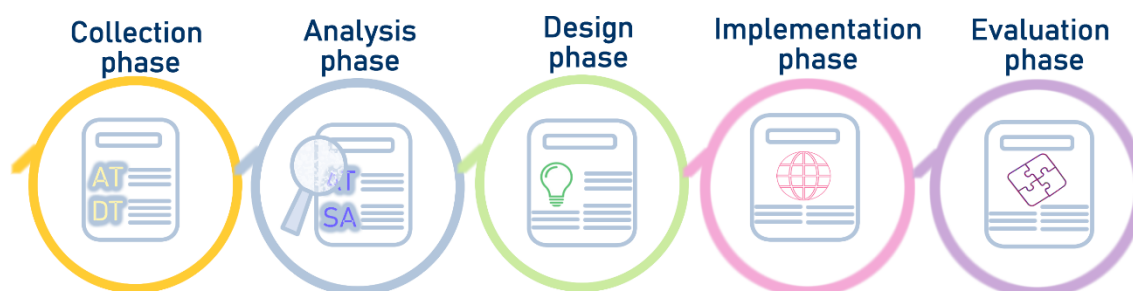


Figure 1. *Phases of the methodology. (Own elaboration)*

Methodological Characteristics

The tutor performance evaluation instrument adapts aspects of the national tutoring model of technological and polytechnic universities, as well as the instrument described by Navarro (2014), which consists of 23 questions and three dimensions are identified: Tutor tasks, which It consists of the ability to lead students through the learning process, it includes questions 4-7,10,12-14,20-23, the methodological domain/attitudinal aspect refers to the specific knowledge of the tutor, it is evaluated with the questions 1-3,8,9,18 and 19; interpersonal/communicative relational skills address the tutor's commitment to group learning and the associated questions are 11, 15-17. For this work, not all the questions were included given the current institutional considerations, questions 5,6,10 and 23 are discarded for the tutor's tasks, 5 and 23 are associated with IT and the institution does not have tutorial follow-up by IT, 6 and 10 are study techniques and work in pairs, programs not yet started at the TUSV, the methodological domain includes 6 of the 7 questions, discarding 9 that is related to the use of IT, relational skills include all the questions, the resulting instrument includes 18 questions on a Likert scale that are adapted to the university situation, one of the main ones lies in the incorporation of factors associated with doing, knowing and being, essential pillars in learning (Delors cited by Navarro, 2014).

The survey designed to identify dropout factors is made up of questions from the National Institute of Statistics and Geography, self-regulation of learning proposed and validated by Matos (2009), to find out stress factors, the validated field instrument is adapted. (2014) and questions on alcoholism, tobacco and drugs are added, the data is complemented with the analysis of failures and withdrawals.

A population of 1459 young university students, men and women of legal age, enrolled in the four-month period September - December 2022, in the educational programs (EP) that are offered at the TUSV, two for bachelor's degrees, five for engineering and nine for UST. A simple random sample is considered by means of their registrations; using a finite sample formula; Both instruments are applied at the end of the September - December 2022 semester with the authorization of the TUSV student services department.

Analysis Phase- the degree of validity and reliability of the instruments is considered, when collecting the data obtained through the Google forms platform, it allows a descriptive analysis to be carried out, to measure variables considering interval and quotient data, the descriptive analysis is selected since it will allow a quantitative analysis, where the researcher has a high degree of objectivity and neutrality.

Results

In the teaching performance evaluation instrument, 56% of men and 44% women responded, of which correspond to the EP of engineering/undergraduate: 14 participants from Maintenance, 59 from Chemistry, 26 from IT, 38 from mechatronics, 28 of Accounting, 9 of Human Capital, for UST four correspond to Automotive Mechanics, 18 administration, 49 of Accounting, 36 of maintenance, 34 of mechatronics, 42 of chemistry, 18 of IT, of the schooled, discontinuous or depressurized modality.

From the tutor performance evaluation instrument, 29 tutors of the 47 assigned tutors were evaluated, corresponding to 62%; of which 14 are men and 15 women. When evaluating the tutoring sessions, 18 questions classified into three categories are considered: tutor tasks, methodological mastery and relational skills.

The tutor's tasks are related to doing, they include questions four, six, seven, nine, 10,11,17,18, students answer that they always or almost always comply with the associated actions (Table 1).

Question description	Percentage Always / almost always
Tutors collaborate with the identification of learning resources.	86.40%
Provide constructive criticism.	87.20%
They guide the student to assume their own learning.	87.73%
Contribuye en el valor del aprendizaje colaborativo	87.73%
Stimulates critical reasoning in the tutorial process.	87.20%
Helps develop individual communication skills in students.	85.87%
Stimulates the participation of all members.	88%

Table 1. *Identification of learning resources and response rate.*

Methodological domain, knowledge activities, students consider that the items are always or almost always fulfilled (Table 2).

Question description	Percentage Always / almost always
Mastery of the academic model during the development of the tutorials.	87.20%
Preparation to face the tutorials and organizes the activities and times of each tutorial.	86.67%
Guides students in identifying learning needs.	86.40%
Make referrals to student services according to the needs of the tutors.	85.60%
Is objective in monitoring student evaluations.	86.13%
Demonstrates commitment to their role as tutor.	87.73%
Demonstrates responsibility in the tutorial process in schedules and punctuality.	88.53%

Table 2. *Methodological domain and response rate.*

Interpersonal/communicative relational skills, elements associated with being (Table 3).

Question description	Percentage Always / almost always
Manages to create an environment of trust and respect in tutoring.	88.00%
Establishes harmonious relationships with students.	87.27%
Demonstrates enthusiasm in their role as facilitator of learning.	87.47%
Encourages good relationships among students.	88.53%

Table 3. *Interpersonal / communicative relational skills and response rate.*

In all the questions asked, the answers are positive since tutors always or almost always comply with a minimum of 85.60% of their activities and with a maximum value of 88.53%.

- When asked if they would like to continue with their tutor, 95.2% said yes.
- In the requests for comments, only 0.8% give suggestions for improving the tutorials, the rest believe that the tutor's performance has been favourable.

Regarding the survey of tutorial areas; the socioeconomic factor is a trigger for dropouts (Balleza, 2020), accordingly, in the TUSV it is an important factor to consider given that: the ages of the students range from 18 to 45 years, whose largest population is 18-22 years, the 49% of the students live with a single person and the family income depends on a single person (father 52% and mother 30%), the monthly family income of 70% of the students is less than or equal to \$6000.00 Mexican pesos, 53.33 % of students come from localities that have a high and very high degree of backwardness and 9.7% are parents.

The personal factor is related to aspects of intrinsic and extrinsic motivation to continue campus (Otero, 2022), in this aspect, more than 45% of students participate because it improves skills and understanding of courses and for intellectual growth (48.24%). More than 50% follow the teachers' suggestions to get good grades and because they think it will help them achieve better learning. Between 53% and 61% indicate that the reason for expanding their knowledge is because they want to learn more and because of the challenge of learning what is done in the courses.

In the wellness aspect there are physical and psychological limitations that prevent academic continuity, some that cannot be mitigated and others that can be contained, 27.75% present alcohol consumption, 20.8% consume tobacco, 13.3% consume or have consumed drugs and 75% have presented stress.

8.4% are reinstated students, in the semesters September - December 2021, January -April 2022, May - August 2022 and September -December 2022 there have been more than 51% of failed subjects, being from the area of languages and methods followed by the area of applied basic sciences for UST whose terminal efficiency is 55.4%, with 68% of graduates being men and 32% women; for engineering, the terminal efficiency is 84.95%, data from the generational cohort of 2001-2022, relevant data from the academic field.

Discussion

This work intends that its impact be from the three axes:

Social: Comprehensive training of human resources generating quality graduates to develop activities in their field of action.

Institutional: Encourage higher level educational institutions to develop research activities, technological development that help generate innovative proposals by promoting the linkage of institutional actors, teachers, tutors, students, support areas.

Academic: With IT you can monitor the academic situation of students to generate strategies aimed at the university student permanence.

With the above, it is expected to contribute at the institutional, state and national level, addressing the problems detected with the terminal efficiency indices, identifying institutional factors that allow generating strategies to address dropouts and adequate monitoring by tutors.

Conclusions

It is important to consider the various risk factors presented and recommendations that contribute to university retention. The performance of the tutor is fundamental for the accompaniment of the students, to generate empathy, to create the communicative process to achieve the links that allow the participation between the tutor and the mentee, to guide and make decisions for the benefit of their academic work.

With the application of the evaluation instrument to the performance of the tutor, the work that has been carried out throughout the almost 20 years in the institution is evident. From the student's perspective, the role of the tutor is performed satisfactorily with 99% approval. The

data collected focuses on the knowledge, doing and being of the tutor, aspects that are in accordance with the educational model of the UT (Table 4).

Factor	Conclusions
Tutor task Know to do	The students consider that the tutor has served as a guide in the university environment, promoting collaborative learning, interest and willingness to solve problems, they consider that they have the ability to identify learning resources, provide constructive criticism, stimulate participation for development of individual skills.
Methodological domain Know	The students point out that the tutor has the skills to conduct himself as a guide in the methodological environment, knowing the academic model and therefore identifying learning needs, channeling it to the indicated areas and following up on student evaluations as far as possible. possible, is responsible and committed to the welfare of students.
Interpersonal/communicative relational skills. Know how to be	It is stated that the tutor creates an environment of trust, respect and encourages good relations by being enthusiastic in the tutorial actions.

Table 4. *Conclusions of knowing, doing and being of the tutor's performance.*

The tutor is the focus of attention of the project to be developed, he is the one who will execute the strategies that are implemented and therefore the strengths must be identified to make use of them in the implementation. Of the 47 tutors, 28 of them were satisfactorily evaluated, however, there is a low percentage of teachers who do not attend the tutorial sessions, so joint work is imperative to close the tutorial cycle to implement follow-up actions.

There are variables that influence the factors, in this idea:

Wellness issues; physical and mental, is the factor with the lowest level of influence, whose variables such as: academic stress, anxiety, which usually occur due to work overload and demand; the consumption of legal and non-legal drugs should be targeted, since they affect school performance.

The personal factor has the third place in the level of influence, the variable of self-regulation of learning is important for the student; denotes an opportunity for motivation to continue their studies, even when some elements depend on the teacher, in the respondents it is of interest to strengthen the motivation to maintain a positive attitude and commitment to their learning.

The socioeconomic factor occupies the second highest place in the level of influence, with variables such as age, where 21.6% who are over 22 years of age, whose age does not allow them to be candidates for the main Mexican federal scholarship, students who have age over 30 years and are usually workers and/or parents, family income, where the income reported by students is the lowest in households according to INEGI (2020), is said to be considered relevant.

The academic factor has the highest level of influence on dropout in higher education. The variables of failure, areas of knowledge, and academic level (UST) have a strong relationship with withdrawals, therefore it is necessary to take timely monitoring actions of subjects at risk and implement tutorial activities for regularization and address the main reason for withdrawal.

The factors that are most influential are: academic with more than 78% and socioeconomic with 20%, with this identification it is possible to work with focused strategies that contribute to the reduction of university dropouts.

The factors that are most influential are: academic with more than 78% and socioeconomic with 20%, for this it is necessary to generate strategies that allow addressing the dropout problem, emphasis is placed on the work of the tutor and its satisfactory evaluation, for what is necessary to take advantage of the profile to carry out the tutorial tasks as a guide in the university environment, the methodological domain, the identification of needs, as well as the relational skills to interact with the tutor. By creating an environment of trust, it contributes to the personal interaction tutor – tutored student, to open up to situations of vulnerability that trigger into school dropout, such as socioeconomic, personal, wellness or academic factors, and before that, take actions to channel to the corresponding areas. Tutoring as strategies against desertion is, without a doubt, a topic of interest is to provide support that allows dealing with university dropout rates.

References

- Arnaud Bobadilla, A.J., Sánchez Villareal, F., Galindo Miranda, N. E., Franco Bodek, D. y Ruiz Gutiérrez, R. (2022). *Revista Iberoamericana para la investigación y el desarrollo educativo*, 12(24). <https://doi.org/10.23913/ride.v12i24.1181>
- Balleza Varela, A., Cruz Zavala, J., González Morales, P., Sánchez Barraza, A. y Sánchez Flores, M. (2020). Factores personales que influyen en el abandono escolar en universitarios. *PsicoEducativa; reflexiones propuestas*, 6(11). <https://psicoeducativa.iztacala.unam.mx/revista/index.php/rpsicoedu/article/view/126/321>
- Campo Arias, A., Celina Oviedo, H. y Herazo E. (2014). Escala de estrés percibido – 10: desempeño psicométrico en estudiantes de medicina de Bucaramanga, Colombia. *Revista de la Facultad de Medicina*, 62(3). <http://dx.doi.org/10.15446/revfacmed.v62n3.43735>
- Coordinación de General de Universidades Tecnológicas y Politécnicas [CGUTyP]. (2017). *Modelo Nacional de Tutorías Comisión de Rectores del Tema 21: Programa de tutorías y Servicios de Apoyo al Estudiante*.
- González, A. M. (2015). *Antecedentes y evolución Histórica de la acción tutorial: Apuesta por una educación integral y de calidad*. Tercer congreso Internacional Multidisciplinar de Investigación Educativa. Segovia, España. http://amieedu.org/actascimie14/wp-content/uploads/2015/02/gonzalez_ana.pdf
- Instituto Nacional de Estadística y Geografía [INEGI]. (2020). Cuéntame de México. Recuperado de la base de datos de información.
- Katt Morales, L., Domínguez Campomanes, M., Gómez Manuel, E. y Morales Reyes, E. (2021). Estrategias para propiciar la permanencia universitaria en tiempos de la COVID-19. *Journal of University Policies*, 5 (14) DOI: 10.35429/JUP.2021.14.5.28.36
- Lázaro Álvarez N. (2020). *Acciones tutoriales con TIC atendimiento a factores predictivos de la deserción estudiantil en carreras de ingeniería informática* [Doctorado en Ciencias de la educación]. Universidad de Granada.
- Lledó Carreras, A., Lorenzo Lledó, G. y Gómez Puerta, M. (2018). Variables determinantes para una cultura tutorial desde el PAT. *Revista de Psicologías INFAD*, 3(1). <http://dx.doi.org/10.17060/ijodaep.2018.n1.v3.1294>
- López Suárez, A., Albiter Rodríguez, A. y Ramírez Revueltas, L. (2008). Eficiencia terminal en la educación superior, la necesidad de un nuevo paradigma. *Revista de la Educación Superior. Vol. XXXVII (2)*, 146, pp. 135-151. http://publicaciones.anuies.mx/pdfs/revista/Revista146_S5A1ES.pdf
- Luna Pérez, G., Manchado Durán, M. y Colunga Santos, S. (2015). Análisis histórico del proceso de acción tutorial en el ámbito educativo. *Transformación, ISSN:2077-2955, rnps: 2098*, 11(1), pp.103-112.

- Matos Fernández, L. (2009). Adaptación de dos cuestionarios de motivación: Autorregulación del Aprendizaje y clima de aprendizaje. *Persona*, 12, pp. 167-185.
- Navarro H. N., Zamora S. J. y Bustos M. L. (2014). Desempeño del tutor/a en el aprendizaje basado en problemas: Validación de un instrumento de evaluación en la facultad de medicina de la Universidad de La frontera. *Revista Educativa Ciencias de la salud*, 11 (2):137-142. <http://www2.udec.cl/ofem/recs/anteriores/vol1122014/artinv11214d.pdf>
- Olvera Coronilla, G. (2015). *Breve historia del surgimiento de la tutoría en la UNAM*. DGOSE-UNAM.
- Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [UNESCO]. (2019). *Thesaurus, United Nations Education, Science and Culture Organization*. Recuperado el 19 de septiembre de 2022, de <https://vocabularies.unesco.org/browser/thesaurus/en/page/concept6707>
- Otero Escobar, A. (2022). Deserción escolar en estudiantes universitarios: Estudio de caso del área económico-administrativa. *Revista Iberoamericana para la investigación y el Desarrollo Educativo*, 12(23). <https://doi.org/10.23913/ride.v12i23.1084>
- Rodríguez Pérez, I. (2017). La calidad de la educación superior y la reestructuración del programa de tutoría. *Revista Iberoamericana para la investigación y el desarrollo educativo*, 8(15). <https://doi.org/10.23913/ride.v8i15.294>
- Rodríguez Pérez, I., Pérez Ramírez, R. y Flores Albino, J. M. (2021). Estrategias para mejorar la calidad educativa con base en el análisis de la trayectoria académica en el área de ingeniería. *Revista Iberoamericana para la investigación y el desarrollo educativo*, 11(22). <https://doi.org/10.23913/ride.v11i22.858>
- Trejo García, M. y García Córdoba, F. (2005). Algunas reflexiones sobre el sistema tutorial en el Instituto politécnico Nacional. *Innovación educativa*, 5(26). <http://docplayer.es/111171075-Innovacion-educativa-issn-instituto-politecnico-nacional-mexico.html>
- Universidad Tecnológica del Sureste de Veracruz [UTSV]. (2019). *Programa Institucional de Tutorías*.
- Universidad Tecnológica del Sureste de Veracruz [UTSV]. (2022). *Misión, Visión y valores*. Recuperado en mayo de 2022, de <http://www.utsv.com.mx/wp/conoce-la-utsv/mision-vision-valores/>

Contact email: alondrakatt@gmail.com

***Emergency Remote Teaching (ERT) in the COVID-19 Pandemic:
Impact on the Education of Higher Education Students in the Health Area***

Olga Ribeiro, Lusófona University, Portugal

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Emergency Remote Teaching (ERT) emerges as a temporary resource for teaching students of courses in the health area, in higher education institutions, during the global pandemic COVID-19. The remote teaching modality brought with it positive aspects, as well as important challenges regarding the learning process in the area of higher education under analysis. This study intends to describe the impact of emergency remote teaching on the teaching of students in the health area, during the COVID-19 pandemic. This is a narrative literature review including articles published between 2020 and 2023, written in Portuguese, Spanish and English. The inclusion criteria were defined: primary source studies, with higher education students in the health area, during the COVID-19 pandemic phase. The research was carried out in several databases, including CINAHL, ERIC, B-On, SciELO, Pubmed, EBSCO Host and Google Academic. Using the descriptors: Health student; Emergency Remote Teaching; COVID-19; Education. The analyzed articles describe the dichotomous impact of ERT on the teaching and learning process of higher education students in the health area, during the COVID-19 pandemic, experienced worldwide.

Keywords: Health Student, Emergency Remote Teaching, COVID-19, Education

iafor

The International Academic Forum
www.iafor.org

Introduction

Human infection with the coronavirus was declared by the World Health Organization (WHO) in January 2020 as a public health emergency of international concern and was identified as a pandemic in March of the same year. In this way, strategies were defended by the WHO, namely: interrupting the transmission of the virus between humans; identify, isolate and care for infected users; accelerate the development of diagnostics, treatments and vaccines; carry out community awareness activities; and minimize social and psychological impacts. In this sense, the pandemic scenario has posed complex challenges for health professionals and students (Baixinho & Ferreira, 2021; Lira, Adamy, Teixeira & Silva, 2020; World Health Organization [WHO], 2020).

Between March and May 2020, around 166 countries closed schools, affecting more than 87% of the world's student population, corresponding to 1.52 million students who were no longer in the classroom (UNESCO, 2020). The COVID-19 pandemic brought with it a new reality and paradigm shifts in the educational context of higher education institutions. During confinement, classes took place in a distance learning regime, using Emergency Remote Teaching (Bloom et al., 2020; Minghelli et al., 2022; Prata et al., 2020).

Emergency Remote Teaching emerges as a temporary resource for teaching students of courses in the health area, in higher education institutions, during the COVID-19 global pandemic. Classes started to be taught using online platforms, however, many practical classes and clinical teaching could not be adapted or carried out. Courses in the health area offer practical classes and direct contact with users to ensure the acquisition of skills by students and maintain the quality of teaching (Evans et al., 2023; Minghelli et al., 2022; Oliveira et al., 2021).

In this way, the students' academic path was compromised due to the teaching-learning methodologies adopted in the pandemic period. The remote teaching modality brought with it positive aspects, as well as important challenges regarding the learning process in the area of higher education under analysis (Idem).

Taking into account a brief review of concepts, we ask: What is the impact of emergency remote teaching on the teaching of higher education students, in the health area, during the COVID-19 pandemic? In response to this concern, the objective of the study was defined: to describe the impact of emergency remote teaching on the teaching of students in the health area, during the COVID-19 pandemic.

Methodology

A narrative review of the literature was carried out. This type of study consists of a regrouping of works already published, in a given period of time, with a common research theme (Fortin, 2009). Thus, in the chronological period from January to March 2023, searches were carried out in the databases: CINAHL, ERIC, B-On, SciELO, Pubmed, EBSCO Host and Google Academic. Using the descriptors: Health student; Emergency Remote Teaching; COVID-19; Education. The search resulted in 35 articles, with inclusion and exclusion criteria being applied for their selection (Table 1).

Selection criteria	Inclusion criteria	Exclusion criteria
Participants	Higher education students in the health area	Other students
Intervention	Experience with Emergency Remote Teaching	Traditional teaching experience
Study context	COVID-19 pandemic	Before the COVID-19 pandemic
Study design	Primary source	Secondary source

Table 1: Article selection criteria

After applying the selection criteria, figure 1 describes schematized the sorting of the scientific evidence carried out.

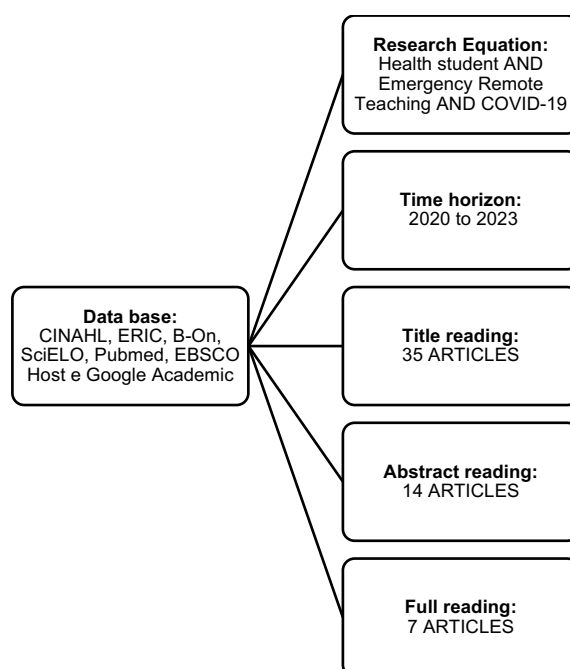


Figure 1: Screening of scientific evidence

Presentation and Critical Analysis of Data

The selection of articles and their reading in full allow presenting the essential data to know the studies, as well as preparing the discussion of data. In this way, and to facilitate the reading and interpretation of the data obtained, Table 2 was prepared with the synthesized content of each of the articles, work carried out by the researcher.

Articles	References	Methodology	Participants	Objectives
Article 1	Lima et al., (2022). Experiences of nursing students at the beginning of the Covid-19 pandemic: a qualitative approach. <i>OBJN</i> , 1-9. https://doi.org/10.17665/1676-4285.20226575	An exploratory study with a qualitative approach	36 nursing students at a Brazilian public university	To understand the experience of nursing students at the beginning of the Covid-19 pandemic
Conclusions	The ERT, in the pandemic scenario, presented challenges and potential. Nursing students demonstrated difficulties in understanding and accepting emergency remote teaching as something substitute and not a methodological choice, there was a need to adapt and change stereotypes in face of face-to-face teaching.			

Article 2	Moreira et al., (2022). Active methodology in emergency remote teaching with nursing students: experience report. <i>Research, Society and Development</i> , 11 (7), 1-11. https://rsdjournal.org/index.php/rsd/article/view/29485/25564	Case study	Nursing students in an interior of Minas Gerais federal university	Describe the experience of using teaching strategies of active methodology in Emergency Remote Teaching with nursing students at a federal university in the interior of Minas Gerais
Main Conclusions	The possibility for students to be protagonists in the teaching-learning process allowed for dynamic, interactive and collaborative classes, with problem solving, knowledge construction and skills development. With ERT, students had more autonomy in class, due to the active methodology that allowed participation, interaction during class and positive feedback.			
Articles	References	Methodology	Participants	Objectives
Article 3	Nóbrega et al., (2020). Remote teaching in nursing among the covid-19 pandemic. <i>Scientific Journal of Nursing</i> , 10 (32), 358-366. https://doi.org/10.24276/rrecien.2020.10.32.358-356	Case study	7 nursing students at a Paraíba university	To report the teaching and student experience and their perceptions about remote teaching in nursing in the face of the COVID-19 pandemic
Main Conclusions	The remote teaching modality brought with it positive aspects as well as important challenges on the learning process in nursing. A experience with remote teaching in the midst of the COVID-19 pandemic demonstrated numerous challenges for training nurses, but it was considered an effective temporary alternative of an emergency nature to minimize social and educational damage in the pandemic period.			
Article 4	Flores et al., (2021). Portuguese higher education students' adaptation to online teaching and learning in times of the COVID-19 pandemic: personal and contextual factors. <i>Higher Education</i> , 83, 1309-1408. https://doi.org/10.1007/s10734-021-00748-x	quantitative study	2718 students from different Portuguese higher education institutions	Research aimed at investigating higher education students' perceptions and experiences of online teaching and learning during lockdown
Main Conclusions	This study demonstrated that both personal and contextual factors seem to explain students positive or negative adaptation to online teaching and learning, as a result of closure of higher education institutions during the pandemic phase.			
Article 5	Sharma et al., (2021). The Pedagogical Shift During COVID-19 Pandemic: Emergency Remote Learning Practices in Nursing and its Effectiveness. <i>Asian Journal of Distance Education</i> , 16 (1), 98-110. https://doi.org/10.5281/zenodo.4695275	Quantitative Study	254 nursing students of Tribhuvan University	This study aimed to assess the perceived effectiveness and factors affecting emergency remote learning practices

Main Conclusions	Almost all respondents preferred live classes over recorded classes. The distance learning method was less effective than the face-to-face method for 33.5% of students and 59.2%. The overall effectiveness of remote learning has declined. However, As positive aspects, the ERT allowed for greater communication between students and the teacher, greater cooperation between students, there was active learning.			
Article 6	Evans et al., (2023). Preparing New Nurses During a Pandemic. <i>Nursing Clinics</i> , 58 , 49-57. https://www.nursing.theclinics.com/action/showPdf?pii=S0029-6465%2822%2903379-5	Qualitative Study	26 nursing students of United States University	The purpose of this article is to explore 2 examples of how educators transformed the undergraduate nursing
Main Conclusions	This study showed that using technology to learn and practice assessment skills can be used effectively to meet course objectives. In addition, the use of technology can standardize messages and clearly define expectations of the assessment skills to be demonstrated for student learning. The use of ERT allowed providing real-time feedback to students, the development of critical thinking and the development of debates between students and teachers.			
Articles	References	Methodology	Participants	Objectives
Article 7	Sy et al., (2022). Emergency remote teaching for interprofessional education during COVID-19: student experiences. <i>British Journal of Midwifery</i> , 30 (1), 47-55. https://www.magonlinelibrary.com/doi/abs/10.12968/bjom.2022.30.1.47	2 Case Studies	Obstetrician students at Northumbria University	There is a growing interest in the use of online learning in interprofessional education in part because of the emergency remote teaching implemented during the COVID-19 pandemic
Main Conclusions	The students involved consider that ERT allows interpersonal collaboration, interaction between those involved and makes education more effective and relevant. Effective teamwork stands out.			

Table 2: Summary of the evidence found

Data Discussion

The narrative review of the literature presented consisted of chronological articles between 2020 and 2023. The result of different groups of researchers, from different countries, being mostly available in English. The scientific production under analysis consisted of primary source studies, in which the primary objective is to describe the dichotomous impact of ERT on the teaching and learning process of higher education students in the health area, during the COVID-19 pandemic, experienced worldwide.

In the pandemic scenario, face-to-face classes were suspended due to the high risk of contagion, and Emergency Remote Teaching was applied. From this emerged several challenges and potentialities, having contributed to the dichotomous impact of the teaching and learning process of higher education students in the health area (Flores et al., 2021).

In an initial phase, the ERT generates feelings of stress and dissatisfaction with the selected methodology, since it differs significantly from the face-to-face method. Some authors report that the quality of teaching was questioned many times by students, mainly due to the

impossibility of attending clinical teaching and practical classes, essential for courses in the health area (Lima et al., 2022; Nóbrega et al., 2020).

Another challenging aspect of the ERT is related to equity in internet access among individuals, with no democratic distribution in the population. About 46.4% of the school population does not have access to the internet at home, compromising students' adherence to the teaching process. The fact that classes take place online, through platforms, causes different types of disturbances and/or distractions for students (Flores et al., 2021; Nóbrega et al., 2020; Sharma et al., 2021).

One of the worrying factors about the use of computer technologies is their influence on the eye health of students, since there is daily eye overload with the application of ERT. Some authors advocate that attending long online classes becomes harmful and ineffective for the academic path of those involved (Sharma et al., 2021; Sy et al., 2022).

In addition to these challenging impacts on the learning process of higher education students, significant gaps were identified in the interaction between students and professors, limiting communication to the virtual classroom environment (Evans et al., 2023).

Not all students consider the ERT as a challenge, but rather as a blossoming of essential qualities and potential for their future as a health professional (Moreira et al., 2022). However, the COVID-19 pandemic has enhanced the resilience of students, contributing to their professional development (Lima et al., 2021).

The ERT allows students a greater theoretical support in certain disciplines and the development of new skills. On the other hand, this modality makes access to the content taught more flexible, since classes can be recorded and accessed at any time (Lima et al., 2021; Moreira et al., 2022).

The remote teaching process allows students to be protagonists in the teaching-learning process, ensuring dynamic, interactive and collaborative classes (Moreira et al., 2022). This process also allows the resolution of problems, the construction of knowledge and the development of skills, which were previously not explored, guaranteeing the evolution of higher education in general (Evans et al., 2023).

Online classes allow real-time feedback to students, ensuring more effective and interactive communication, as well as the development of reflective critical thinking (Evans et al., 2023; Sy et al., 2022). Students who have positively adapted to emergency remote teaching associate their previous experience with the process, namely, their results suggest that the previous experience of online teaching and learning was related (Flores et al., 2021).

Interestingly, ERT presents itself as an alternative to face-to-face teaching, minimizing damage to the teaching-learning process; however, it cannot be considered a substitute for face-to-face teaching, if applied in the manner described by the studies under analysis (Evans et al., 2023; Flores et al., 2021; Lima et al., 2021).

Conclusion

The situation of the COVID-19 pandemic, and the measures adopted by several countries regarding education, have driven higher education institutions towards an Emergency Remote Teaching process at an accelerated and, above all, unstructured pace.

The pertinence of the described reality contributes to compromising the teaching and learning process, cooperating in the development of dichotomous impacts among students in the health area. There are several personal and/or contextual factors that explain the positive or negative adaptation of students to online teaching, after the temporary closure of higher education institutions, during the COVID-19 pandemic that hit the world in 2020.

However, it is important to understand how technology mediates the teaching-learning process in order to facilitate the adaptation of those involved, making it possible to see ERT as a more effective methodology in pandemic contexts.

The study highlights the need for training students on Information and Communication Technologies (ICT) to be used in this process, equitable access to the internet, as well as a more assertive interaction between students and teachers in order to facilitate the process of acceptance of the ERT.

In this way, it is understood that more research is needed in order to determine the impact of emergency remote teaching on the teaching of higher education students in the health area, even outside the pandemic context.

References

- Baixinho, C., & Ferreira, O. (2021). Ser estudante de enfermagem em tempos de COVID-19. *Escola Anna Nery*, 25(1), 1-7.
<https://www.scielo.br/j/ean/a/nGqxXmXcMqKvQHRJ4GfjCyw>
- Bloom, D. A., Reid, J. R., & Cassady, C. I. (2020). Education in the time of COVID-19. *Pediatric Radiology*, 50(8), 1055–1058. <https://doi.org/10.1007/s00247-020-04728-8>
- Evans et al., (2023). Preparing New Nurses During a Pandemic. *Nursing Clinics*, 58, 49-57.
<https://www.nursing.theclinics.com/action/showPdf?pii=S0029-6465%2822%2903379-5>
- Flores et al., (2021). Portuguese higher education students' adaptation to online teaching and learning in times of the COVID-19 pandemic: personal and contextual factors. *Higher Education*, 83, 1309-1408. <https://doi.org/10.1007/s10734-021-00748-x>
- Fortin, M. (2009). Fundamentos e Etapas do Processo de Investigação. Lusodidata.
- Lima et al., (2022). Experiences of nursing students at the beginning of the Covid-19 pandemic: a qualitative approach. *OBJN*, 1-9. <https://doi.org/10.17665/1676-4285.20226575>
- Lira, A., Adamy, E., Teixeira, E., & Silva, F. (2020). Educação em Enfermagem: Desafios e perspectivas em tempos da pandemia COVID-19. *Revista Brasileira de Enfermagem*, 73(2), 1-6.
<https://www.scielo.br/j/reben/a/5k48Mq64Qp5vnCthC3GGMMq/abstract/?lang=pt>
- Minghelli, B., Tavares, E. & Pinheiro, T. (2022). Feelings Related to the Academic Path in Virtue of the COVID-19 Pandemic: Testimonies from Portuguese Higher Education Students Attending Healthcare Courses. *European Journal of Mental Health*, 17(2), 43-51. <https://doi.org/10.5708/EJMH.17.2022.2.6>
- Moreira et al., (2022). Active methodology in emergency remote teaching with nursing students: experience report. *Research, Society and Development*, 11(7), 1-11.
<https://rsdjournal.org/index.php/rsd/article/view/29485/25564>
- Nóbrega et al., (2020). Remote teaching in nursing among the covid-19 pandemic. *Revista científica de Enfermagem*, 10(32), 358-366.
<https://doi.org/10.24276/rrecien2020.10.32.358-356>
- Oliveira, G., Teixeira, J., Torres, A. & Morais, C. (2021). An exploratory study on the emergency remote education experience of higher education students and teachers during the COVID-19 pandemic. *British Journal of Education Technology*, 52, 1357-1376. <https://doi.org/10.1111/bjet.13112>
- Prata, J., Mello, A., Silva, F., & Faria, M. (2020). Mediações pedagógicas de ensino não formal da enfermagem durante a pandemia de COVID-19. *Revista Brasileira de Enfermagem*, 73(1), 1-5.
<https://www.scielo.br/j/reben/a/W3GWPT6gXZQR67L6V8x6Q5G/?lang=pt>

Sharma et al., (2021). The Pedagogical Shift During COVID-19 Pandemic: Emergency Remote Learning Practices in Nursing and its Effectiveness. *Asian Journal of Distance Education*, 16(1), 98- 110. <https://doi.org/10.5281/zenodo.4695275>

Sy et al., (2022). Emergency remote teaching for interprofessional education during COVID-19: student experiences. *British Journal of Midwifery*, 30(1), 47-55. <https://www.magonlinelibrary.com/doi/abs/10.12968/bjom.2022.30.1.47>

UNESCO. (2020). Coronavirus COVID-19 and higher education: Impact and recommendations. <https://www.iesalc.unesco.org/en/2020/03/09/coronavirus-covid-19-andhigher-education-impact-and-recommendations/>

World Health Organization. (2020). *Coronavirus disease 2019 (COVID-19) pandemic*. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

Contact email: olgaribeiro_27@hotmail.com

Making Assessment Engaging for Elementary/Primary Students in Online Learning

Gregory Macur, University of Sunderland, United Kingdom

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This paper identifies the two main areas of online education that cause problems for elementary/primary school teachers. This is done through the use of quantitative and qualitative data collected cross culturally in 2022. Specifically, teacher interviews and surveys were used. Through rigorous data analysis and triangulation, the two key problem areas that come out on top repeatedly are Assessing and Engaging students. The paper then goes on to identify best practice approaches to the integration of these two key problem areas, attempting to put forward a case and set of practical methods for “Making Assessment Engaging for Elementary/Primary Students in Online Learning.” This is done through a combination of a best practice literature review, teacher interviews and lesson observation forms. Justifications for the importance of this approach to assessing when teaching online are given, as well as potential limitations for this study.

Keywords: Assessment, Engaging, Online Education, Elementary, Online Learning

iafor

The International Academic Forum
www.iafor.org

Introduction

Understanding what aspect of the educational process causes the highest level of issue in a given context, and elucidating ways in which to alleviate the challenge in these areas, is a key part of educational research (Macur, G. 2022a). When teaching in an online context, one key issue that teachers face is a lack of credible targeted research (in comparison to that of a traditional classroom teacher). This led the author of this paper to conduct a piece of research to discover a hierarchy of problems that teachers face when teaching online. Once this hierarchy was discovered, a more directed practical application approach was needed in the research. This led to the creation of this paper and three additional stages of research. These research areas were geared towards helping teachers make assessment engaging for elementary/primary students. Why is it important to contribute to the literature surrounding education in an online context? Teaching online has become a rapidly growing field, partly due to the Covid-19 epidemic, where teachers globally found themselves flung into a context they did not understand, and partly because of the ease of access to education that parents want (Pokhrel, S., & Chhetri, R. 2021). Ultimately, there are a plethora of students around the world who are now studying in an online setting (McAllister, C. 2009), as such, educators and educational researchers have a duty to ensure the best education possible is being delivered.

The Initial Research

The initial research aimed to discover the main problems that teachers face when teaching online, and to create a hierarchy of these problems. The purpose of that aim was to ensure educators and educational researchers would be able to, in a targeted way, address the biggest problems that teachers are facing. The hierarchy was discovered by first, interviewing 13 teachers and asking them to list all the problems they faced when teaching online. These problems were then grouped based on similarity to create problem categories. There were 12 categories which emerged in total, these included: Assessing students, engaging students, technology, parents over or under support, motivating students, supporting students with barriers to learning, planning, behavior, communication, incorporating social-emotional learning, giving of instructions and general organization. At that point, 554 teachers were surveyed cross-culturally. These teachers were asked to choose the two main problems they were facing (although there was an option to choose more). This created a hierarchy of problems based on the number of votes each problem received. This list was then compared with a “1 country 1 vote” system. This system meant that countries which received a bulk of votes could not skew the data in a more global sense. In both the initial data set and the “1 country 1 vote” averaged data set, assessing students, engaging students, technology and parents over or under support were ranked in the top 4 problems (4th place almost double the number of votes as 5th place), (Macur, G. 2022b).

Comparison of the Full Data Percentage of Votes Vs. One Country One Vote

Problems	Full Data % of Votes per Problem	One Country One Vote % of Votes per Problem
Assessing	17.7	12.3
Engagement	14.9	15.4
Technology	12.7	14.4
Parents over	12.6	14.5
Motivating	7.5	7.3
Supporting	6.9	7.6
Planning and	4.7	2.3
Behaviour	4.5	4.4
Communication	4.5	5.8
Incorporating	4.4	5.0
Other	4.0	4.5
Instructions	3.9	4.9
Organisation	1.6	1.7

Figure 1: This is an image of a table with the 4 main problems teacher face highlighted in a drawn on red box. (Macur, G. 2022b)

The Next Steps

A mixed methods research approach was utilized to better inform data triangulation and formulation of recommendations (Almalki, S. 2016). The author identified that the two main areas of problem were assessing students and engaging students. In an attempt to directly influence both of these key factors, the author combined them, leading to the aim: To find ways to make assessment engaging for element/primary students. Three approaches were used to support the creation of best practice ways of doing this. These three areas included a literature review of best practice, a group interview with five elementary teachers who were experienced in relation to teaching online, and lesson observations. Once these steps were completed, a comparison was made to find the methods of making assessment engaging which arose the most. The methods which arose in all three areas of research, would form the primary methods to consider when making assessment engaging. The methods which arose in two areas of research would form the secondary level of concern and the methods which were represented in only one area of research, would be considered the lowest priority of recommendation, unless further analysis lead to a different conclusion.

The Three Research Area Findings

The first area of research was a literature review. The literature review revealed that 100% of respondents to a poll voted that engaging students to be challenging and that integrating active learning into assessments is one way to resolve this (Khan, A., Egbue, O., Palkie, B., & Madden, J. 2017). It was also found that enabling autonomy impacted engagement and motivation (Deci, E. L., & Ryan, R. M. 2012). Furthermore, using quiz/game-show approaches for formative assessment was found to positively impact motivation (Zarzycka-Piskorz, E. 2016), as well as the use of Gamification in a more general sense (Antonaci, A., Klemke, R., & Specht, M. 2019). Finally, the use of multimedia and peer-assessment had positive impacts on outcomes and motivation (Barra, E., Aguirre Herrera, S., Pastor Cano, J. Y., & Quemada Vives, J. 2014).

The second area of research was a group interview. Five elementary teachers were interviewed and asked to provide ways in which they have found assessment to be engaging when teaching online. Their answers included: Use animations; Offer read aloud functions

within assessments; Make use of Gamification; Use quiz tools such as Kahoot; If delivering directly as the teacher, use body movement to engage and clarify (Total Physical Response); Use yes/no questions where students make an action to answer, such as stand up and sit down; Offer autonomy in responses and to consider integrating AI (Artificial Intelligence) for upper primary.

Thirdly, lesson observations were conducted. These were added to see practical examples and to observe assessment methods which stood out as more engaging. The author split these findings into formative, summative and assessment as learning findings. Formative assessment recommendations included: Integrate movement and/or emojis on the platform to check learning is occurring; Use quiz platforms such as Kahoot; Play games either digitally or physically to check understanding. Summative assessment recommendations included: Use relatable scenarios; Give students autonomy on how they demonstrate their learning, e.g. PPT live presentation, Speech, Flyer etc; Set fair expectations; The author observed that the use of creativity and design demonstrated the highest levels of engagement when conducted. Assessment as learning recommendations included: Use self-assessment quiz platforms; Have students observe and provide simple feedback to each other.

The Comparison Findings

These three areas were compared to see what methods were represented the most. The more frequently a method showed up, the higher it would be placed in the recommendations at the end of this paper. All three research areas agreed that: Using Gamification and quizzes, application of active learning in the assessment process, and enabling student autonomy where possible in the assessment process, makes assessment more engaging for elementary students. Two of the three research areas agreed that using peer-assessment is an effective way to make assessment engaging, as can the use of multi-media such as emojis. One out of the three research areas revealed that assessments should have fair expectations, assessments should be relatable and the use of artificial intelligence should be integrated with upper elementary/primary students.

Limitations

Limitations of this paper include: The key patterns which emerged, as well as the key takeaways from the conclusion, may not be suitable in all contexts. The lesson observations which took place were not solely centered around how engaging assessments were, had the author told the teachers to aim to create their most engaging assessments, there may have been different outcomes and better findings. The teacher interview stage could have incorporated a second group, to review the first group's answers. The final suggestions put forward in the conclusion could have been reviewed by another group of online teachers, to assess their practical ease of application.

Conclusion

This paper looks at two of the main areas of problem for elementary/primary teachers when teaching online. These were engaging and assessing students. These were combined to create an aim to demonstrate how to make assessment engaging for elementary/primary students. This was accomplished through the application of a mixed methods research approach. This approach drew from a wide scale data set, reviewing the literature, interviewing teachers and observing online lessons. It was found that to make online assessments more engaging for

elementary/primary learners, it is most important to use Gamification, quizzes, active learning and to give students autonomy. Gamification and quizzes can easily be completed in the online learning space through the use of sites such as Kahoot. Active learning applied in the assessment context can include interviews, designing or creating. Autonomy can be given by giving students a selection of methods to demonstrate their learning, such as presentations, written papers, PPTs etc. Once these have been suggestions have been utilized, teachers can focus on ensuring the increased use of multi-media and peer/self-assessment. Multimedia can include the simple use of emojis or relatable characters embedded in the assessment. Self/Peer-assessment can be integrated through the use of rubrics, platforms and discussions. Finally, AI integration can be considered for the upper primary/elementary students, generally as a research tool. The author of the paper reflected on the comments around fair assessment and relatable assessments having only appeared in one of the three areas. This was concluded that as a result of these being general “best practice” approaches to assessment, as opposed to online learning specific, it simply did not seem specific enough for it to arise repeatedly (Nitko, A. J. 1996).

References

- Almalki, S. (2016). Integrating Quantitative and Qualitative Data in Mixed Methods Research--Challenges and Benefits. *Journal of education and learning*, 5(3), 288-296. <https://eric.ed.gov/?id=EJ1110464>
- Antonaci, A., Klemke, R., & Specht, M. (2019, August). The effects of gamification in online learning environments: A systematic literature review. In *Informatics* (Vol. 6, No. 3, p. 32). MDPI.
- Barra, E., Aguirre Herrera, S., Pastor Cano, J. Y., & Quemada Vives, J. (2014). Using multimedia and peer assessment to promote collaborative e-learning. *New Review of Hypermedia and Multimedia*, 20(2), 103-121.
- Deci, E. L., & Ryan, R. M. (2012). Self-determination theory.
- Khan, A., Egbue, O., Palkie, B., & Madden, J. (2017). Active learning: Engaging students to maximize learning in an online course. *Electronic Journal of e-learning*, 15(2), pp107-115.
- Macur, G. M. A. (2022a). *Teaching Online for Kindergarten and Primary Teachers: Get Ready For Your Next Online Class*. Taylor & Francis.
- Macur, G. M. A. (2022b). Issues in Online Teaching: Elementary Teachers' Perspectives. *Journal of Education and Educational Development*, 9(2), 211-228.
- McAllister, C. (2009). Teaching online: Growth in online education. *Distance Learning*, 6(2), 35.
- Nitko, A. J. (1996). *Educational assessment of students*. Prentice-Hall Order Processing Center, PO Box 11071, Des Moines, IA 50336-1071.
- Pokhrel, S., & Chhetri, R. (2021). A literature review on impact of COVID-19 pandemic on teaching and learning. *Higher education for the future*, 8(1), 133-141.
- Zarzycka-Piskorz, E. (2016). Kahoot it or not? Can games be motivating in learning grammar? *Teaching English with Technology*, 16(3), 17-36.

Contact email: gregoryteaches@gmail.com

System Thinking in a Global Context to Foster Transcendent Leadership

Shuaa Alnifie, Princess Nourah bint Abdulrahman University, Saudi Arabia

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This paper examines contemporary topics of leadership globally and its importance to be applied within multiple levels of governance. This paper is grounded in theory employing a theoretical framework to conduct qualitative deductive and inductive analysis (Maxwell, 2013), Patton (2015) posits that ‘Grounded theory emphasizes steps and procedures for connecting induction and deduction through the constant comparative method.’ Through the examination of theories like Systems Thinking framing model in relation to Transcendent Leadership and governance, the need arises for Systems Thinking theory, by which innovative solutions can be achieved for thriving international organizations. With the complexity and interdependency nowadays in pedagogy, concepts, and interaction, the shift in global leadership enacts a new demand for holistic inquiry fostering nonlinearity, interdependency, and an integral framework of thinking, thereby improving synergy in leadership and productivity of all systems, what Gardner (2006) calls ‘transcendent Leadership.’

Keywords: System Thinking, Global Context, Transcendent Leadership

iafor

The International Academic Forum
www.iafor.org

Introduction

The world is transcending and transforming into connected yet complex forms of interactions globally. All international institutions are extremely interdependent and connected, we no longer can depend on the skills of mechanical reductionists to analyze situations and find "technical solutions," and more adoptive emerging problems arise in our globalized social, international systems (Holmes & Noel, 2015). Changes in policymaking, educational advancement, and economic gains in one nation will inevitably affect another. Hence, a new 'systems mindset' proves feasible to understand the deep roots of complex behavior and be able to predict them.

All the parts and intricate loops of interaction feed into each other causing the emergence of a complex globalized future. These models of interactions are unable to depict the full magnitude of understanding the dynamics of the intricate components of the system. Thus, a new form of inquiry and leadership is needed for self, others, and the institutions.

Global leadership is a prominent field of study to foster successful international exchange and improve human experience within and amongst nations. It requires the skills and consideration of working in different cultures; combining business practices to fit multinational needs; cultivating trust among team members that may not be of the same nationality or only work with each other remotely or both; overcoming communication barriers; creating clarity in team objectives where values may differ, dealing with different laws and regulations; overcoming stereotypes; and managing through the complex, changing, and often ambiguous global environment (O'Keefe, 2018, p. 5).

As organizations around the world become more interdependent and connected, leaders are increasingly focused on performance on a global scale. The discussion therefore focuses on global leaders who are operating in a more complex and diverse environment. Accordingly, it requires new skills to work more effectively. (Terrel & Rosenbusch, 2013).

According to Al-Ebraya (2017), transcendent leadership is "the leader's adoption of an administrative philosophy to fulfill the desired goals of the institution, based on serving the subordinates, adopting satisfaction and encouraging to participation, initiative, and creativity within the frame of teamwork" (p. 27). The researcher claims that transcendent leadership is a style of leadership based on the leader who manifests ethical and noble styles in dealing with the followers and prioritizes their requirements to promote their performance and to accomplish the goals of the institution.

This paper aims to deliver a meta-framework to assess and synthesize the different philosophies, theories, models, and definitions concerning global leadership (as an overarching term) to decrease conceptual confusion and uncover the underlying mechanisms.

This paper investigates the following questions: What is global leadership? How does Systems Thinking in a global context foster Transcendent Leadership?

System Thinking in a Global Context

"Systems Thinking is literally a system of thinking about systems" (Arnold & Wade 2015; Westover, 2022). The first element of the system is the leader. We all come from various backgrounds, demographics, and life experiences that helped us shape our value system, lenses, and the way we look at things. Then we encounter other leaders in larger systems that

are interconnected. As Harter (2021) pointed out, “It is not just that leaders participate in systems as something out there as an encompassing reality, but leaders are themselves systems” (p. 41). Leaders are both influenced by and influencing the system all the time. Each leader's experiences, biases, and behaviors contribute to the landscape of the system and in turn, are constantly influenced by the system. As Lippitt (2021) suggested, one important characteristic of systems analysis is that an individual, whether it is a leader or a follower, needs to “recognize (their) potential distortions or bias” (p. 55).

The second main element of a system is that it is made up of others. As Kellerman (2016) discussed, the systemic approach transcends “the leader-centrism that has plagued the leadership industry for 50 years” (p. 36). She went on to discuss her argument for eliminating leader-centrism, and for employing instead a more holistic approach to leadership, one that, by definition, is more inclusive. Lippitt (2021) recommended an important characteristic of systems analysis is to “solicit, respect, and involve all stakeholders” in the process (p. 55). Lippitt (2021) went on to say, “Leaders must tap cross-professional expertise and engage others to generate a comprehensive understanding of current challenges and triggers novel solution” (p. 56).

Finally, and possibly the most salient element in systems thinking, as it relates to the process of leadership, is the important role context plays in the system. Harter (2021) made the argument that systems and the context of the system shape both the leader and follower even before they engage in the process of leading or following. Lippitt (2021) argued that this perspective of context is critical for systems analysis suggesting individuals need to, “learn from the past, understand the present, and plan for the future” (p. 55). Each of these contexts plays an important role in impacting all the elements of the system. Donaldson (2021), influenced by Kellerman (2016) noted “Leadership must have a context. The context for leadership is the system” (p. 44). For leaders and followers to operate effectively within a particular system they need to recognize the influence context has on them and the overall system, so systems thinking can lead us on a critical and rational path of theories.

Systems thinking is a holistic approach to analysis that focuses on the way that a system's constituent parts interrelate and how systems work over time and within the context of larger systems. The systems thinking approach contrasts with traditional analysis, which studies systems by breaking them down into their separate elements. According to systems thinking, system behavior results from the effects of reinforcing and balancing processes. A reinforcing process leads to the increase of some system components. If reinforcement is unchecked by a balancing process, it eventually leads to collapse. A balancing process tends to maintain equilibrium in a particular system (Lutkevich, 2023).

System Thinking is a realization that there are consequences to our actions that we are oblivious to. By understanding and changing structures that are not serving us well (including our mental models and perceptions), we can expand the choices available to us and create more satisfying, long-term solutions to chronic problems. In general, a systems thinking perspective requires curiosity, clarity, compassion, choice, and courage. This approach includes the willingness to see a situation more fully, to recognize that we are interrelated, to acknowledge that there are often multiple interventions to a problem, and to champion interventions that may not be popular (Goodman, 2021).

We need a system to think about this complex system, systems thinking is a way to think about systems (Westover, 2022). While systems thinking can be considered a talent, there is a

lot of supporting theory and a range of tools that can be used in application. Systems thinking educators identify six key elements for creating systems thinking: (1) interconnectedness, (2) synthesis, (3) emergence, (4) feedback loops, (5) causality and (6) systems mapping (Jonathan, 2020).

Grounded Theory

During its 40-year history, grounded theory has served as a major method for conducting emergent qualitative research. What is an emergent method? I start with a working definition of an emergent method as inductive, indeterminate, and open-ended. An emergent method begins with the empirical world and builds an inductive understanding of it as events unfold and knowledge occurs. Social scientists who use emergent methods can study research problems that arise in the empirical world and can pursue unanticipated directions of inquiry in this world. Emergent methods are particularly well suited for studying uncharted, contingent, or dynamic phenomena. These methods also allow for new properties of the studied phenomenon to appear that, in turn, shape new conditions and consequences to be studied. By adopting emergent methods, researchers can account for processes discovered in the empirical world and direct their methodological strategies accordingly (Charmaz, 2006, p.155; Karin, 2016).

In 1967, Glaser (2008) developed the term "grounded theory," which stems from the analysis of the previously collected data as opposed to the approach that develops a theory from numerous observations or concepts, then data are collected to test this theory. It is claimed that grounded theory constructs theories close to reality. It focuses on the construction of theory more than focusing on a particular theoretical content. It also asserts steps and procedures by combining deduction with induction, comparing research areas, sampling, and testing concepts derived from the field study. At the same time, grounded theory takes the researcher to the real world and makes them close to it. Consequently, the results are grounded in the empirical world.

The Grounded theory is an inductive—or perhaps more accurately—critical method aimed at generating theory from empirical data collected in the field. Often viewed as both a process and product of social research, grounded theory has been argued to be the most utilized contemporary qualitative research methodology (Bryant and Charmaz, 2007; Guetterman et al., 2017).

Studies that incorporate a grounded theory approach are a step towards conceptual thinking and theory building rather than empirical testing of the theory. Hence, a qualitative research approach is used in these types of studies. Particularly it is conceptual thinking and theory building that's why the researchers usually are going to conduct an inductive, constructivist 'Grounded Theory' approach. It is the systematic development of theory in social settings, and it depends upon inductive approaches which are appropriate for the study mainly aimed at theory development (Shahid, 2014, p.224). Furthermore, the research questions and literature review by themselves lead and support conceptual thinking and theory building rather than empirical testing of the theory, and this type of study follows an inductive theory-building approach. Gray (2009) argued that deductive reasoning moves towards hypothesis testing to verify, refuse, or modify a theory based on empirical data, whereas inductive reasoning seeks to discover a binding principle and to construct generalizations, relationships, and even theories by analyzing the data collected for this purpose. However, he also emphasized that the inductive process may still have some pre-existing theories or ideas

when approaching a problem. Nonetheless, it does not pursue to approve or negate the existing theories, but endeavors to create outlines, stabilities, and significances by collecting data (Gray, 2009).

Grounded theory is a method of explication and emergence. The method takes a systematic inductive, comparative, and interactive approach to inquiry and open-ended strategies (Charmaz, 2006). These strategies make grounded theory more than only inductive because they encourage researchers to make conjectures and check them and therefore to engage in deductive reasoning as inquiry proceeds. Grounded theory strategies make the method explicit, and their open-ended qualities foster the development of emergent conceptual analyses. Grounded theory strategies prompt early analytic thinking and keep researchers interacting with their data and emerging analyses (Charmaz, 2006).

The logic of grounded theory provides a major contribution to emergent methods because grounded theory involves creative problem-solving and imaginative interpretation. Grounded theory strategies prompt the researcher to reach beyond pure induction. The method builds a series of checks and refinements into qualitative inquiry through an iterative process of successive analytic and data collection phases of research, each informed by the other and rendered more theoretical. In short, the grounded theory method emphasizes the process of analysis and the development of theoretical categories, rather than focusing solely on the results of inquiry (Shahid, 2014, p.156).

Transcendent Leadership

Leadership theories abound, but few have provided means to integrate the depth and breadth of the vast literature available. Building on the research of Crossan and Mazutis (2008) who propose Transcendent Leadership as an integrated framework, the search describes the key leadership challenges of leading across the levels of self, others, organization, and society. Much of the leadership discourse has focused mostly on the leadership of others and occasionally on the leadership of the organization, yet little has focused specifically on the integral component of leadership of self. There is evidence of the necessity of multiple levels of leadership, as well as some practical guidance.

Gardner (2006) coined the term 'transcendent leadership,' where the leader transcends the self and bases leadership practices on a 'shared vision' and a collective view (Crossan, Vera & Nanjad, 2008). The dynamics between the leader and follower may overlap without impeding progress or disrupting official tasks and litigation of each position within an organizational structure. In transcendent leadership, a new paradigm is needed to bring human efforts to higher levels of synergy' (Gardner, 2006, p. 72). Transcendent leadership is prominent within 'learning organizations' and 'systems theory' and is mostly concerned with developing the system in its entirety, including all of the intricate parts, feedback loops, people, units, ideas, policies, litigation, and leadership (Arnold & Wade, 2015; Senge, 1990). Hence, the concept of contemporary transcendent leadership, as it applies to systems thinking mindset internationally is explored in this paper to analyze processes that promote successful and meaningful interactions between various institutions with a wide range of philosophical worldviews, bylaws, beliefs, and explain the difference between micro and macro levels of governance between these institutions (Macdonald et al. 2018; Senge, 1996).

To establish a common understanding of global leadership will require intensive cooperation between science and practitioners. Meanwhile, the development of a meta-framework that

enables a better understanding of the actual scientific findings and the use of terms concerning global leadership could help to minimize the above-claimed conceptual confusion which is the aim of this study. It is intended to offer a tool that supports the coexistence of different global leadership frameworks, processes, models, and theories and visualize their interdependencies (Laszlo, 2012, p.1).

The notion of transcendental leadership has been developed recently by Cardona (2000), as a contribution-based exchange relationship. In this relationship, the leader promotes unity by providing fair extrinsic rewards, appealing to the intrinsic motivations of the followers, and developing their transcendent motivation. Later, Sanders, Hopkins & Geroy (2003) proposed, that the transcendental theory of leadership comprises three dimensions of spirituality (consciousness, moral character, and faith) that incorporate the managerial facets of transactional theory and the charismatic aspects of transformational theory to enhance Leadership effectiveness.

Taking this into consideration, the definition of Mendenhall, et al., (2012, p. 262) applies best: “Global leaders are individuals who effect significant positive change in organizations by building communities through the development of trust and the arrangement of organizational structures and processes in a context involving multiple cross-boundary stakeholders, multiple sources of external cross-boundary authority, and multiple cultures under conditions of temporal, geographical and cultural complexity.

For a better understanding of the term “positive,” it is helpful to review the findings of Morgan & Luthans (2012). They argue that positive global leadership results in more efficient and motivating communication using all kinds of (technical) resources to bridge physical distance avoiding an “out-of-sight, out-of-mind”-setting entering daily business. Challenges of cultural distance will be managed by positive global leadership in a more appropriate, “ambicultural” way by leveraging the good parts of each culture and avoiding the less useful or even blocking influences. Contrary cross-cultural barriers, e.g. corruption, institutional deficiencies, or language barriers cannot be solved by positive global leadership. Nevertheless, Morgan & Luthans (2012, p. 545) argue that “...leaders who possess positive traits such as courage and wisdom; have developed positive capabilities and psychological resources such as hope, efficacy, resilience, and optimism; and are intentional about behaving ethically, authentically and in ways that systematically and integratively affirm the strengths, capabilities, and potential of their followers and their organizations over time and across contexts.”

Characteristics of Transcendental Leadership

Scientific leadership emerged in the 20th century in sequence with the emergence of administrative theories by Henry Fayol after the industrial age and when the focus shifted to fostering psychology (positive psychology in the ‘60s), the investment in various human strengths and talents became prevalent rather than on just physical stamina (Seligman, 2000).

With the advent of the third millennium, numerous challenges, such as globalization of markets and technology, increase in global communication, intensification of competition and economic conflicts, transition to reliance on intellectual and social rather than physical capital only, increase in freedom of choice and the diversity of alternatives, emerged. Other value challenges, including finding and trading ethical values, linking ethics with capitalism, and the increasing number of experts and practitioners calling for the need to test leadership

concepts and models that contribute to understanding and overcoming these challenges and complexities, emerged, as well (Gadah, 2021; Crossan & Mazutis, 2008).

In a search for modern leadership models that contribute to resolving institutional crises and problems, transcendent leadership emerged as a relational leadership model that emphasizes stimulating the followers' motives; providing fair incentives and rewards; linking them to higher goals; devoting principles of cooperation, service, and sacrifice among the leaders and follows, prioritizing the well-being of the people and society, participating in decision-making and building common vision and goals. It is dynamic leadership that encourages the leader to commit to supporting and motivating the followers to contribute more through extrinsic motivation (money and praise), intrinsic motivation (learning and satisfaction), and transcendental motivation (appropriate actions and decisions for the benefit of all) (Acuna, 2017; Gadah, 2021). Transcendent leadership is a model for developing the leader based on spiritual and internal development, as most aspects of the leader's development disregard the internal system that leads to the emergence of their daily behaviors, helps them see aspects and solutions to the ambiguous personal and organizational problems, contributes to the institution's vision as mechanisms that create meaning and purpose for humanity rather than the mechanisms concerned with material profit only, and increases the followers' awareness of their work instead of acting coercively.

Transcendent leaders are accountable, they pay attention to followers to maintain quality personnel in the organization as long as possible, creating incentives and showing leadership potential using various techniques to achieve the vision of the organization, Leader competency is the ability to formulate strategies for personal and organizational development, the ability to lead oneself, lead others, and lead the organization to be the leader of change as an opportunity, knowing how to find the right change and how to create change effectively (Srichaiwong et al., 2020, p. 601).

Also, it entails a commitment to serving others, it also prioritizes the ethics of integrity, sublimity, and sacrifice that help accomplish the goals of the institution. Transcendent leadership supplements transformational leadership by providing the motivations behind the practice of harmony, altruistic love, and a sense of wholeness and well-being that are created by care, concern, appreciation for oneself and others, and concern for others rather than self-interest. Accordingly, it helps the followers feel powerful and empowers them to make decisions, accomplish work, and lead. Transcendent leadership also offers real human leadership that is service-oriented, seeks to develop the ones' motives, away from opportunistic behavior that seeks personal interest, and includes love and care for the followers (Gadah, 2021).

Transcendent leadership is a form of leadership that leads institutions and companies in light of the present global competitiveness to fulfill the requirements of the global market, where people restrict themselves to some determinants by defining what they can and cannot do. Therefore, the theory of transcendent leadership helped remove these limitations because the leaders, according to this theory, attempt to conceptualize new patterns of thinking with a deeper sense of what they feel. They also tend to create a type of commitment among workers based on self-confidence and provide motivation that promotes their performance (Covey, 2007).

In transcendent leadership, the leader attempts to develop high motivation among followers, focuses on the followers' potential, prioritizes their personal development, fulfills their needs

to have more freedom, wisdom, and autonomy, and gives continuously (Cardona, 2000; Acuña, 2017).

The transcendental leadership style is typically associated with a leader who motivates their followers not only extrinsically and intrinsically, but also transcendently (Fry, 2003; Liu, 2007). Great emphasis is placed on these preferred characteristics, including the leader's ability to achieve the impossible and make the intangible tangible (Community for Human Resource Management Rosas, 2016).

Conclusion

Transcendent leadership offers a platform for an enriching and collaborative human experience in organizational dynamics. Transcendental leadership initiates the planet as a concept that needs attention. It is the leadership of making a difference in our lives for the welfare of all. Core principles these leaders stand for include compassion, integrity and bravery, modesty and insight, genuineness, and tranquility. Transcendental Leaders provide a strong moral backbone on which the entire organization flourishes not just as a profit center that focuses on today's strategies but also thrives on a global vision that encompasses the welfare of the sustainable future of humanity.

Global leaders need a unique set of competencies that are important to lead in diverse environments. The leader's willingness and ability, skills such as making linkages, experiences to deal with different people, and the ability to be successfully adaptable to new cultural settings with cultural knowledge and problem awareness. Experts and practitioners of leadership development emphasize the need for increased focus on a more holistic perspective of leadership through systems thinking.

Through the examination of theories like Systems Thinking framing model in relation to transcendent leadership and governance, the need arises for systems thinking theory, by which innovative solutions can be achieved for thriving international organizations. With the complexity and interdependency nowadays in pedagogy, concepts, and interaction, the shift in global leadership enacts a new demand for holistic inquiry fostering nonlinearity, interdependency, and an integral framework of thinking, thereby improving synergy in leadership and productivity of all systems.

References

- Acuña, P. (2017). Critical revision of leadership styles in management and company cases contemporary leadership challenges. Doi: 10.5772/65952
- Al-Ebraya, N. (2017). *Relationship of the servant and distributed leadership to the ethical decision-making among the headmistresses of the basic education schools in Muscat governorate in the Sultanate of Oman from the perspective of the female teachers* (Unpublished master's thesis) (in Arabic). Middle East University, Jordan.
- Arnold, R. D., & Wade, J. P. (2015). A Definition of Systems Thinking: A Systems Approach. *Procedia Computer Science*, 44, 669–678. <https://doi-org.sdl.idm.oclc.org/10.1016/j.procs.2015.03.050>
- Bryant, A., & Charmaz, K. (2007). Introduction: Grounded theory research: Methods and practices. In A. Bryant & K., Charmaz (Eds.). *The sage handbook of grounded theory* (pp. 1–28.). Sage, Thousand Oaks.
- Cardona, P. (2000). Transcendental Leadership. *Leadership and Organizational Development Journal*, 21(4), 201-207.
- Charmaz, K. (2006). *Constructing Grounded Theory (Introducing Qualitative Methods series) 2nd Edition*, Kindle Edition.
- Charmaz, K. (2006). *Grounded Theory as an Emergent Method*. New York.
- Covey, S. (2007). *The speed of trust: The one thing that changes everything*. London: Simon & Schuster.
- Crossan, M., & Mazutis, D. (2008). Transcendent leadership. *Science Direct*, 51, 131-139.
- Crossan, M., Vera, D., & Nanjad, L. (2008). Transcendent leadership: Strategic leadership in dynamic environments. *The Leadership Quarterly*, 19(5), 569–581. <https://doi-org.sdl.idm.oclc.org/10.1016/j.leaqua.2008.07.008>
- Donaldson, W. (2021). Leadership as a system holon. *Journal of Leadership Studies*, 15 (2), 43– 48.
- Fry, L. W. (2003). Toward a theory of spiritual leadership. *The Leadership Quarterly*, 14, 693-727. Doi:10.1016/j.leaqua.2003.09.001
- Gadah, A. (2021). Transcendent leadership among the secondary school leaders in Saudi Arabia and its relationship to the development of organizational culture (in Arabic). *Journal of Educational Sciences and Human Studies*, (16).
- Gardner, J.J. (2006). “Transactional, transformational, and transcendent leadership: Metaphors mapping the evolution of the theory and practice of governance.” *Leadership Review*, 6: 62-76.
- Glaser, B.G. (2008). *Doing quantitative grounded theory*. Sociology Press, Mill Valley, CA.

- Goodman, M. (2021). *Systems Thinking: What, Why, When, Where, and How?*
<https://thesystemsthinker.com/systems-thinking-what-why-when-where-and-how/>
- Gray, D. E. (2009). *Doing Research in the Real World* (2nd Ed.). SAGE Publications.
- Guetterman, T.C, Babchuk, W.A, & Howell Smith, M.C. (2017). *Intersecting mixed methods research with qualitative designs: Principles and practices, mixed methods research series (in press)*. Sage, Thousand Oaks, CA.
- Harter, N. (2021). Intersecting pathways: On the compatibility of systems thinking and leadership studies. *Journal of Leadership Studies*, 15 (2), 39– 42.
- Holmes, B. J., & Noel, K. (2015). Time to shift from systems thinking-talking to systems thinking-action: Comment on "constraints to applying systems thinking concepts in health systems: A regional perspective from surveying stakeholders in eastern mediterranean countries". *International Journal of Health Policy and Management*, 4(4), 245-247. doi:<https://doi.org/10.15171/ijhpm.2015.38>
- Jonathan, H. (2020). The Role Of *Systems Thinking In Organizational Change And Development*, <https://www.forbes.com/sites/forbescoachescouncil/2020/06/15/the-role-of-systems-thinking-in-organizational-change-and-development/?sh=2e4d162b2c99>
- Karin Klenke. (2016). *Qualitative Research in the Study of Leadership*: Vol. Second edition. Emerald Group Publishing Limited.
- Kellerman, B. (2016). Leadership—It's a system, not a person! *Daedalus*, 145(3), 83– 94.
- Laszlo, K. (2012). From systems thinking to systems being: The embodiment of evolutionary leadership. *Journal of Organizational Transformation & Social Change*, (9).
- Lippitt, M.B. (2021). Situational mindsets: A context approach to leadership. *Journal of Leadership Studies*, 15 (2), 53– 61.
- Liu, C. H. (2007). Transactional, transformational, transcendental leadership: Motivation effectiveness and measurement of transcendental leadership. *Paper presented at Leading the Future of the Public Sector: The Third Transatlantic Dialogue, University of Delaware, Delaware, May 31-June 2*. Retrieved from <http://www.ipa.udel.edu/3tad/papers/workshop6/Liu.pdf>
- Lutkevich, B.(2023). *Systems thinking, MIT's Sloan School of Management. This the was last update* <https://www.techtarget.com/searchcio/definition/systems-thinking>
- Macdonald, I., Burke, C.G., & Stewart, K. 2018. *Systems Leadership: Creating Positive Organizations*. London: Routledge.
- Maxwell, J. A. (2013). *Qualitative research design: An interactive approach* (3rd ed.). Thousand Oaks, CA: Sage.

- Mendenhall, M.E, Reiche, S. B., Bird, A. & Osland, J, S. (2012). Defining the “global” in global leadership. *Journal of World Business*, 47 (4), 493-503.
- Morgan. M & Luthans.F. (2012.). Positive Global Leadership. *Journal of World Business*. 47(4), 539–547.
- O 'Keefe, S. A. (2018). *The development and initial validation of a self-assessment for global leadership competencies* (Unpublished doctoral dissertations). College of Arts, Sciences, and Education; Florida International University; USA.
- Patton, M. Q. (2015). *Qualitative Research & Evaluation Methods: Integrating Theory and Practice*. SAGE Publications, Inc.
- Rosas, D. (2016). *The awakening project*. Retrieved from <https://debbierosas.com/wp-content/uploads/2016/12/Month-0- Guidebook.pdf>
- Sanders, J. E., Hopkins, W. E., & Geroy, G. D. (2003). From transactional to transcendental: Toward an integrated theory of leadership. *Journal of Leadership and Organizational Studies*, 9 (4), 21-31.
- Seligman M. E. P., and Csikszentmihalyi M. (2000). ‘Positive Psychology: An Introduction’, *American Psychologist*, 55, (1), 5–14.
- Senge, P. 1996. Systems thinking. *Executive Excellence*, 13(1): 15.
- Senge, P., Hamilton, H., & Kania, J. 2019. The dawn of system leadership. *Policy & Practice*, 77 (1):12–19.
- Shahid, N. (2014). Qualitative research method: Grounded theory. *International Journal of Business and Management*, 9 (1), 224-233.
- Srichaiwong, P, Jedaman, P, Teemueangsa, S., Wongsard, K., Jongmuanwai, B., & Darae, P. (2020). Characteristics of transcendental leadership in managing educational organization to sustainability. *International Journal of Innovative Science and Research Technology*, 5 (6).
- Terrel, S. & Rosenbusch, K. (2013). Global leadership development: What global organizations can do to reduce leadership risk, increase speed to competence, and build global leadership muscle. *People & Strategy*, 36 (1), 41-46.
- Westover, J. H. (2022, October 12). *Council post: The role of systems thinking in organizational change and development*. Forbes.
<https://www.forbes.com/sites/forbescoachescouncil/2020/06/15/the-role-of-systems-thinking-in-organizational-change-and-development/?sh=2e4d162b2c99>

Rethinking Work Integrated Learning Pedagogy: Reflections Post COVID-19

Natasha Janse van Rensburg, University of Johannesburg, South Africa

Charl J Roux, University of Johannesburg, South Africa

The Paris Conference on Education 2023

Official Conference Proceedings

Abstract

The consistent battle to ensure quality outcomes in work integrated learning (WIL) experiences has been an ongoing matter for higher education institutions. For universities that offer WIL modules, it is essential to ensure consistency from one year to the next concerning student experiences, as well as outcomes. During the COVID-19 pandemic, universities moved to emergency online teaching, with profound implications for WIL. This autoethnographic self-study examines the lecturer's reflections on coordinating WIL pre, during, and post-COVID-19 to determine the challenges, opportunities, and future potential of the practice. Work integrated learning holds diverse benefits to students, and it is believed that the overall approach to organising WIL should be modeled based on good practice. However, the uncertainty of work placements and changing environments have made reflection on how outcomes can be consistently met year after year invaluable. Whilst the reflective practice has been beneficial in increasing the efficiency of WIL practices before COVID-19, post-COVID-19 many adapted strategies provided otherwise not thought-off opportunities for the WIL programme. As predicted, not all reflections on the adaptation to emergency online teaching and its application to WIL were positive. However, the findings of this study confirm the valuable nature of self-reflection, even under the circumstances of emergency teaching.

Keywords: Reflective Practice, Work Integrated Learning, Higher Education

iafor

The International Academic Forum

www.iafor.org

Introduction

In Sport Management at a Higher Education Institution (HEI) it has become evident that reflecting on the teaching practice is important. Teaching a work integrated learning (WIL) module has its unique challenges and finding information to assist in the planning and offering of such a module is difficult. This reflection is about identifying aspects of how the module was presented over five years (2018 to 2023), whether it was bad or good, but an attempt to understand and improve the teaching practice of WIL in Sport Management. Schon (1987) explains reflective practices as 'knowing-in-action', 'reflection-on-action', and 'reflection-in-action'. While it is not always possible for a lecturer to revise their actions during teaching, it is the reflection-on-action, such as thinking about what has been done and making changes which this article is focused on.

Additional to reflection after every academic year, the students are requested to complete a module evaluation in which students can comment and rate the course content and lecturer. While many students choose not to participate in module evaluation, for those who do, the feedback is always seen as valuable. The University of Johannesburg (UJ) also includes in the feedback the overall university, faculty, and department rating, in comparison to your own. While this is useful, it could make a lecturer question how appropriate it is to compare a WIL module to theoretical modules, even if the lecturer is the same. It is important to note that the delivery of the WIL module (which is focused on for this reflection) is among many other modules presented by the same lecturer, but the only practical module. While it could be assumed that the amount of planning and effort is not necessarily more than that of a theoretical module, the worry to sustain consistency is a concern unique to our WIL module.

While our fourth-year students have seven additional modules to complete over one year, the WIL module stretches the year (28 weeks) and is allocated six hours a week to conduct the experience needed to meet the course outcomes. The approach to the 'workplace' has been a reoccurring issue and the source of reflection. We seem to return to the same question at the start of every academic year, whether to predetermined placements, for example, organising workplace experience on behalf of the student or whether to allow them (based on set criteria) to choose their own workplace. Another point of deliberation is the placement on- or off-campus. While some students have found the freedom to choose their own workplace as freeing, others have found it frustrating and even thought of it as a lack of planning or care by the course presenter.

Although the lecturer's actions do not always present their intentions accurately (Brookfield, 1995), the placement options are well reflected. To better express the options and ideas regarding this module, the lecturer must allow their voice to be heard. A deeper understanding of how the module has evolved could be gained if time is spent on the overall construction of the module, adaptations, feedback, and success rates, as well as personal reflections. It is our opinion that during the collaboration of all these points, we would find what works well and which aspects we could suggest in the delivery of this WIL module. Therefore, this study was underpinned by the following research questions:

1. What are some of the challenges and successes experienced over the last five years of teaching this module?
2. How to ensure consistency within the pedagogic practice?

Literature

The term WIL has received global recognition amongst HEI educators (Ferns, Campbell & Zegwaard, 2014). The pressure to produce students who will contribute to a competitive workforce has become even more evident in curriculum planning (Jackson, 2016). Enabling students with skills to transition into the workspace is not only beneficial to the student but provides the university with differentiation within the higher education sector (Jackson, Fleming & Rowe, 2018). An important understanding of WIL and its composition is its uniqueness based on discipline, industry involvement as well as the availability of resources (Rook & Sloan, 2021). Examining WIL in certain disciplines is limiting since many disciplines have not included WIL in their curriculums. While this might be the case, research has identified a range of WIL pedagogical approaches or models used in certain disciplines (Rook, 2015, 2017).

Activities included in WIL could range from visiting experts (guest lectures), simulations, and virtual reality to industry placements, with the pedagogies of the institutions becoming more inclusive (Ferns, Campbell & Zegwaard, 2014). The pedagogies used in WIL should be deliberate and aimed to provide students with an experience *in class* with how that experience would be in the workplace. Ferns and colleagues (2014) prescribe WIL to be made up of activities with a range from low to high levels of accuracy to workplace experiences as well as some level of engagement. While WIL is highly dependent on the discipline and context, it is still an education process with foundational pedagogy and theory (Moreland, 2005). The diversity of the term (WIL), and its understanding may seem to be compromising its consistency as a teaching module, yet it is based on the variation of activities used within the curriculum and flexibility which promotes opportunities and more possibilities to the course.

Ultimately researchers agree that WIL should be designed to blend a discipline's theories with practice-based learning (Ferns, Campbell & Zegwaard, 2014). WIL should promote innovation and skill application of its graduates, yet research on the topic is largely focused on stakeholder benefits. It cannot be argued that stakeholders receive numerous benefits from work-ready graduates, however, Dressler and Keeling (2011) include career, academic and personal benefits as additional categories. Based on the research of Zegwaard and Coll (2011), WIL students, especially students who had work placements showed the ability to make better-informed decisions about their career direction and choices and reported higher starting salaries. Flemming and Eames (2005) stated that WIL students, who were placed in industry, showed an increase in their research ability, and critical thinking, as well as being able to manage their time more efficiently during their return to campus. Ferns and colleagues (2014) agree and state that students who return after placements tend to appreciate the content of their studies more and find the work more relevant. Among being able to be more innovative, WIL students obtain personal benefits such as the ability to work in teams, work on common goals and increase their organisational skills (Crebert, Bates, Bell, Patrick, & Cragnolini, 2004).

Types of WIL can be framed using Rowe, Mackaway, and Winchester-Seeto's (2012) suggested terms of locality and level of engagement. Rowe and colleagues (2012) explain that locality could include on-campus or off-campus activities, for example working with industry partners or campus departments, while the level of engagement would refer to the depth of involvement for example day visits versus internships. Chowdhury (2020) concluded that for WIL courses to be designed and delivered successfully, industry

participation is important. An understanding of common needs will include those of students, lecturers, managers, and professional bodies for a mutual agreement to form regarding WIL courses. The mix of needs and agreements highlights the complexity of providing a standardised program or course outline for WIL. Jackson and colleagues (2018) support this statement and express that by viewing WIL as a range of pedagogical activities, nonlinear based on superiority, the appropriateness of activities can be focused on. The question then arises regarding how to deem pedagogical activities as appropriate for a specific WIL course.

Background

Sports Practice Management is a postgraduate module within the Honours Degree in Sport Management. The module carries 18 credits and students are registered for an entire academic year (28 weeks). The module is designed based on WIL concepts and students focus on specific areas of sport and management. The focus areas include sports structures, sports marketing, sports events, business ethics, sports facilities, and personal development. The module is examined using an oral examination and a final mark of 50% is required to pass the module. Based on COVID-19 the university moved to emergency online teaching in 2020, consequently applying continuous assessment to all modules which is still the case for Sport Management Practice in 2023. Additional to the curriculum change, the sports industry in South Africa was largely affected by the lockdown periods and restrictions.

Methodology

As a reflective study, Rolfe, Freshwater, and Jasper's (2001) reflective model which focused on three questions, namely what, so what, and now what, was adapted to the following three points:

- What happened?
- Why did it happen?
- Where does it leave me?

Resources used to answer these adapted questions include personal reflections, course material (learner guides, assessments, moderators' reports), and module success rates.

What Happened?

In 2018, 26 students were registered for the module. The module consisted of only on-campus placements with pre-arranged partners working at service departments at the universities. These include the sports bureau, facility, and operations, and student gymnasiums. Students would be allocated to groups and would rotate between these placements. Rotations range between six to seven weeks per rotation. At the end of the year, students had to complete all the rotations. During the rotation students would have to compile a log sheet (worksheet), have it signed, and return it to our offices. The log sheet included a small section for activity description and space for the number of hours spent on the mentioned activity. Because the placements were arranged by the previous lecturer responsible for the module before the academic year with the stakeholders, predetermined outcomes (activity examples) were already agreed upon. During the rotations, the rotation manager would orientate the group of students, and assign them the necessary tasks to ensure they all receive the outcomes specified by the end of the rotation. Three rotation managers were involved, unfortunately at the last moment, one withdrew, and their department was no

longer willing to assist with student placement. Luckily, one of the other rotation managers provided students with the necessary experience within their domain and took on more rotations. Very few class discussions were scheduled, students would meet with their lecturer once or twice during the semester. Monitoring and administration of students was done by the rotation managers. For a semester mark to be calculated, students had to return their log sheet so that the hours spent, and activities done could be checked. Marks per student were given by rotation managers for assigned tasks and added by the lecturer. During the oral examination, both rotation managers were present, as the course lecturer, one colleague from our department (who also was appointed as the internal moderator), and the external moderator (from another institution). The pass rate for the oral examinations was 100%, yet the success rate was 96% due to two module cancelations.

In 2019, 24 students registered for the module. The arrangement with the original two rotation managers stayed in place, with one new stakeholder (for marketing) asking to become involved. It was decided that the students should look for off-campus placement for their facility rotation. Students were given clear instructions regarding their facility rotation, with task examples and a letter to the placement with the contact details of the lecturer. The panel for the oral examinations stayed the same with the addition of the new rotation manager. The oral examination had a 100% pass rate, as well as the module, received 100% success rate.

In 2020, 28 students registered for the module. The plan at the start of 2020 was to keep the arraignments like the year before. Yet, the rotation manager for marketing's contract was not renewed and her position became vacant. In March 2020, the COVID-19 lockdown and restrictions meant that the campus closed, and all activities had to move online. Subsequently, the sports industry also did not allow any student's work on their premises. The format for assessment also changed from examination to continuous assessment. Many of the activities meant for each rotation were not made into assignments with some practical applications. Rotation managers assisted with the creation of assignments related to the tasks they would give during their rotations. Students were asked to attend online classes to explain the changes, assignments, and how the final marks will be determined. More sessions with individual students to engage directly with each of them and track their progress were arranged. The success rate for the module was 96%. Two students canceled the module at the start of the academic year before COVID-19.

Thirty-two (32) students registered for the module in 2021. Since students were not allowed to return to campus, the continuous assessment plan and activities stayed the same as in 2020. The same arraignment with sessions and feedback was implemented, yet student engagement was problematic. A new external moderator was appointed and assisted with the quality insurance and a tutor who only helped with this group. The success rate for the module was 81%, and not satisfactory to report. Notably, the module success rate was not low due to failures, but purely module cancelations.

Twenty-eight students registered for the module in 2022. Since we could return to campus but had to continue using continuous assessments, it was decided that the tasks used in the previous year be used again, but to add a class project (to be done for our department) as the practical aspect. Because students had access to campus, we were able to meet with the students (and they with each other) on a face-to-face basis. More class sessions were scheduled during the academic year. The external moderator was consulted more frequently on the practical assignments and visited the class on two occasions as a consultant as well as

an examiner. While the tutor was appointed to assist the group with their theoretical modules, she also assisted the group with their project. The success for the module was 88%.

Why Did it Happen?

In 2018 a large amount of time was spent on orientation (the feeling of finding one's feet), the lecturer was new to the university and module. Due to a limited knowledge of the institution's staff and structures, it was the rotation managers who chose to step in to assist and keep with the arrangement which added value to the continuation of the module for 2018. As a lecturer, losing stakeholders at the start of an academic year would leave them feeling vulnerable, especially in how to ensure curriculum consistency. The assumption that 'they will help again' because the stakeholder assisted the year before and was willing to work with the students, was incorrect to make. The 2019 year was planned better, by the end of 2018 an understanding existed with the rotation managers, and leading up to 2019 frequent emails and calls meant that the lecturer became more visible to the managers. The arraignment worked well enough that another rotation opened for students. While it was not in our control that contracted staff leave, more thought should have been given to a rotation not being attached to one specific person, again. The facility rotation becoming an off-campus rotation was difficult to manage. Many students did not know or were not willing to look for their placement. As a lecturer, you become anxious and frustrated when students delay their facility rotation due to the excuse that they could not find anything. Those students who had more confidence found placements quickly and even enjoyed working off-campus. Yet, it was decided that 50% of the rotations for 2020 would be on-campus and 50% off-campus, thus covering facility and marketing.

At the start of 2020, the class seemed eager for this arraignment. When the new module outline was explained to students, they did not seem too hesitant, and the feedback session went well. There were a few issues or concerns regarding the online consultations, very rarely students would not show up, and if they did, they always ensured that they reschedule. Together with the external moderator and rotation managers, we tried to keep tasks as close to practical work as possible, being conscious of the restrictions. Although it was a difficult year, it seemed that the students did their best to adapt to the new module outline. The two cancelations the module had were before the COVID-19 lockdown and which we take as a positive and students were able to finish their academic year with all the changes and challenges. The year 2021 was difficult since we did not return to campus, and we did not have the opportunity to meet in person. Although we were able to show our faces in online classes, large classes and being cautious of data usage meant that some lecturers did not know how their students looked at all. Many students did not attend sessions and did not respond to emails or calls. Feedback and monitoring students that did not respond to emails or calls were frustrating. Although the work was presented before, it was difficult to keep students motivated to participate, and sometimes it was noticed that the 'value' of an assignment meant to be practical work was lost on them.

Things looked up when we were notified that students will return to campus for 2022's academic year. Although the rotation managers were all still unsure if their departments will be able to accommodate students, it was decided that the module will be presented on a hybrid approach. Students had to complete the assignments online (like in previous years), but as a class, they were given a project to complete within our academic department on campus. Some challenges regarding the project were expected, but the complaints, student issues, and the fighting among class members were overwhelming. It got to a point where the

student representatives and the Head of Department had to get involved. The project was completed, and a final presentation was held with the class, department staff, and external moderator. The reasons for the module cancellations varied, yet it was not for the module specifically but cancellation of the qualification. Few students wanted to complete the module evaluation survey issued by the university, however, the frustration students experienced working in a team was a recurring topic. In hindsight, allowing students to do part of their work on their own, but other work they relied on students they also have not seen for two years (some they do not know at all), could have contributed to the arguments. Many students did not return to residences close to campus; therefore, they were absent for group work sessions on days when classes were not mandatory.

Where Does it Leave Me?

In preparation for 2023, assistance from colleagues in the department who had students do practical work regulated by their governing body was sought. They shared how they would arrange the outcomes based on specific tasks (not only hours) as well as 360-degree feedback. It was decided to keep some of the individual assignments (still based on the historic rotations) but included an off-campus or on-campus placement requirement for students to return to industry. The class project was also kept, yet the approach is different. More time will be given on the group work timetable and an extra day (6 hours) for this module.

A large focus of the class orientation will be a meet and greet. As leisure scholars, we understand the purpose and value of including a full-value contract, getting students to talk about expectations and general rules for the class. We also value icebreakers (activities) and know the importance of students getting to know each other. The class representatives play a significant role and will be nominated at the first session. Setting up a communication structure with them is needed. They will also be asked to develop a class list with pictures and some background of the class members.

Time was allocated to construct the module's Blackboard (our Learning Management System) and prepare it for students to help themselves with what will be expected of them during the year. This includes the learner guide, assessment plan, and work schedule (due dates for assessments). Students will also be provided with documentation regarding the placements, these include tasks, evaluation forms, example emails, an agreement contract, etc. This is referred to as a starter kit. The arraignment should be that students must complete a pre-set number of tasks at their placements, under the supervision of an assigned mentor who will also provide them with feedback. The number of hours needed to complete these tasks I set at 100 for the 28 weeks (about 6 and a half months). Identifying a mentor at the placement is important, this person or persons will need to mentor the students throughout the year. Some industries might have more than one person who can assist, therefore students might have a different mentor based on the task. Feedback from the mentor to the student on the task is important and part of the feedback indicates if the discussion has taken place between mentor and students. At the end of each month, students will need to submit their progress and attend a one-on-one session, during this session challenges should be discussed with the students, and being able to read the submitted feedback, assist them in improving their skills. This will also allow time to engage with the stakeholders regarding issues and monitor the progress of the students.

The first practical tasks (which are done individually) will include email construction, developing their email signature, and updating CVs. This could assist students with their search for placements and the formal communication that will go with it.

Conclusion

Although South Africa is enthusiastic about sports, little is documented regarding the use of WIL in qualifications related to the sustainability and development of the sports industry in South Africa. Education, and more specifically, the curriculum is key in preparing students to enter the workplace with the skills needed to meet requirements set out by each industry. WIL plays a vital role in these skills, which go beyond that theoretical knowledge.

As mentioned earlier, WIL could include various forms of activities, yet context alters the effectiveness of these activities. Chowdhury (2020) who advised on the use of WIL in Bangladesh's education system, mentions that long- and short-term plans to integrate WIL into qualifications are needed. Being involved with other modules and being aware of module outcomes, is needed to see the full *readiness and usefulness* of the activities included in the WIL program. While it might be difficult to balance curriculum consistency with student-centered learning, there can be a balance. The importance of design and delivery with close consultations with stakeholders and experts is a critical component. It is not about reinventing the wheel but making the wheel turn smoothly and purposefully.

Networking with the industry provides a sense of stability with WIL's content and context. Stakeholders have been valuable assets on and off campus. The diverse groups students surround themselves with during WIL add value not only to the program but to students' skills. By WIL providing students the opportunity to develop important graduate attributes such as communication, time management, and other interpersonal skills they might transition easier into the workplace. Students who become invaluable to workplaces, who transition easier, and who can start adding value to the workforce provide the institution with a competitive advantage, being seen as a contributor to workplace-ready graduates. On the other hand, if students find this transition easy, or have more opportunities to apply for jobs based on practical skills and experience their time spent at the institution is also validated.

This leads me to conclude, firstly, that in reflection on the pedagogy with regard to WIL, we found that it took some time and networking before an understanding of the module and its outcomes related to certain activities was achieved. Learning and adapting from one year to the next is key to how WIL is designed. Secondly, the assumption that a WIL module is self-study or self-managed is not true. The lecturer is and should be involved, as much as they would be with a theoretical module, if not more. Students need a constant presence, not to micro-manage them, but to support them. Lastly, students should be more aware of their voice in bettering the WIL module, when they graduate, they can also support future students not only by suggestions on content but by being part of context. Students who enter the workplace and extend the same courtesy to students by offering their place of work for placements. Building such a network of support and broadening the stakeholders' reach is beneficial to the curriculum, qualifications as well as industry.

It is recommended that establishing and maintaining a partnership with industry, institutions can deliver an authentic WIL experience for their students. In establishing this mutually beneficial partnership between industry and institutions consistency to a WIL curriculum can be planned both in context and content.

Acknowledgments

The authors would like to acknowledge their colleagues for their support in sharing their knowledge and experience in their programs and curricula.

References

- Cameron, D. (2001). *Working with spoken discourse*. London: SAGE.
- Coates, J. (2007). Talk in a play frame: More on laughter and intimacy. *Journal of Pragmatics*, 39, 29-49. <https://doi.org/10.1016/j.pragma.2006.05.003>
- Crebert, G., Bates, M., Bell, B., Patrick, C-J., & Cragolini, V. (2004). Developing generic skills at university, during work placement and in employment: Graduates' perceptions. *Higher Education Research and Development*, 23(2), 147-165. <https://doi.org/10.1080/0729436042000206636>
- Dressler, S., & Keeling, A. E. (2011). Benefits of cooperative and work-integrated education for students. In R. K. Coll & K. E. Zegwaard (Eds.), *International handbook for cooperative and work-integrated education: International perspectives of theory, research, and practice* (pp. 261-275). Lowell, MA: World Association for Cooperative Education.
- Drew P., & Heritage J. (1992). Analysing talk at work: An introduction. In P. Drew, & J. Heritage (Eds.), *Talk at work* (pp. 3-65). Cambridge: Cambridge University Press.
- Ferns, S., Campbell, M., & Zegwaard, K. (2014). Work-integrated learning. In S. Ferns (Ed.), *HERDSA guide: Work-integrated learning in the curriculum* (pp. 1-6). Milperra, Australia: HERDSA.
- Jackson, D. (2016). Modelling graduate skill transfer from university to the workplace. *Journal of Education and Work*, 29(2), 199-231. <https://doi.org/10.1080/13639080.2014.907486>
- Jackson, D., Fleming, J., & Rowe, A. (2018). Student transfer of skills and knowledge across university and work contexts. In *Refereed Proceedings of the 3rd International Research Symposium on Cooperative and Work-Integrated Education* (p. 65). World Association for Cooperative Education.
- Moreland, N. (2005). *Work-related learning in higher education*. Heslington, York: The Higher Education Academy.
- Rook, L. (2015). Work-integrated learning programs in human resource management. [Doctoral thesis, University of Western Sydney]. University of Western Sydney. <https://researchdirect.westernsydney.edu.au/islandora/object/uws:30144/datastream/PDF/view>
- Rook, L. (2017). Challenges implementing work-integrated learning in human resource management university courses. *Asia Pacific Journal of Cooperative Education*, 18(3), 199-212.
- Rolfe, G., Freshwater, D., Jasper, M. (2001). *Critical reflection in nursing and the helping professions: a user's guide*. Basingstoke: Palgrave Macmillan.

Rowe, A., Kelliher, M., & Winchester-Seeto, T. (2012). Typology of participation activities.
Retrieved from
http://staff.mq.edu.au/teaching/curriculum_development/pace/resources/effective_curriculum/

Contact email: natashajvr@uj.ac.za

An Examination on the Role of Culture and Socialization on South Asian Women's Pursuit of STEM Education

Kinza Shaukat, University of Western Ontario, Canada
Anton Puvirajah, University of Western Ontario, Canada

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This study examines the experiences of five South Asian women who aspire for careers in Science, Technology, Engineering, and Mathematics (STEM) at the University of Western Ontario. It also analyzes the ways in which cultural and societal experiences shape their pursuit of a STEM degree. The research questions being investigated through this study are: (1) How has a South Asian woman's experiences in the home influenced their own perception of education? (2) What types of experiences have South Asian women had in different levels of schooling? (3) How does cultural identity inform the experiences of South Asian women in their education and social lives? Data was collected through semi-structured interviews. The findings are presented through qualitative narrative storytelling. The findings discussed the extent to which the participants' identities were constructed through home and school life, as well as ideas of educational significance in their cultures.

Keywords: South Asian, Diaspora, Intersectionality, Feminism, STEM, Culture, Socialization

iafor

The International Academic Forum
www.iafor.org

Introduction

The purpose of this study is to inform readers about the social and cultural factors of a group of women who are identified as South Asian Women, who have taken the career path of pursuing the STEM (Science, Technology, Engineering, and Mathematics) Fields. I worked as a participant interviewer to uncover the stories of five South Asian women in STEM programs at the University of Western Ontario. Through narrative inquiry, specifically storytelling, I explore how both cultural socialization as well as schooling experiences work together to build a South Asian woman's understanding of the importance of her education. Current relevant literature suggests that South Asian women are socialized to prioritize family life and maintain dependent (Ghosh 2013). Experiences in early ages may shape the way that South Asian women view themselves and their societal roles through way of dressing, interactions, food, and social demeanors (Inman, 2006). Through my study, I have uncovered gaps in previous literature that show how the experiences of young South Asian women have changed over time through personalized and storied experiences.

Theoretical Framework

Intersectional Feminism

Intersectional feminism combines the axes of race, class, gender, sexuality, to define an individual. The theory sets out to explore how these axes intersect to create unique experiences (Pande, 2014). The purpose of using this framework for the study was to help understand the experiences of women in relation to the social categories of race, class, gender, and ethnicity. The experiences of racialized and non-racialized women differ as gender, race, and class can create different results when combined in the oppression of underrepresented minorities (Ralston, 1999). The importance of utilizing an intersectional feminism framework in this study is that while women are fighting for equity in academia and the workforce, these experiences are unique to each individual woman because of the way that her race, class, and ethnicity provide an identity that is unique to her as an individual (Sang, 2018).

Diasporic Studies

Diasporic studies as a framework can show how the process of migration from one's home country effects self-perception and identity (Dwyer, 2000). The changing of cultural practices when entering a new geographic location can have a significant impact on the type of socialization that is received and practiced. When South Asian women experience a clash between the culture they inherit from their parents and the western culture they encounter through schooling or social experiences, there can be a negative affect when realizing that the cultures can clash with one another (Inman, 2006). Migrants grapple with the concept of reconstructing their identities in new spaces while still trying to maintain important cultural and religious practices when they are exposed to more western ways of life (Samuel, 2010). For children, and South Asian female children in particular, the learned cultural and religious practices can often create difficult boundaries when socializing with individuals in school environments (Dwyer, 2000).

Rationale

The rationale to explore the experiences of South Asian women that choose to pursue careers in STEM is motivated by my personal experiences in seeing South Asian women struggle in

navigating around cultural expectations. For the experiences that I have encountered through my own family, STEM careers are seen to typically be more encouraged for men rather than women, as these careers take time to develop; this means that if a woman were to pursue a career in STEM, the timeline that is expected for marriage and starting a family would be the second priority, which, according to my experience, is frowned upon. The literature available at the time of this study did not focus on experiences of South Asian women specifically. My research aims to close this gap and show the importance of research that focuses on specific groups of minoritized women and their unique experiences in relation to cultural socialization. While this is an experience specific to my own family, the aim of this study was to identify the prevalence of these types of situations today, and possibly explore the changes that have come to be as we see more women entering the STEM workforce. I work constantly to call out my own positionality in the research as many of my own experiences may not necessarily mirror those of my participants. For this reason, it is important to conduct a smaller scale study to gain more insight on specific experiences for the newer generations of women.

Existing Literature

Current literature expresses that minoritized women are not given the same level of support and encouragement in their specific educational experiences pertaining to careers in STEM (Leaper & Starr, 2019). The most current literature at the time of this study emphasized the structure of the nuclear family (Williams, 2014), which meant that women were encouraged to prioritize their families above their desire to be educated or to define their success through education. Generational gaps occurred when parents migrated from South Asian countries to Canada, and the education system their children were exposed to encouraged women to pursue careers that were once seen as more popular for men (Inman, 2006).

According to the literature, parents of South Asian children express that it is important for their children to learn the significance of cultural practices for instances where they may encounter any form of discrimination (Iqbal, 2014). A cultural identity can prepare children to make sense of their own experiences and maintain positive attitudes towards their culture (Rivas-Drake, Huges, & Way, 2009). In later stages of life, children will take the practices learned from their parents and adapt them into their own lives – carrying traditions on for generations (Chakawa & Hoglund, 2016).

Many previous studies express the importance of marriage and the responsibility of creating and maintaining the family as one of the primary identities of South Asian women (Sohal, 2009; Samuel, 2010). Men maintain their status and respect through providing for their families through their work and income, while women maintain their reputation through their femininity, maternal instincts, and their ability to keep their home in working order (Sohal, 2009; Dwyer, 2000). Women are expected to take on domestic responsibilities from a young age to build their reputation over time, while for men, the importance of education is emphasized on a greater level (Bhopal, 1997).

Methodology

Narrative inquiry was used to tell participants' experiences through storytelling. By holding semi-structured interviews, we were able to uncover their unique experiences layer by layer as comfort and trust was built between the researcher and the participant. Storytelling is seen to be a primary structural part of the human experience (Connelly & Clandinin, 1990). By asking open-ended questions and allowing participants to freely tell their stories, we were

able to develop better relationships with our participants while still maintaining their anonymity.

Mili	Amirah	Sam	Nila	Alara
Pakistani	Tamil-Sri Lankan	Indian	Tamil Sri Lankan	Pakistani
Med-Sci	Med-sci	Biology	Engineering	Med-sci
First Generation Canadian	Second Generation Canadian	First Generation Canadian	Second Generation Canadian	First Generation Canadian
Muslim	Hindu	Hindu	Hindu	Muslim

Figure 1: Table of Participants

The importance of using storytelling as a method of data collection was to ensure that participants felt in control of the information that they were giving, and how their stories would be interpreted. As the participants' stories were told and retold, the process creates a sense of meaning-making when reflecting on their experiences (Clandinin & Connelly, 1991). When participants were telling their stories, they were simultaneously reflecting on their past experiences and viewing them from a different lens; this contributes to meaning making of their own experiences and helps the participants understand their experiences in a different perspective.

Conclusions

Findings

While the findings in this study are not inclusive to all South Asian women due to the sample size, it is evident that experiences of young South Asian women have changed due to cultural influence, socialization and family support. Participants reported that connection to their culture was important in shaping their cultural identity (Tirone & Goodberry, 2011). A positive self-identity emerged for all participants as a result of support given from teachers and family figures. The core values in the families of the participants included the importance of education, along with cultural practices (Chakawa & Hogg, 2016). This meant that along with an education, participants maintained a "well-rounded" sense of self (Shariff, 2010), which they owe to their parents' teachings. For all participants, education was a big contributor in maintaining a positive self-identity, and cultural experiences encouraged them to pursue their desired STEM careers.

It was important to note that all five participants from the study come from backgrounds where parents were educated regardless of gender. This influence served as motivation for these participants to maintain academic excellence, and consequently, pursue careers in STEM. The representation that participants saw in their immediate families and social networks will encourage participation in STEM (Bagguley and Hussain, 2014), and evidently, was an important factor to choosing their prospective career paths. It was crucial for the participants to see their family members as well as members of their social network succeed in their STEM-related careers to decide to pursue their dreams in STEM careers as well. Education is seen as a quality attribute in the families of South Asian women (Tirone & Goodberry, 2011). Participants were raised knowing the importance and value of their

education as it is a way for them to assert their independence and power in both their social lives and the working world.

Limitations

This study was conducted during the height of the COVID-19 pandemic; this meant that extra measures had to be taken to ensure the safety of our participants while maintaining authenticity in the data collection and interpretation processes. Instead of holding in-person meetings, we scheduled two rounds of Zoom interviews with each of the five participants. This created difficulty in regard to having conversations about more sensitive topics, as the closeness and trust between the researcher and the participant is more of a challenge to achieve during a virtual conversation rather than one that were to take place in person.

The sample size of this study remained small to ensure that storied experiences were captured with as much detail as possible, and connections made with participants were further developed and meaningful. This allowed a sense of comfort between the researcher and participant, which helped to uncover more sensitive topics with regards to the participants' social or cultural experience. While the participants all come from diverse backgrounds, the study does not account for various areas of South Asia such as Bangladesh, Bhutan, the Maldives, and Nepal. A larger scale study would be beneficial to capture a larger scope of unique experiences of South Asian women in STEM careers.

Positionality of the researcher can provide many variations in the interpretation of the data collected for a qualitative research study. Looking back on personal experiences both before and after the study can affect how the stories given by the participants are interpreted in the final stages of the study. For this reason, it was important to add a step for the validation of the interpretations made by the researcher by providing the participant an opportunity to review these interpretations before the work is data analysis is completed.

Implications

The results from this study provide a greater understanding of how the social and cultural experiences of South Asian women can influence their decisions in pursuing careers in STEM. Upon a review of the current literature as well as the five storied experiences of the participants from this study, it is evident that the current research pertaining to minoritized women in STEM would benefit from being analyzed from more specific lenses, such as one that would pertain to individual groups of South Asian women rather than minoritized women as a whole. The findings from the study can help educators, academic counsellors or other organizations who work with women of colour uncover ways to encourage South Asian women to pursue careers that they are interested in by providing inclusive programs and resources.

Acknowledgements

Thank you to the wonderful women who shared their stories and experiences with me. This work would not have been possible without you. I would also like to acknowledge my thesis supervisor, Dr. Anton Puvirajah for his time, dedication, and endless support throughout this entire process. Anton, thank you for believing in me and seeing this project through to the end. I would also like to give a special acknowledgement to Professor Mi Song Kim, for

offering exceptional guidance and feedback in the beginning stages of this project. Lastly, I would like to thank my family for their endless support and encouragement.

References

- Bhopal, K. (1997). *Gender, 'Race' and Patriarchy: A Study of South Asian Women*, Aldershot: Ashgate.
- Chakwawa, A & Hoglund, W. L. G (2016). Measuring parent cultural socialization practices: extending the research to diverse racial-ethnic groups in Canada. *Canadian journal of behavioural science*, 48, 121-131. DOI: 10.1037/cbs0000028
- Connelly, F. M., and Clandinin D. J. (1990). Stories of experience and narrative inquiry. *Educational Researcher*, 19(5), 2-14.
- Dwyer, C (2000). Negotiating diasporic identities: young British South Asian Muslim women. *Women's studies international forum*, 23(4), 475-486. DOI:10.1016/s02775395(00)00110-2
- Ghosh, S. (2013). 'Am I a South Asian, really?' Constructing 'South Asians' in Canada and being South Asian in Toronto. *South Asian Diaspora*, 5(1), 35-55.
- Inman, A. G (2006). South Asian women: identities and conflicts. *Cultural diversity and ethnic minority psychology*, 12(2), 306-319. DOI: 10.1037/1099-9809.12.2.306
- Leaper, C. & Starr, C. R. (2019). Helping and hindering undergraduate women's STEM motivation: experiences with STEM encouragement, STEM-related gender bias, sexual harassment. *Psychology of Women Quarterly*, 43(2), 165183. <https://doi.org/10.1177/0361684318806302>
- Pande, R (2014). Challenges to feminism in the 21st century: a South Asian perspective, with special focus on India. *Revista Artemis*, 17(3). Retrieved from <http://go.galegroup.com.proxy1.lib.uwo.ca/ps/i.do?p=AONE&u=lond95336&id=GALE A395846830&v=2.1&it=r&sid=summon#>
- Ralston, H (1999). *Identity and lived experience of daughters of South Asian immigrant women in Halifax and Vancouver, Canada: an exploratory study* (Doctoral dissertation). Retrieved from <https://sites.ualberta.ca/~pcerii/Virtual%20Library/ConferencePapers/ralston99.pdf>
- Samuel, L (2010). Mating, dating and marriage, intergenerational cultural retention and the construction of diasporic identities among South Asian immigrants in Canada. *Journal of intercultural studies*, 31(1), 95-110, DOI: 10.1080/07256860903477712
- Sang, K. J. C (2018). Gender, ethnicity and feminism: an intersectional analysis of the lived experiences feminist academic women in UK higher education. *Journal of gender studies*, 27(2), 192-206. DOI: 10.1080/09589236.2016.1199380
- Shariff, A. (2009). Ethnic identity and parenting stress in South Asian families: implications for culturally sensitive counselling. *Canadian journal of counselling*, 43(1), 35-46.

Sohal, A (2009). *Negotiating identities: second generation South Asian women's endogamous marital relationships* (Master's thesis). Retrieved from <https://pdfs.semanticscholar.org/b7cc/e99e35c7588dd15e5357e39ffc5842ad9aaa.pdf>

Tirone, S & Goodberry, A. (2011). Leisure, Biculturalism, and Second-Generation Canadians. *Journal of Leisure Research*, 43(3), 427-444, DOI: 10.1080/00222216.2011.11950244!!

Williams, T (2014). Demystifying male dominance in STEM subjects. *Women in higher education*. 23, 9-19. doi:10.1002/whe.20142

Contact email: kinza.shaukat@gmail.coms

Callidus Academy Project Bringing a New Vision on Professional Training Related to the Industrial Pole of Manaus (PIM)

Rafael Lopes e Oliveira, University of the State of Amazonas–UEA, Brazil
Nathalia Cristina Mafra Bessa, University of the State of Amazonas–UEA, Brazil
Antonio Cláudio Kieling, University of the State of Amazonas–UEA, Brazil
Ricardo da Silva Barboza, University of the State of Amazonas–UEA, Brazil

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The Callidus Academy is a project of the LUDUS ecosystem, from the State University of Amazonas, in partnership with the company CALLIDUS INDUSTRIA COMERCIO E SERVIÇOS DE PLACAS E COMPONENTES ELETRONICOS. To solve the problems of the PCB industry, the project carries out case studies with the research of causes and effects involved in the assembly and welding processes, training professionals in the areas of manufacturing and testing, involving topics such as SMT, Lean Manufacturing tools, Industry 4.0, welding metallurgy and testing of manufactured boards. The information technology area faces a shortage of professionals in Brazil, with an expected demand of 420,000 IT professionals by 2024. Skilled labor affects the Industrial Pole of Manaus (PIM), causing competition between companies for these professionals. To increase efficiency and productivity in the industry, reducing errors and redundancies in production, the Lean Manufacturing management system has been widely disseminated, with the application of concepts aimed at reducing waste and optimizing resources. These concepts are in line with the premises of the modern theory of Industry 4.0. Thus, to solve this problem, we started to train the professionals of the company Callidus, with the methods: “Learning by doing” and “Learning by interacting”. These methods are more effective when it comes to adults, as it makes training classes more interesting, less tiring, and easier for learning, making the student remain in training until the end. With this strategy, in the first year of the project alone, 135 students were trained.

Keywords: Learning by Interacting, PCB Industry, Industry 4.0

iafor

The International Academic Forum
www.iafor.org

Introduction

There is an estimate by the Brazilian Association of Information Technology and Communication Companies (Brasscom, 2021) that by the year 2024, Brazil will need 420 thousand information technology (IT) professionals. Brasscom also alerts that the country currently graduates approximately 46 thousand professionals per year. In this context, the Manaus Industrial Pole (PIM) experiences a shortage of IT professionals, resulting from a lack of skilled professionals and intense competition for talent from various technology companies in the region, as well as tech firms across Brazil.

In general terms, there is a deficiency and scarcity of qualified workforce across various sectors, where the demand for professionals surpasses the number of available positions. This scenario forces companies in need of these professionals to look externally, beyond the state's boundaries, since the job market is highly competitive and the absence of these professionals leads to revenue losses and delays in strategic projects, causing companies to miss out on investments. The solution lies in providing training to students in the region, focusing on technologies geared towards industry applications.

Another scenario that companies face is that the training of these professionals is not immediate; it takes time. In some cases, the academic content taught is not aligned with the interests of the job market, mainly because many courses are heavily theoretical and lack practical experiences provided in the classroom. This delay hinders the integration of these future graduates from undergraduate, high school, and post-high school courses into the job market.

The project aims to precisely address this gap between the immediate needs of the industry and the theoretical-practical content required during students' education. It covers advanced aspects of technological subjects typically seen in postgraduate courses, such as Artificial Intelligence, Computer Vision, Metallurgical Technology, Lean Manufacturing, PCB Production, and Industry 4.0. This approach will undoubtedly bring the graduates of this project closer to the real needs of the industries in the Manaus Industrial Pole (PIM) regarding qualified professionals.

Methodology and Development

Taking into consideration this problem, Callidus Indústria de Componentes Eletrônicos proposes this project that will initially train students from the 2nd and 3rd periods of the State University of Amazonas, from the School of Technology, which are part of the courses of Information Systems, Computer Engineering and Computer Science, aiming to enable students with technologies that are used in companies installed in the Industrial Pole of Manaus.

The project will also train people from the industry linked to the manufacture of printed circuit boards in the areas of manufacturing and testing, involving topics such as SMT - Surface Mounted Technology, Soldering Metallurgy and Testing of manufactured boards. This approach will consider the problems that may exist in the area of quality related to the main products seeking to identify deficiencies in materials, labor, machinery, methodologies used and measurement and evaluation systems employed in their approval or disapproval. And it is on this second topic, which is the training of people in the industry, that this article will address an analysis of how the active methodologies employed in the project, can be

validated by the evaluation of the students graduating from the courses. The courses are training in metallurgy and welding technologies of electronic components, SMT assembly technologies, Products and Testing Methodologies and, mainly, Lean Manufacturing Applied to Industry 4.0, in which the article will address a case study for the class, to analyze how the learning of this course will influence their day-to-day work and how the methodology addressed was of impact on their learning.

Lean Manufacturing is a management system designed to increase efficiency and productivity by reducing errors and redundancies in industrial production. With the arrival of industry 4.0, the importance of companies maintaining their competitiveness has been enhanced. This is one of the basic courses taught to student-professionals, so that they have control and assertiveness within the industry.

The Management in Industry 4.0 course is designed to train participants in People Management, making them aware of the company's leadership styles and their suitability for industry 4.0 through the following actions: a) Reinforce the commitment to their continuous self-development process; b) Train participants in skills aimed at a better interpersonal relationship in teamwork; c) Sensitize and instrumentalize participants to guide the development of other professionals in their team; d) Stimulate the exchange of experiences between professionals from different areas and business units; e) Strengthen bonds between participants; f) Encourage participants to reflect on the impacts and potential of their actions inside and outside the company context; g) Invest in active training aimed at problem solving and continuous improvement. The training will consist of 40 theoretical hours and 40 hours of hands-on, practical activities and active monitoring, with a total of 80 hours.

In the hands-on division, the methodology used in the lean manufacturing course are: "learning by doing" and "learning by interacting," with the use of LEGOS assembly, where different boxes were made available to each group and only with the image of the object that should be assembled, where the team would apply the methods studied in the theoretical course to assemble in a timely manner and with all the quality (the assembly being more faithful to the image). After the whole process, the manuals were made available to check what they approached differently but that made them arrive at the same assembly result.

Why use these active methodologies to teach adult professionals?

- The "Learning by Doing" methodology is preferred for teaching adults.
- Adults learn best when they are actively involved in the learning process.
- The Learning by Doing approach enables active engagement of adults.
- Adults value learning that is relevant and applicable to their lives and careers.
- The methodology allows for practical application of knowledge.
- Adults prefer to take responsibility for their own learning.
- Learning by Doing promotes autonomous learning.
- Adults retain information better when they are involved in practical activities.
- The methodology helps to build a solid knowledge base.
- Adults also learn through interaction with their peers.
- The methodology promotes collaboration and the exchange of ideas.

Note: Rubeus (2021), Pelica, R. O (2017).

The pyramid of learning

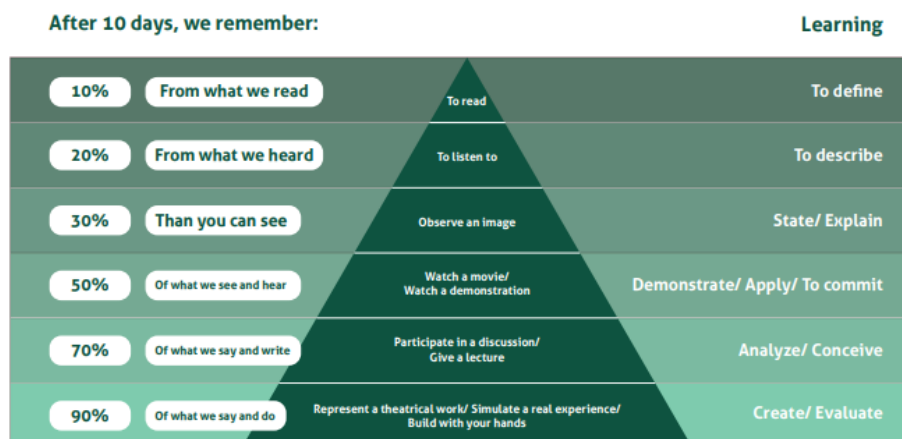


Figure 1 - Example of fixation of each type of study methodology

Conclusion

In the first year of the project (July/2022-March/2023) 135 students were trained, in all four courses had active methodologies employed, so that students could have the interaction of what was taught in the Lean Manufacturing course applied to industry 4.0. Where they applied the methods to be efficient within the industry while learning about metallurgy and welding technology, SMT assembly technologies and test study technologies. An evaluation form of the courses and their methodologies was applied and, in the graphs, below we report the students' achievement, each one reported on their positive experience and gave their opinion of what needs to be improved.

In the questionnaire addressed, the responses of 90% of the students showed that the methodologies applied were enlightening and innovative, stimulating. Regarding the subjects addressed 85.71% reported having been enlightening and objective. And 100% reported having been applicable daily.

About what could have been improved, the students mentioned about not having more course time, as they would have been of great benefit, and two mentions were reported of improvements but related to the distance from the workplace to the university, where the courses are applied.

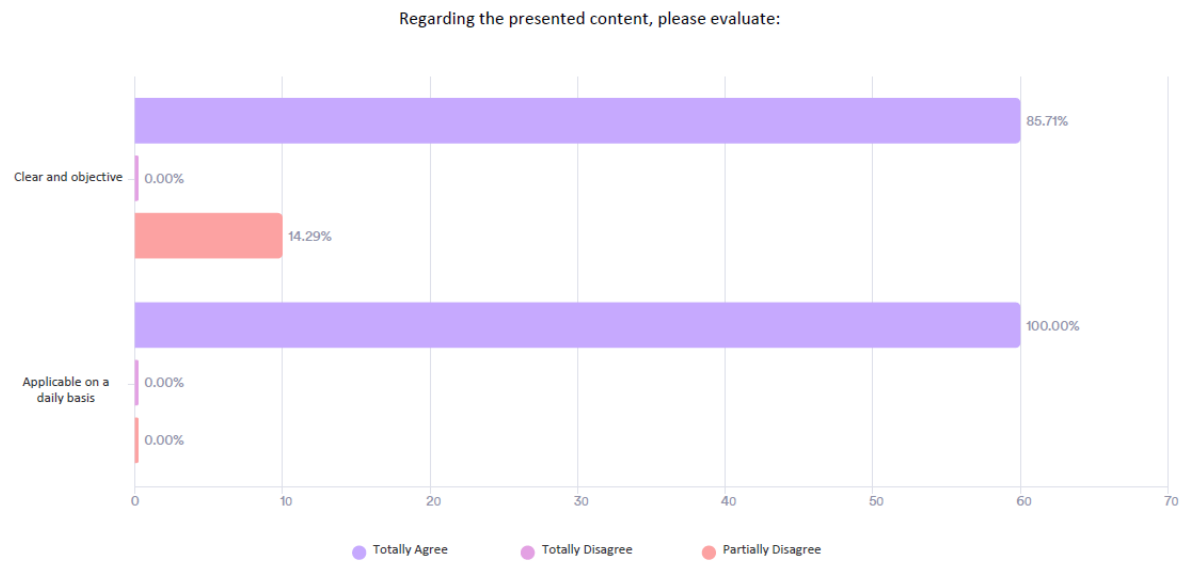


Figure 2 - Evaluation chart about the Lean Manufacturing course to the students

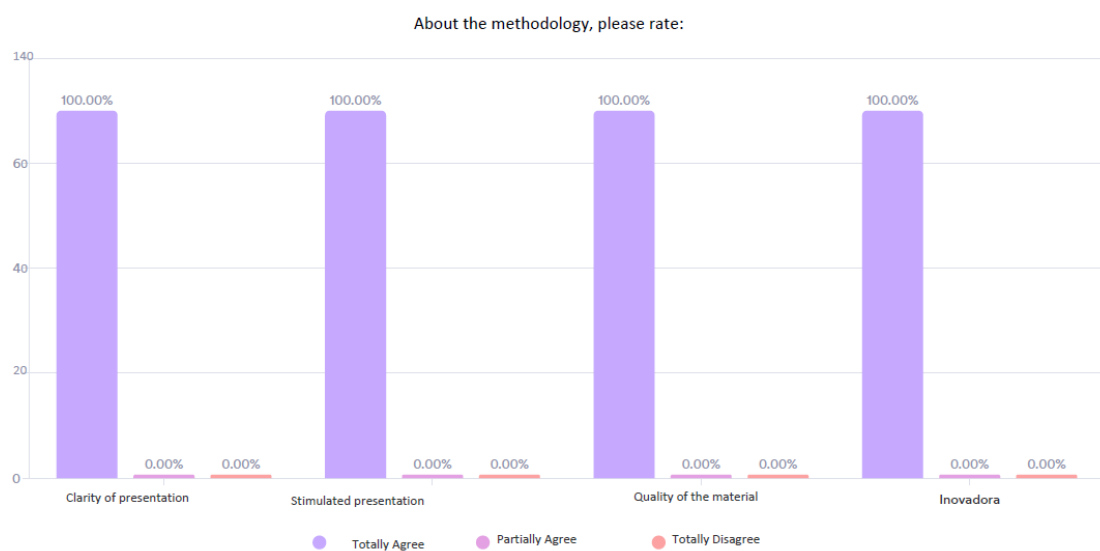


Figure 3 - Evaluation chart on the methodology used in the Lean Manufacturing course

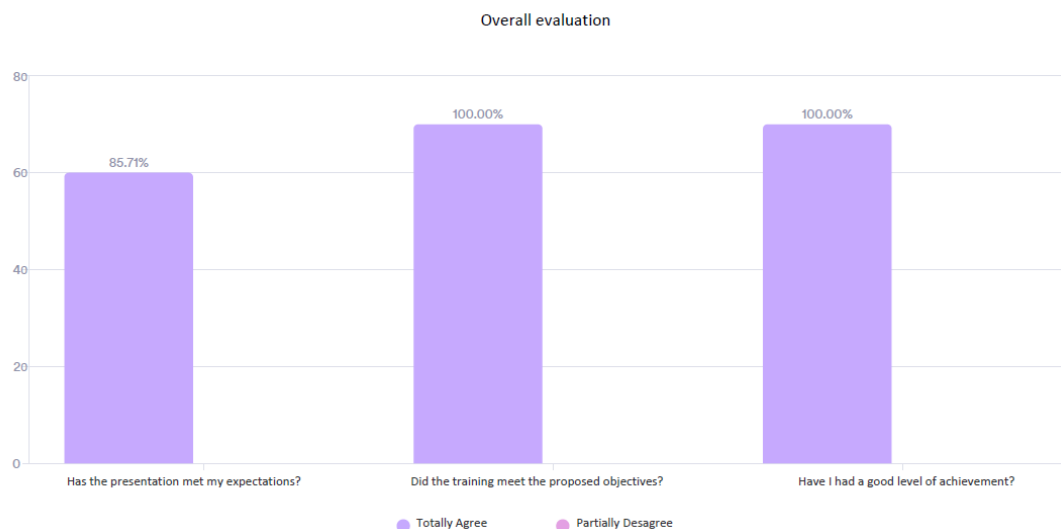


Figure 4 - Overall evaluation chart on the utilization of the courses in general applied by the project

These two previous points are one of the limitations to attract more students from the factory to the project courses, because the courses are applied in the night shift and with that the majority already leave very tired, one of the points to be discussed so that we can improve and disseminate the course, is to disseminate the results to other employees, and show that the active methodologies applied can improve learning.

There are great expectations that this will increase the demand for the courses and that we can present them to other companies in the same sectors within the Manaus Industrial Pole and thus increase the level of professionals trained for the demands of the industry.

Acknowledgements

Our simple thanks for the partnership with the company CALLIDUS INDUSTRIA COMERCIO, for entrusting us with an arduous and rewarding mission that was in this first year of the project. To the graduates who participated in this evaluation study, inspiring us to improve our courses for the second cycle of this rewarding project.

References

- Brasscom. (Date of publication of the article 2021, January 20). Demand for IT professionals will be 420 thousand people by 2024 and Brazil trains only 46 thousand per year. Retrieved from <https://brasscom.org.br/procura-por-profissionais-de-ti-sera-de-420-mil-pessoas-ate-2024-e-o-brasil-forma- apenas-46-mil-por-ano/>
- Pelica, R. O. (2017). Playing with Lego is new way for adults to learn. The Economic Journal. <https://jornaleconomico.pt/noticias/brincar-com-lego-e-nova-forma-de-aprendizagem-para-adultos-226769/>
- Rubeus. (Date of publication of the article 2021, May 14). What is Learning By Doing and why is its application so effective? [Web post]. Retrieved from <https://rubeus.com.br/blog/o-que-e-learning-by-doing/>

Contact emails: loprafa@gmail.com,
Ncmb.mtr@uea.edu.br

Mapping, Coding, Learning: When Infographic Meets Digital Education –A Pilot Programme in Design School

Ida Cortoni, Sapienza University of Rome, Italy
Alessio Caccamo, Sapienza University of Rome, Italy
Carlotta Belluzzi Mus, Sapienza University of Rome, Italy

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Media Literacy and Media Education are two concepts that are now endorsed and become part of the academic lexicon of contemporary society internationally and seem to be recognised for all intents and purposes as new processes of education within formal or informal educational contexts. This process, however, cannot be self-taught and entrusted exclusively to the experiential practice of everyone, but requires forms of cultural mediation in educational contexts, especially for the development and practice of more sophisticated transversal digital skills. In this sense, a growing number of researchers in different disciplinary fields claim the need for a 'design twist' in educational practices, with "Design" playing a leading role in terms of notions, processes, and no less distinctive intelligence. The discipline of Design, through the artefacts of Information Design - like infographics - can assist such pedagogical activities, facilitating storytelling in the acquisition of new content and tools supporting the educator in guiding the learning. Starting from these premises, the contribution - through the case study of the Digital Education programme of the master's in design, Multimedia and Visual Communication at Sapienza University - aims at critically reflecting on the relevance of disciplinary trespassing in the reconstruction of the methodologies of Design applied to future Digital Education. Contaminations useful for the research of new models, methods and processes that allow the design of new learning experiences aimed at the construction of democratic educational systems, inclusive and more adherent to contemporary challenges.

Keywords: Information Design, Digital Education, Coding, STEAM, Critical Thinking

iafor

The International Academic Forum
www.iafor.org

Introduction

In recent years, the international public and political attention has focused on the digital capital (Ragnedda et alii, 2019; Pitzalis et alii, 2016) of the school education system. By this expression, we mean the set of material resources (infrastructural technological endowment) and immaterial resources (digital skills) used in the performance of everyday activities in a circumscribed socio-cultural context such as school (Cortoni, 2020). The investment in digital capital in the school context, therefore, inevitably includes the strengthening of design skills and experimentation of appropriate teaching methodologies that, through technologies, can stimulate and enhance the child's learning, preserve the social and relational dimension with the educator, and stimulate an active participation and cooperation among students in the development of the activities. In this framework, optimizing the use of communicative technologies for an educational purpose also means investing in the implementation of the *human capital* (Coleman, 1988) of the teaching staff, especially in terms of *digital skills* and methodologies of the *digital education* approach,¹ to be experimented daily in the classroom with students and other educators.

In the two decades between the first Lisbon Strategy 2000 and the Europe 2020 Strategy, many initiatives have been promoted and supported aimed to have digital literacy included in the school system, with reference to the debate on digital competence.² Through the *Digital Education Action Plan*, in 2018 the European Commission proposes to improve the quality of pedagogical use of technologies in teaching and learning processes and foster the development of digital competences of teachers and students to cope with contemporary socio-cultural changes (Eurydice, 2019). The investment in digital capital is thus supported by the legal institutional awareness, shared at a European level, of including media education in the school curriculum and using technologies as a propaedeutic didactic support for *digital literacy* and for the stimulation of learning and implementation of students' competences. However, these policies are not always accompanied by teacher support and accompaniment strategies which help to concretely apply the digital education methodologies and procedures in the classroom and simultaneously safeguard the ethical, psychological, emotional, and physical integrity of children when using those same technologies.

In recent years, the use of STE(A)M (*Science, Technology, Engineering, Arts and Mathematics*) (Maeda, 2013, Perignan, Buonincontro, 2019), as a multidisciplinary and

¹ By this expression, we mean that teaching and learning process in which media, analogue and digital, are used as support for educational activities and as stimulation of digital competences (Hartai, 2014; Perez Tornero & Varis, 2010) and of the cognitive, metacognitive, and socio-emotional competences of citizens, young and old, in different educational contexts.

² In this regard, some of the European Commission's regulations concern: *Proposal for a Council Recommendation on key competences for Lifelong Learning* (2018); *Report on Literature Review of Reforms related to the 2006 European Framework of key competences for Lifelong Learning and the role of the Framework of these reforms* (2017); *Education and training 2020 Work Programme thematic Working Group "Assessment of key competences" Literature review, Glossary and examples* (2012); Recommendation of the European Parliament and of the council of 18 December 2006 on key competences for Lifelong Learning (2006); OECD Competency framework (2014); OECD, *the Definition and selection of key competencies* (2013); EU, *Digcomp: A framework for Developing and Understanding Digital Competences in Europe* (2013); EU, *Developing key competences at school in Europe. Challenges and opportunities for Policy*, Euridice Report (2012); EU, *A new skills agenda for Europe* (2016).

interdisciplinary didactic approach using *computational thinking*,³ has been progressively legitimized in schools to promote the transformation of the traditional way of teaching scientific disciplines through a creative use of opportunities offered by ICT and digital languages, creating new experiential learning spaces for students. Based on the relevant scientific literature, the use of STEAM in a school context brings several benefits for the child's learning:

- *Cognitive*, as STEAMs stimulate the capacity for independent and in-depth study, facilitating memorization and acquisition of disciplinary knowledge. In addition, STEAMs help implement certain soft skills such as the ability to identify connections between the acquired information, developing *high order thinking skills*: such as creative, analytical, reflective and metacognitive thinking, as well as problem solving skills.
- *Communicative*, as STEAM allows the child to work using, in an integrated manner, multiple communicative languages (multiple formats and multimedia tools) and testing different ways of expression and representation of information. Children learn to argue their own choices, also using appropriate terminology.
- *Social-relational*, to the extent that STEAMs promote a methodological intervention that is predominantly collaborative and focused on teamwork. Students are stimulated to share their results with others, to discuss hypotheses and insights. The teacher thus gradually shifts from content provider to learning facilitator, while students are stimulated to experience a serene, democratic and inclusive atmosphere in their class.
- *Emotional-motivational*, as the STEAM approach enhances learning motivation towards the various study disciplines and curiosity.
- *Techno didactic* as STEAM stimulates different areas of digital skills: from creativity in the construction of digital artefacts to the communication and sharing of knowledge; from the ability to select and organize digital content to the skills of critical analysis of the same information including media.

The STEAMs, however, in this case do not represent the child's main learning objective but the methodological approach through which to design and test digital educational paths to enhance the child's learning and to implement knowledge also of humanistic disciplines such as geography, civics, history, mother tongue, etc. Starting in 2021, the *Digital Education Studio* research area in the Department of Planning, Design, Architecture Technology at Sapienza University of Rome has launched a *pilot programme* on the design and experimentation of communicative and digital artefacts for education in the *master's degree in Design, Multimedia and Visual Communication*.

1. Infographic as Visual Thinking Strategy

In recent years, due to the widespread use of digital media and its consumption, people must process a large amount of information in considerably less time than in the past, a time defined as perceptual (Riva, 2018). Physiologically, the intervals between information input and its perception are in the order of milliseconds. These delays, even though infinitesimal, can distort their interpretation because the brain - unable to process new information - will translate the input into inaccurate or approximate forms (Thwaites, 2000). Proper understanding of such artifacts requires competencies that go beyond mere factual and conceptual domains but extend to higher levels of learning - procedural and metacognitive domains - to stimulate critical

³ Definition introduced by computer scientist Jeannette Wing in 2006: 'mental process underlying the formulation of problems and their solutions so that the solutions are represented in a form that can be implemented effectively by an information processor, be it human or artificial'.

thinking, which is essential for human development and the only defence against illusion, deception, superstition, and self-ignorance of ourselves and the world around us. Data visualization is not free from errors (Huff, 1954/2007), and when faced with communicative-infographic artifacts, the receiver tends to filter them through cognitive and social biases, influenced by their visual perception process. In general, there seems to be a bias of rejection towards the complexity of the communicative-infographic artifact, leading the user to see what they want to read (Cairo, 2020) due to the representation itself (Gibson & Gibson, 1955). Driven by the need to process information in minimal time (Riva, 2018), this attitude can generate a bias, causing the receiver to misread the information or not give it proper weight because it is deemed too complex and incomprehensible, leading to informational disorder.

As a communicative artifact, the infographic should not be considered merely a set of notions or interpretations but a process; and meanings are not exclusively internal to the works but are also produced through consumption (Falcinelli, 2014, p.101). To form a judgment of value resulting from perception, the receiver - when decoding a communicative-infographic artifact as a communicative process - applies patterns of interpretation, involving classification, organization, and connection (Gell-Mann, 1994). These patterns can be influenced by the level of attention - arbitrary and personal (Falcinelli, 2014) - that the recipient employs in consuming the artifact. Due to the richness of information contained in it, they might not be able to apply their critical thinking properly. Therefore, it is essential to focus on strategies that emphasize the logical-procedural structure in creating an infographic and activities based on the analysis of the artifacts themselves. If we taught "how something turns into something else, how styles change over epochs, how major artists have worked according to the message, means, and techniques of their time [...] then perhaps the public would be more ready to understand current transformations" (Munari, 1971/2017, p.107).

Munari's theory seems to be confirmed by several studies. For example, Yildirim et al. (2016) highlighted the effectiveness and preferences of communicative-infographic artifacts and their use in basic learning processes. Ibrahim and Alarmo (2021) showed that infographic teaching materials positively influence computer skills, e-learning, and motivation to achieve goals. Shaback (2017) revealed significantly higher results in the experimental group concerning educational infographic production in a controlled experiment. Nearly 90% of participants in the experimental group reported that infographics had a positive impact on their intellectual abilities, life skills, and emotional development. Alyahaia (2019), after assigning STEAM-related infographic design tasks, observed improvements in educational support in terms of effectiveness and communicative interest among students. Similarly, Bicen, Beheshti (2017) found that using infographics in education positively impacted academic success by improving knowledge retention in students. Kongwat & Sukavatee (2019) reported improved collaboration and team-building skills, message effectiveness, and understanding due to infographic use. Matix & Hodson (2014) highlighted how assigning research-based graphic design tasks in courses encouraged students' visual and digital literacy. Gareau, Keegan & Wan (2015) revealed a significant advantage in terms of accuracy for participants with any level of university education and a significant interaction between the type of stimulus (infographic vs. documents) and the condition (search vs. recall) with infographics leading to improved research performance. Lastly, Lastari & Silvana (2020) found that students believed the use of infographics motivated and allowed them to summarize assigned reading topics more easily. Positive effects were also seen in terms of active and collaborative participation in reading activities, allowing students to develop creativity and foster positive attitudes toward technology in educational contexts. It is not incorrect to state that before being an artifact, the infographic is a way of thinking, closely connected to visual thinking as theorized by Arnheim

(1969/1997). In the process of translating data into information, strategies of representation, analysis, synthesis, abstraction, and figuration are employed (Meirelles, 2013). The organization of informative content in an infographic - or Information Architecture - corresponds to a representation of information, as it is the first form of data visualization through the "transcription [...] of a thought [...] through the mediation of any system of signs" (Botta, 2006, p.31).

To develop a correct approach to competence, it is necessary to frame everything within a mental process of visual or, more precisely, infographic thinking. This is because visual languages are not isolated entities but widespread (Falcinelli, 2014), influencing the social, cultural, and cognitive planes. To stimulate critical Graphicacy skills, it is crucial to work on cognitive stimulation by reasoned exposure of the receiver to communicative-infographic artifacts, fostering a critical approach to these types of communicative artifacts and learning to read data critically. This approach revolves around the concept of the reflective practitioner by Schön (1983): a constructivist view of human perception and thought processes where the Designer constructs their knowledge based on experiences (Valkenburg & Dorst, 1998). According to Kokkos (2021), contact with art - in this case, communicative-infographic artifacts - can offer new and effective ways of giving meaning to the content itself through a critical reevaluation of our interpretation. Visual thinking strategies aim not only to form factual competence but also to facilitate the decoding of recurring patterns through "clarifying visual forms and organizing them into integrated patterns, as well as attributing such forms to objects" (Arnheim, 1969/1997, p.18). To do this, direct processing of complex information is reinforced to draw simple interpretations of the provided data (Borkin et al., 2013) through visual-based strategies. In this sense, infographics as artifacts and media serve as prostheses, meaning "artificial structures that replace, complete, or enhance a [...] performance" (Maldonado, 1997/2005, p. 141) of an informative nature. Infographics can also act as activators of critical thinking and reflection (Leggette, 2020; Liu, 2021), promoting improved critical skills when approaching visual information. Similarly, the creative production of infographics in different contexts (Jean, Kim, 2017) involves acts of naming, ordering, and parameterizing, which are interpretive acts representing a perspective on knowledge, reality, and experience (Drucker, 2014). Applying the theory of cognitive adaptation (Vessey, 1991), infographics and data visualization facilitate the identification of trends and relationships. While seeing is a natural act, perception is an enabling process (Dondis, 1973) intrinsically connected to thought (Arnheim, 1980). In the face of a communicative-infographic artifact, "we simultaneously look, read, and decipher, and we do much more, so much that we could find a verb for each action involving visualization [such as] analyzing, decomposing, relating, [and] comparing" (Falcinelli, 2014, p.154). According to Loukissas (2019), it is essential to consider new ways of thinking and critically seeing data and their visualizations, not just in terms of representation but also in the definition of a mental image of an idea, concept, or description. Moreover, the emergency lies in the fact that most processes related to Data Journalism are entirely hidden from the reader (Bradshaw, 2014). Finally, Data visualization techniques are not simply a means to make data more aesthetically appealing but rather "tensions of traction and pressure of content" (Falcinelli, 2014, p.219), providing a coherent form to discourses, making thinking visible, and enhancing analytical reasoning, data analysis, and cognitive development.

2. Edumat+, Pilot Programme of Design for Digital Education

The pilot programme, entitled Edumat+, is part of the experimentation on Digital Education and Digital Literacy, developed inside a *Digital Education Studio* in the Department of

Planning, Design, and Architectural Technology at Sapienza University of Rome. In this area oriented towards *Design for Digital Education*, for some years now the students of the master's degree have been training and designing communicative artefacts for education, which they experiment operationally inside the schools through their curricular internship. In this essay the focus will be on infographic mats for digital education designed for primary school children. This *pilot programme* represents an opportunity to share communicative and digital prototypes for education, to design, test and validate an innovative teaching methodology where the media artefact and coding can be integrated into the teaching setting and curricular programming as a methodology and communicative support for the achievement of curricular educational goals of not only scientific but also humanistic disciplines. The application of design to the area of *Digital Education* and STEAM as a support for teaching and learning in the humanities is still underdeveloped in the Italian context, there are few case studies of similar projects and few universities oriented to communication design with a specialization in *digital education* and *digital literacy*. The lack of studies and schools in this area is reflected in the public and political debate on digitalization, which, when it deals with digital capital, focuses mainly on strengthening the technological dimension of the media, neglecting the narrative, linguistic and interaction aspects that nowadays make media devices more than just devices, they are in fact true socio-communicative environments with significant socialization effects on children. Such media environments in fact require a design of the interface and the architecture of the media system of an educational type, attentive to the socio-emotional, psychological and cognitive traits of the reference target, in order to make precise expressive and structural choices of the communicative artefact capable of stimulating the internal and combined capabilities of the child (Nussbaum, 2002).⁴ This is why it is appropriate to reflect about and explore communication design applied to digital education. Specifically, the *pilot programme* proposed by Sapienza in 2022 intends to support the use of communicative artefacts, both digital and non-digital, in school education according to Digital Education perspectives, through the design of infographic mats to be used, for educational purposes, in curricular activities in the primary schools. These mats focus the attention on the themes of the UN 2030 Agenda, the subject of in-depth study of the various disciplines of the Italian primary school, through an interdisciplinary approach and the involvement of curricular teachings, in compliance with the learning goals set for children attending primary school.

The project includes the use of STEAM educational methodologies oriented towards the implementation of coding activities with the help of a kit of physical robots (specifically Sphero Bolt), designed for the target age group of the project. The use of the robots is integrated with coding support services, so that any virtual applications for programming the robots can preferably and indifferently also be manipulated using smartphones, tablets, or personal computers.

Among the innovative aspects of the project, in addition to the use of STEAM as a teaching methodology for the development of pupils' disciplinary and soft skills, it is worth mentioning the use of visual language, through the infographic (not narratives) storytelling represented in the interactive mats, as a supporting factor for children's involvement and understanding. In the wake of Neurath's (1936) *Isotype*⁵, the adoption of a visual language, with the aim of

⁴ According to Sen (2000) and Nussbaum (2002), capabilities are what *people are actually capable of doing and being, having as a model the intuitive idea of a life that is worthy of the dignity of a human being*. they distinguish fundamental or basic capabilities for surviving in a social context, internal capabilities related to people's innate predispositions and combined capabilities, i.e. those capabilities stimulated by external socio-cultural stimulation that are transformed into competence

⁵ *Isotype* is considered the first example of contemporary infographics.

'explaining by images', recalls the democratizing power of visual design, i.e., the possibility of transferring knowledge clearly to many subjects with heterogeneous skills. In fact, the iconic language (mainly infographics) is easily recognizable and interpretable even by those who do not possess adequate linguistic codes (e.g., immigrant students), by those who may have learning disorders (dyslexia, dyscalculia, etc.), as well as by students with different learning and expression times, starting from the different cultural stimulations of the socio-cultural family context.

The *Edumat+ pilot programme* consisted of three main macro-phases:

1. Design and prototype.
2. Experimentation.
3. Evaluation.

The first phase, explored in more details in the following paragraphs of this essay, mainly concerned the design of the educational programme, starting from the analysis of the school's educational needs (i.e. understanding the psycho-cognitive and emotional characteristics of the target audience, the educational goals for each age group, and the educational programme traditionally carried out in the classroom by teachers with regard to certain humanities-related subjects) to come up with the design of the communicative and digital methods and tools to work effectively in the classroom. Specifically, the use of storytelling and coding methodologies (involving the stimulation of computational thinking through computer programming) combines the peculiarities of pedagogical content design with visual semiotics (reading, writing, coding, and interpreting visual texts) and stimulates experiential learning. These methodologies were used to create infographic mats focused on the themes of the UN 2030 agenda, used in an integrated way with a robot kit capable of moving and interacting in physical and digital environments, such as infographic carpets.

The second phase of experimentation with the designed communicative artefacts involved the organization of a 20-hour digital education course lasting 5 months within the classroom where children, divided into working groups and supported by media educators, worked on the interactive mats using coding to explore different topics including water pollution, the shapes of matter, the seasons, and living and non-living beings. Each group focused on each mat for about a month (4 hours), changing topics and activities in the following months. Some of the didactic methodological principles at the basis of the activities proposed during the experiment concerned peer education and cooperative learning, the active participation and the emotional involvement through the use of multimedia languages and digital tools, the capabilities of comprehension, memorisation of information and expression and designing coding activities with the support of media educators.

Lastly, the experimentation promoted the evaluation of the training course *in itinere* through the use of two instruments: an evaluation form on the educational and relational environment built in the classroom among the children and with the educators, filled out by two research observers from outside the programme, and an evaluation form on the soft skills progressively acquired by the students while working with the map, filled out by the media educators involved in the experimentation at the end of each meeting (Cortoni, 2016).

3. Design and Pedagogy: The Value of Interdisciplinary Research

The research reflects the current trend of integration and dialogue between design disciplines and experimental pedagogy; indeed, Design Culture, if correctly included within the School's innovation processes, can respond to the functional needs of the new pedagogy, dynamically reinterpreting the transition from the traditional to the contemporary (Gislason, 2009; Stadler-Altman, 2018). While this focus is often exclusive to an interdisciplinary relationship between Pedagogy and Architecture, it is now more necessary than ever to open up such innovation to the discipline of Design. The school that wants to be futuristic and that intends to move from traditional to innovative solutions, must accommodate objects, tools and contents that have not necessarily been studied by the actors of the school itself, but belong to methodological and thinking approaches belonging to other contexts (Weyland, 2019). In this sense, what this project highlights is precisely the value of adopting a design-driven approach within the design of digital education services, an approach that suggests a change of perspective (Verganti, 2009) that can be easily evaluated and validated. It is possible to find a confirmation of this willingness to open up to interdisciplinarity precisely within the objectives and structure of the Edumat+ project. With respect to the path undertaken, as mentioned in the previous paragraphs, in fact, the entire methodological structure of the experimentation follows a Design Thinking model (Meinel & Leifer, 2012) that can be associated with the Double Diamond approach (Ball, 2019), as it is structured on distinct and consequential phases of research, conception, prototyping and experimentation, as described above. This method, already known in research belonging to other disciplines than design, allows designers to apply the knowledge acquired in a conscious and functional manner to the specific application phase in which one finds oneself, proceeding in an orderly manner towards obtaining a tangible result that is effective and at its maximum potential in terms of artefact-user interaction. Not only that, the Design Thinking framework allows the research and project team to integrate analytical skills with creative attitudes, facilitating participatory design as much as possible (Malena, 2023). Since this is a research project on STEM subjects, moreover, the pedagogical structure of the activities submitted to the children will also follow a model similar to Design Thinking, a methodological overlap that accentuates the need to rethink the School through a broader and more inclusive view of group research. From an application point of view, interdisciplinarity mainly involved two closely related phases:

a. *Knowledge Transfer*

During the research and contextual understanding phases, it was necessary for project team members to update and expand their knowledge and skills in terms of Design for Communication, Infographics, and Instructional Design. In this sense, the acquisition of knowledge from the complementary disciplines allows designers, communicators, or educationalists to have a stereotomic view of the methodologies and theories applicable to the project, for an effective and valid result from a scientific and implementation point of view.

b. *Map artefact design*

The construction of the design and storytelling for the map artefact was geared towards the assumption that this communicative artefact should play the role of a pedagogical tool. In this sense, the graphic design phase had to be flanked by a pedagogical storytelling and content project well defined in all its steps, first translated into a storyboard that translated the various moments of the story into images, then into a 2x2m infographic, which flanked the design with data, call to action and appendices

functional to the use of the digital tool as well as to the communication of the educational content.

Paradigms from primary level education, visual and multimedia communication design and data visualization thus contributed to the construction of a hybrid model of conscious design that facilitated complex learning actions not only of school notions, but also of Digital Education and Coding. Through confrontation, dialogue, exchange, and reciprocity, it was possible to motivate to a cooperative form of knowledge construction (Jonassen, 1994) that would enhance the discipline of Pedagogy with the expressive and intuitive character of Information Design, already, as mentioned above, loaded with pedagogical value. Similar experiences contribute to building a network of shared actions and knowledge open to the scientific community, which stimulates interest and growth for a Design-driven innovation of school systems oriented to the new needs and challenges for the future (see the teaching theme related to Digital Literacy). Furthermore, in conclusion, taking into consideration the methodological structure and action steps just described, it was possible to provide students and project stakeholders with the tools to start a constructive reflection on the role of Designers and the discipline of Design (Camuffo & Dalla Mura, 2017) in the future of learning processes.

Conclusions

Downstream of the experimentation, as well as during the development and prototyping phases of the maps, it was possible to validate how an interdisciplinary approach, which intersects skills and knowledge from both Pedagogy and Design, is necessary and sufficient to enhance the experimental pedagogical activities, especially when integrated with digital tools. It is no coincidence that the design and methodologies pertaining to Design Thinking have long since been borrowed by educators in the sphere of Instructional Design - precisely - and the proposition of new educational activities.

In this sense, research must set itself the objective of participating in this hybridization process through experimental actions and in-depth theoretical and methodological investigations, identifying touchpoints and potentialities of an increasingly integrated design between the two disciplines. Digital Education activities, if designed starting from a Design-oriented approach, or Design-driven in more extreme cases, can acquire better characteristics for children with respect to usability, memorability and intuitiveness, all indispensable variables in the construction of services, products or experiences addressed to a specific user identified upstream.

Edumat+, with its strong experimental character related to the use of storytelling for infographics, intends to be a case study in this sense for researchers in Design and Pedagogy who intend to investigate this field of scientific interaction. Therefore, the aim and hope is to pursue the development of the project, implementing the tested prototypes and reaching a level of development such that it can offer an integrated design model for educators who wish to make use of this interdisciplinary approach.

Acknowledgment

The paper is the result of a joint reflection by the Authors. However, the paragraphs 'Introduction' and 'Edumat+, pilot programme of Design for Digital Education' were written by I. Cortoni, the paragraph 'Infographic as visual thinking strategy' by A. Caccamo, and the

paragraphs ‘Design and Pedagogy: the value of interdisciplinary research’ and ‘Conclusions’ were written by C. Belluzzi Mus.

References

- Alyahya, D. M. (2019). Infographics as a Learning Tool in Higher Education: The Design Process and Perception of an Instructional Designer. *International Journal of Learning, Teaching and Educational Research*, 18(1).
- Arnheim, R. (1980). A plea for visual thinking. *Critical Inquiry*, 6(3), 489–497.
- Arnheim, R. (1997). *Il pensiero visivo. La percezione visiva come attività conoscitiva*. Turin: Einaudi. (1a ed. 1969).
- Ball, J. (2019). The Double Diamond: A universally accepted depiction of the design process. Design Council. <https://www.designcouncil.org.uk/our-work/news-opinion/double-diamond-universally-accepted-depiction-design-process/>
- Bicen, H., & Beheshti, M. (2017). The psychological impact of infographics in education. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 8(4), 99-108.
- Borkin, M. A., Vo, A. A., Bylinskii, Z., Isola, P., Sunkavalli, S., Oliva, A., & Pfister, H. (2013). What makes a visualization memorable? *IEEE Transactions on Visualization and Computer Graphics*, 19, 2306-2315.
- Botta, M. (2006). *Design dell'informazione: tassonomie per la progettazione di sistemi grafici auto-nomatici*. Valentina Trentini.
- Bradshaw, P. (2014). Data journalism. In *Ethics for Digital Journalists*. London: Routledge.
- Cairo, A. (2020). *Come i grafici mentono. Capire meglio le informazioni visive*. Milan: Cortina Raffaello.
- Camuffo, G. & Dalla Mura, M. (2017). Design e apprendimento creativo: questioni ed esperienze. Milano: Guerini e Associati.
- Coleman, J. S. (1988). Social Capital in the creation of human capital. *American Journal of sociology*, 94, 95-120.
- Cortoni, I. (2016). *App digital education*. Milan: FrancoAngeli.
- Cortoni, I. (2020). *Le competenze digitali nella scuola*. Rome: Carocci.
- Dondis, D. A. (1973). *Primer of Visual Literacy* (Rev. ed.). Boston: The MIT Press.
- Drucker, J. (2014). *Graphesis: Visual forms of knowledge production*. Cambridge: Harvard University Press.
- Eurydice (2019). *Early childhood. Education and Care in Europe*. Eurydice Report. Brussels.
- Falcinelli, R. (2014). *Critica portatile al visual design: da Gutenberg ai social network: [come informano, narrano e seducono i linguaggi che ci circondano]*. Turin: Einaudi.

- Gareau, M., Keegan, R., & Wang, L. (2015, August). An Exploration of the Effectiveness of Infographics in Contrast to Text Documents for Visualizing Census Data: What Works?. In *International Conference on Human Interface and the Management of Information*, 161-171.
- Gell-Mann, M. (1994). Complex Adaptive Systems. In *Complexity: Metaphors, Models, and Reality*. Santa Fe: Addison-Wesley.
- Gibson, J. J., & Gibson, E. J. (1955). Perceptual learning: Differentiation or enrichment?. *Psychological review*, 62(1), 32.
- Gislason, N. (2009). Building Paradigms: Major transformations in School Architecture (1798-2009), *The Alberta Journal of Educational Research*, vol. 55 (2): 230-248.
- Hartai, L. (2014). Report on formal media education in Europe. *European Media literacy Education Study (EMEDUS)*, Lifelong Learning Programme.
https://www.academia.edu/37033951/La_metodologia_del_design_thinking_per_una_Didattica_Digitale_interdisciplinare_per_argomenti
- Huff, D. (2007). *Mentire con le statistiche*. Monti & Ambrosini. (1° ed. 1954).
- Jonassen D.H. (1994). Thinking technology, toward a constructivistic design model. *Educational technology*, XXXIV.
- Kongwat, A., & Sukavatee, P. (2019). The Effects of Collaborative Reading Instruction Using Infographics on Student's Reading Comprehension. *An Online Journal of Education*, 14(2), OJED1402010-12.
- Lastari, D. S., & Silvana, R. (2020). The effects of summarizing using infographics on EFL learners' reading comprehension. *Globish: An English-Indonesian Journal for English, Education, and Culture*, 9(2), 128-143.
- Leggette, H. R. (2020). Visualizing the analysis: Using infographics to strengthen critical thinking skills. *Communication Teacher*, 34(4), 333-339.
- Loukissas, Y. A. (2019). *All Data Are Local: Thinking Critically in a Data-Driven Society*. Boston: The MIT Press.
- Maeda, J. (2013). STEM + Art = STEAM. *The STEAM Journal*. Vol. 1: Iss. 1, Article 34. doi: 10.5642/steam.201301.34
- Maldonado, T. (2005). *Reale e virtuale*. Milan: Feltrinelli.
- Malena, R. (2023). La metodologia del design thinking per una Didattica Digitale interdisciplinare per argomenti. *Academia*.
- Martix, S., & Hodson, J. (2014). Teaching with infographics: practising new digital competencies and visual literacies. *Journal of Pedagogic Development*, 3 (2), 17-27.

- Meinel, C. & Leifer, L. (2012). "Design Thinking Research," Understanding Innovation. In H. Platt-ner, C. Meinel, L. Leifer (Cur.), Design Thinking Research, 127 (pp. 1-10). New York, NY: Springer.
- Meirelles, I. (2013). *Design for Information: An Introduction to the Histories, Theories, and Best Practices Behind Effective Information Visualizations*. Londra: Rockport Publishers.
- Munari, B. (2017). *Artista e Designer*. Bari: Laterza. (1° ed. 1971).
- Neurath, O. (1936). *International picture language; the first rules of Isotype*. London: K. Paul, Trench, Trubner & co.
- Nussbaum, M. (2002). *Giustizia Sociale e Dignità Umana*. Bologna: il Mulino.
- Perez Tornero, J. M., Varis, T. (2010). *Media Literacy and New Humanism*. UNESCO. Moscow: Institute for Information Technologies in Education.
- Perignat, E., Katz-Buonincontro, J. (2019). STEAM in practice and research: An integrative literature review. *Thinking Skills and Creativity*, 31, 31-43 doi: <https://doi.org/10.1016/j.tsc.2018.10.002>
- Pitzalis, M. et alii (2016). *Innovare a scuola. Insegnanti, studenti e tecnologie digitali*. Bologna: Il Mulino.
- Ragnedda, M., Ruiu, M. L., Addeo, F. (2019). Measuring Digital Capital: an empirical investigation. *New media and Society*, 5, 1-24.
- Riva, G. (2018). *Fake news. Vivere e sopravvivere in un mondo post-verità*. Bologna: Il Mulino.
- Schön, D. (1983). *The Reflective Practitioner*. London: Temple-Smith.
- Sen, A.K. (2000). *Lo sviluppo è libertà*. Milan: Mondadori.
- Stadler-Altmann, U. (2018). Ambienti di apprendimento formali: gli edifici scolastici e le aule in-fluenzano i processi di insegnamento e apprendimento? Contributo teorico, in: formazione & insegna-mento. *European journal of research and education* (2).
- Stamatel, J., P. (2015). How data visualization can improve analytical thinking in cross-national crime research. *International Journal of Comparative and Applied Criminal Justice*, 39(1), 31–46.
- Thwaites, H. (2000). Visual design in three dimensions. In Jacobson, R. E. (2000). *Information Design*. Amsterdam: Amsterdam University Press.
- Valkenburg, R. & Dorst, K. (1998). The reflective practice of design teams. *Design studies*, 19(3), 249-271.

- Verganti, R. (2009). Design-Driven innovation. Cambiare le regole della competizione innovando radicalmente il significato dei prodotti e dei servizi. Segrate: Rizzoli.
- Weyland, B., Stadler-Altman, U., Galletti, A & Prey, K. (2019). Scuole in movimento. Progettare in-sieme tra pedagogia, architettura e design. Franco Angeli.
- Wing, M. J. (2006). Computational Thinking. *Communications of the ACM*. Vol. 49(3) ACM.
- Yıldırım, S., Yıldırım, G., Çelik, E., & Kaban, A. (2016). A study on the development of an infographic designer questionnaire and designer opinions. In *SHS Web of Conferences* (Vol. 31). EDP Sciences.

A Blended Approach to Community Involved Education for the Wellbeing of Society

Joy Garfield, Aston University, United Kingdom
Paul Nzacahayo, Queen's Foundation for Ecumenical Theological Education, United Kingdom

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This paper aims to look at the different layers of meanings of the concept of community, the role communities play in enhancing education and how this serves the overall wellbeing of societies. Given the complex challenges that are endemic to our globalized society such as climate change, intercontinental mass migration, and the consequences of technological progress, scholars such as Torres (2017) acknowledge that the modern structured education alone cannot solve these problems. Furthermore Hordern (2018) argues that specialized forms of knowledge need to be considered alongside non-specialized local knowledge. This paper argues that there are lessons to learn from small-scale, kinship and neighborhood-based community education. If, as Dewey (1916) argued, students who are able to learn within their communities make noticeable contributions to the wellbeing of their societies and improve themselves, then it does make sense that this approach is brought into on-going conversation with modern classroom based competitive education. The result would be a blended approach which has the benefit of holding the modern structured education through the classroom together with the traditional small-scale unstructured community-based education in a hybrid blended approach. The authors of this paper will use lived experiences of African traditional societies and European modern structured classroom education together with a substantial review of the literature available in this field. Instead of holding the modern classroom structured education as an enemy of the traditional community-based education (Freire, 1970) this paper will suggest a new framework which reconciles the two.

Keywords: Community-Based Education, Community Involved Education, Blended Learning, Structured Education, Hybrid Education Approach

iafor

The International Academic Forum
www.iafor.org

Introduction

The power of community is being eroded as people become more and more individualistic. As noted by Block (2018), ‘the need to create a structure of belonging grows out of the isolated nature of our lives, our institutions, and our communities. The absence of belonging is so widespread that we might say we are living in an age of isolation, imitating the lament from early in the last century, when life was referred to as the age of anxiety.’ With this in mind there is a need to clarify what we mean by community.

A community can be described in a number of ways and we will unpack these in section 2 of the paper. It has also been evidenced that people can belong to multiple communities. Furthermore, given the complex challenges that are endemic to our globalized society such as climate change, intercontinental mass migration, and the consequences of technological progress (e.g. Delanty, 2003) calls on those delivering public services such as education to make sure that those who are being educated gain a fully rounded educational experience integrating community.

There is a plethora of methods and techniques for educating societies and most of these depend on context, time, money, age, and resources. In traditional non-advanced societies such as some parts of Africa education is locally administered and responds to local needs. In globalized and developed societies education tends to respond to the needs and competition of a globalized society.

There is a need to look again at the kind of education that is given to today’s generations and reassess imbalances between the structured classroom-based education and traditional more informal education. These two are sometimes presented as enemies when they can complement each other for the benefit of educators, learners and the whole community. This paper will review the concept of community and the role communities play in enhancing education of their people. It will also discuss different experiences of community involved education in both the African indigenous context and the British educational setting, and it will put forward a framework for a blended approach to community involved education for the wellbeing of society.

Definitions of Community

Community is a complex concept. According to the Cambridge Dictionary (2023), community is defined as ‘the people living in one particular area or people who are considered as a unit because of their common interests, social group, or nationality’. Merriam Webster Dictionary (2023) defines community simply (and broadly) as a unified body of individuals. For Chavis and Lee (2015) a community is not a place, not a building nor an organization, but the people. They argue that people live in multiple communities which have formal and informal ways of organizing themselves. These communities have the capacity to educate their members, to learn from each other and contribute to the wellbeing of the wider society. On the other hand, as Anthony Achi (2021) contends, it is true that people are born ‘into a community whose survival and purpose are linked with that of every single member of that community’. As such, every human being is first and foremost a member of a community.

For many centuries, classroom education has been promoted as the primary method of education. There has been a lack of recognition of the value of what happens outside of the

classroom. This lack of recognition has motivated some scholars into advocating community-based learning, which has also been referred to as community-based education in which ‘each shares their experience, - listens to, and learns from, the others’ (Hope and Timmel, 1984, book 1, p.10). They argue that ‘students will be more interested in the subjects and concepts being taught, and they will be more inspired to learn, if academic study is connected to concepts, issues, and contexts that are more familiar, understandable, accessible, or personally relevant to them’ (Hope and Timmel, 1984).

One of the key features of this approach is that the community is used as the classroom; and is rooted in the belief that all communities have intrinsic educational assets and resources that educators can use to enhance learning experiences for students. In such settings educators can improve knowledge retention, skill acquisition, and preparation for students by giving them opportunities to apply learning in practical, real-life experiences and issues.

Comparisons Between Community Involved Education and Classroom Structured Education

Most of the time when one speaks about education, we mean a period of formal classroom structured education; mostly classroom based (whether face-to-face or online) with an educator/s who knows the subject and the students who are there to be taught. In this mode of teaching, Paulo Freire (1985, p.54-55) noted that ‘the educator’s maximally systematized knowing and the learner’s minimally systematized knowing’. He suggests that in this ‘banking education’, teachers talk and pass on information and pupils ‘sit and listen quietly and passively’ (Hope and Timmel, 1984, book 2, p.49). However, in latter years problem-based learning has come more to the forefront of advanced educational methodologies and the benefits of such are well known (e.g. Savin-Baden and Howell Major, 2004).

However African indigenous communities had and still have their own way of educating their people (e.g. Achi, 2021). For instance, every aspect of life from ploughing the fields, building living accommodation, making clothes and indeed the very essence of morality is bound up in community education. Meaning that the skills and knowledge are passed on from generation to generation mostly informally. This education prepared young minds for their responsibilities once adults in their communities. As Cameron and Dodd (1970) argue, the strength of this method lies in the fact that it ‘was a native, locally developed lifelong process of learning, with well-defined goals, structures, content, and methods, through which cultural values, skills, norms, and heritage were transmitted by the older and more experienced members of society from one generation to another to help individuals be integrated into the society.’ They further assert that although at the end of such an education, graduands didn’t sit final exams, nor were awarded certificates or diplomas, they graduated ceremoniously and were considered graduates by the society; not because they had papers to show, but because they were able to do what they had graduated in.’ In this way communities made sure once adults these people did what the community expected of them.

Unlike in traditional communities where learning is happening in communities and in informal settings, the structured education has the classroom as its base with a clear demarcation between educators and students and with a beginning and an end point with conferring awards depending on the educational stage. As evidence has shown, classroom structured education has enabled communities to pull themselves out of illiteracy and equip their people with skills needed in today’s global connected communities. The argument in this paper is that classroom structured education needs to be valued and recognised; it is

irreplaceable and is here to stay. But one needs also to acknowledge that when it is blended with the traditional community-based education, results are overwhelmingly better. If for example as Dewey (1916) argued, students who can learn within their communities make noticeable contributions to the wellbeing of their societies and improve themselves, then it does make sense that this approach is brought into on-going conversation with modern classroom based competitive education. Moreover Torres (2017) argues that modern structured education alone cannot solve the complex problems which we find within 21st century societies.

For some time, educationalists have argued for a more interactive model of learning which recognizes not only that knowledge is not only limited to the classroom, but also flows both ways between the educator and the students. For Paulo Freire (1985, p.177) ‘the very practice of teaching involves learning on the part of those who are teaching, as well as learning, or relearning, on the part of those who teach.’ The implication of this is that the gap between the educator and the student diminishes.

A Case Study of a Fully Integrated Community Involved Education

The Queens Foundation for Ecumenical Theological Education (Birmingham UK), a training institution for Anglican, Methodist and Pentecostal clergy has been using a form of community involved blended learning for a number of years.

The education is delivered in six blended formats:

- The daily sharing of food and conversations between all year groups and members of staff, together with daily worship help to foster a learning community.
- Classroom structured delivery through assessed modules where tutors are responsible for designing and delivering the material and facilitating classroom discussions.
- From the outset each student is given a Link church where they are paired with another experienced clergy for the whole period of their training. The student practically and closely observes what is going on in the church, has opportunities to ask questions and reflect on what they see. They meet regularly with the clergy they are paired with. In this way the congregation and the parish become another classroom. Link church clergy meet with members of staff at the Queens Foundation once a year to discuss and feedback into the experience of training.
- Each student is given a six-week placement period working in a context similar to the one they will face when they finish their education. Again, they are working alongside and sharing some responsibilities with an experienced practitioner. At the end of this period the students produce a portfolio in which they describe the context they have been working with, they carefully choose the themes emerging from that description and then intellectually reflect on them.
- Students’ partners are involved in the life of the community either through worship and food as well as through meetings with tutors to discuss their experience of accompanying their partners on the education and vocational journey.
- Cultural education exchanges take place where students travel to other educational institutions overseas and live there for a number of weeks with a reciprocal arrangement to follow.

Although many other higher education institutions integrate a number of these elements into their educational programs, such as work placements, Queens has a fully integrated and lived experience of integrating community into the heart of its learning and teaching.

The blending of these modes of education aims at bringing together the theoretical knowledge in the classroom structured education and integrate it into the real issues/concerns of the contexts in which their institutions are set and grapple with on a daily basis. The result is an education that is relevant and responds to the community's problems and concerns. The other key advantage of this blended approach is that students are formed and trained by the whole community – the training institution, the local and regional church and indeed the national and international church which does input in what is happening in all those areas.

Other benefits of the blended community involved approach include the fact that all stakeholders take ownership and feedback into its evaluation and improvement. Communities are encouraged to own the kind of education that is taking place; and if there are areas which need to improve or change, they have opportunities to influence what happens next. This requires those who design curriculum to be willing and open to other people contributing to the thinking, design, and implementation of what is to be taught. However, if there is already a problem of an 'elitism' gap between educators and students, (Freire, 1985, p.177) then it would be important that this new approach will need humility from the 'experts' and academics.

Furthermore, since all those involved will not be paid in monetary terms, this blended approach will result in less monetarization of education. This can be a positive thing as well as a challenge as traditional universities will want to achieve maximization of profits as one of their aims. On the other hand, this may lead to universities taking more revenues but being able to value more those other stakeholders who deliver education alongside them.

A Framework for a Blended Approach to Community Involved Education

Figure 1 shows the framework put forward for a blended approach to community involved education for the well-being of society. Blended in this context is different to blended learning that is used to mean online and physical teaching.

The ingredients of the fabric of the community join hands with what happens in the classroom and in a blended integrated way they make the cog that is educational learning turn. The use of cogs by the authors of this paper is intentional. It aims to illustrate the fact that the learning that is provided in and by the community is as important as that offered in the classroom. The blending is done by several things, each providing a learning relationship in which educators and students learn together. As said earlier in this paper, the gap between the educator who knows, and the student who does not know or knows little disappears. In mentoring for instance, although an experienced person takes somebody less experienced under their wing, providing advice and guidance does not mean an equal relationship. In this model the mentor will be prepared to learn from the one being mentored.

The pairing involves students being sent into the community with pre-defined and well-established processes to jointly capture and summarize key ideas from the context and then discuss their observations and learning. This approach can even be broadened to include a mentor or supervisor as another voice in the learning. As said earlier those involved would need to be open to deepen their learning and prepare their minds for new insights to emerge.

For placements, a period of specified time is set aside where the student would be allowed to have work experience which is an integrated and assessed part of a student's degree. The student is encouraged to apply their learning from the course in the workplace and apply

learning from the workplace in the course. Such experiences are well established within courses at a number of universities, such as Aston University, Birmingham.

Attachments would involve undertaking unpaid work experience with an organization, to gain insight into a particular job role or industry. This kind of ‘on-the-job learning’ can be mutually beneficial to both employers and students. Other forms of threads linking the classroom and the community include vocational and visits. Where adequate planning and preparations are done well, everybody involved benefits from such a blended approach to education. In other words, the more blended and integrated education is, the wider the benefits are spread.

One of the uniqueness’s of this model is that not only students have their presence in the classroom as well as in the community but so do their educators. The blended and integrated approach changes the dynamic of the relationship between the classroom and the community, between the educators and students, and between employers and their future employees. In the process of such a blended community involved education, the ties that hold the communities together are strengthened and the community in the broader sense benefits from such a community. The world of business, religious bodies, charities, social interest groups, sporting groups and neighborhoods know and are connected to what is going on in the classroom, and in return the classroom knows and is connected to its community. Block (2018) acknowledges that the key to creating or transforming community is the power of being with others embodied in each relationship we encounter and each meeting we attend.

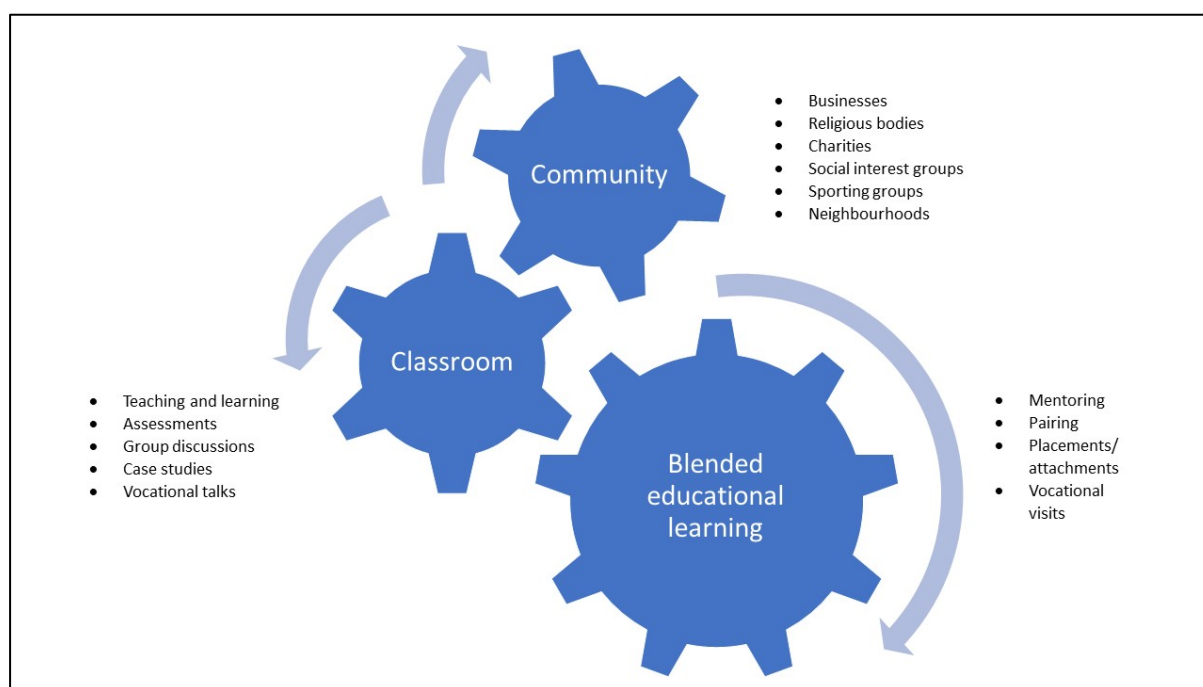


Figure 1: Framework for a hybrid blended approach to community involved education

This approach potentially has a number of challenges. One of which maybe the resistance from academics who may feel that parts of education are being moved from their grip. They would share the platform solely occupied by them with other stakeholders such as professionals already practicing in various fields. Results will also depend on how this is sold to those other professionals who will be involved in the placements, attachments, pairings, mentoring and other methods of blending this kind of education. They also may say that they

wouldn't be able to afford to do this work. However, our argument is that time and space need to be created for this blended approach to succeed. Furthermore, safeguarding is a growing area of work that needs attention. Institutions have invested heavily in this area mainly because of the need to create safe environments for employees, customers, and other stakeholders but this would need to be considered further for the framework we have put forward.

Conclusion

The argument we make in this paper is that a blended community involved approach of delivering education has benefits for the wellbeing of society. We made it clear that classroom structured education, though very important, is not enough on its own to deliver what 21st century contexts need.

Despite the seemingly overlapping of teaching and learning with sometimes blurred boundaries between teachers and learners, it still remains the case that students learn more when theories are constantly tested, debunked and reexamined against the real issues and concerns of the contexts of everyday experiences.

We have also tried to highlight the challenges which may prevent the blended community involved approach to work. These include resistance to it from the classroom structured approach and concerns over safeguarding.

We have tried to bring the undervalued modes of education to the fore: education outside of the classroom and in the community. In doing this, we do not want to give the impression that there is anything wrong with classroom structured education, but rather to affirm it and its place in the wider scheme of education. The key to this paper is those other models of education, sometimes undervalued, that we want to sit at the same table as the modern classroom structured education. We hope we have made this argument clear; and whether classroom structured mode of education wishes to share the platform with these other models in a blended way remains to be seen.

References

- Achi, A. (2021). *African indigenous education*.
https://www.researchgate.net/publication/357050398_African_Indigenous_Education
- Block, P. (2018). *Community: The structure of belonging*. Oakland, CA: Berrett-Koehler Publishers Incorporated.
- Cambridge Dictionary (2023). *Community*. Cambridge: Cambridge University Press.
- Cameron, J. and Dodd, W.A. (1970). *Society, school and progress*. Oxford: Pergamon Press.
- Chavis, D.M. and Lee, K. (2015). *What is community anyway?* Stanford Social Innovation Review, 12 May 2015.
- Delanty, G. (2003). *Community*. Abingdon: Taylor and Francis Group.
- Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. New York: The Free Press.
- Freire, P. (1970). *Pedagogy of the oppressed*. New York: Continuum.
- Freire, P. (1985). *The politics of education*. London: Bergin and Garvey Publishers, Inc.
- Hope, A. and Timmel, S. (1984). *Training for transformation: A handbook for community workers*. Mambo Press.
- Hordern, J. (2018). Educational knowledge: Traditions of inquiry, specialisation and practice. *Pedagogy, Culture & Society*, 26(4), 577–591.
- Merriam-Webster (2023). *Dictionary*. Springfield, MA: Merriam-Webster Incorporated.
- Savin-Baden, M. and Howell Major, C. (2004). *Foundations of problem based learning*. Maidenhead: Society for Research into Higher Education and Open University Press.
- Torres, C. A. (2017). *Theoretical and empirical foundations of critical global citizenship education*. New York: Routledge.

The Views of Romanian Teachers on the Sexual Development and Education of Children

Noémi Szállassy, Babes-Bolyai University, Romania
Nándor Erős, Babes-Bolyai University, Romania

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The topic of sexuality passes for a taboo in our country even today, there being no open treatment of the subject, not even in the closest family circle. There is no sexual education in schools, while sexual enlightenment is restricted to 1-2 hours, provided at the age of 13-14. Our goal is to determine the knowledge and views of Romanian teachers on the sexual development and sexual education of children. The survey was conducted in 2022-2023 as self-filling on-line questionnaire (N=455). Our research was aimed at exacting the knowledge of Romanian kindergarten teachers, elementary school teachers and teachers on the bodily and psychic safety of children, on the factors endangering these, on various topics of sexual education, on the openness of parents related to the sexuality of their children and the flexibility of kindergartens and schools in what pertains to the introduction of sexual education. Most of our responders consider sexuality to be a natural part of a healthy life and also that it should be tackled from the earliest possible ages both within the family and in educational institutions. According to the surveyed teachers, parents are reluctant to talk about sexuality to their own children and rely on sexual education in kindergartens and schools. If training on sexual education were to be introduced in Romania, most of the surveyed would gladly participate. They also recommended 27 related topics in 7 categories, all of which should all be covered by the said training. Our results called attention to the deficiency of education on reproduction.

Keywords: Sexual Education, Sexual Education Relevance, Teachers' Views

iafor

The International Academic Forum
www.iafor.org

Introduction

American sexual educator H. F. Kilander (1970) defined the essence of sexual education already in the 1970s, stating:

Sexual education consists of all educational proceedings meant to help young people prepare for all sorts of problems in life originating in one's sexual urges, which will inevitably occur in one way or another during the life of all normal people. These problems range across a huge variety of life experiences, from simple matters of sexual hygiene to extremely complex medical, social psychological and moral problems related to successful marriage and family life.

Sexual education is closely related to education furthering a healthy lifestyle, to family education but also to moral and civilizational education. Health and lifestyle education is closely related to sexual education, as knowledge and acceptance of our own body, a healthy sex life and a harmonious partnership are all parts of a healthy life. Several studies have emphasized the need for a sexual education among children and teenagers, and pointed out the fact that parents and schools are the most important sources for this type of knowledge. Health education in Romania merely touches upon sexuality, dealing only with sexual hygiene, reproduction and venereal diseases, while even this set of information only reaches pupils who choose Health Education as an optional subject (this is 6-9% of all pupils). Much like it happens in all other Eastern European countries, except for a few narrowly distributed and short-lived individual attempts, sexual education is not even today included in the curriculum of Romanian schools. There are isolated cases where physicians, psychologists or other health professionals are invited to deliver enlightening lectures to pupils at various schools, nevertheless this is far from sufficient and it cannot counterbalance the unfavourable influences young people are facing on a daily basis, through televised reality shows and series, in social media, pornographic papers and movies (Szilágyi, 2003).

In Romania, the Orthodox church is strongly against the introduction of sexual education programs. According to their stance, sexual education is "a form of manipulation and it mars children's innocence". Unfortunately enough, among European countries, Romanian has the second highest number of minor mothers. Statistics in 2019 revealed 16639 pregnancies among girls under 18 (based on a joint survey by UNICEF and SAMAS Association) (UNICEF, 2021). The number of early pregnancies is closely related to a low level of schooling and poor social conditions. Data in this study reflect the acuteness of the issue and the necessity for the introduction of a complex educational program.

The topic of sexuality still passes for a taboo in our country, not even in family would people openly talk about it. There is no such thing as sexual education at school, while sexual information is reduced to 1-2 hours for children 13-14 years old of age. The Ministry of Education is currently trying to introduce a subject called "Life Education" beginning with the fifth grade. Sexual Education is supposed to be a module of this subject. In June 2022, the Romanian House of Commons adopted a draft law that makes health education classes compulsory in schools beginning with the eighth grade (pupils of 14) and with the consent of parents, in order to avoid venereal diseases and teenage pregnancy.

Our research was meant to determine the knowledge, views and attitudes of Romanian teachers on the sexual development and sexual education of children.

Methodology

The survey was conducted in 2022-2023 as self-filling on-line questionnaire (via Google Forms) (N=456). The sampling was based on convenience, with the help of social media platforms, online groups dedicated to teachers, who have initially received a message with the invitation to participate in a study regarding aspects about sexuality and sexual education in Romania.

The questionnaire starts with informing participants on the study, then follow 7 questions/demographic items: gender, *what kind of job you are working in and how many years have you been teaching, highest educational qualification, degree obtained in education, type of settlement where you teach, number of students in the institution.* Following the demographic items, a number of 37 questions allow for the collection either of quantitative responses (5-point Likert scale a number of 7 questions, 7-point Likert scale a number of 10 questions), or of qualitative reflections (open, simple and multiple choice questions – 20 questions) on several aspects related to: the basic rights and needs of the child, the safe, free and joyful experience of its body, gender-related role behaviour, Underwear Rule, the importance of sex education and its sub-topics, the attitude of educators and parents towards sex education, sexually charged manifestations in the institution (kissing, display of genitals, masturbation, sexual harassment, etc.) needs assessment for participation in sexual education program.

The pre-processing of data was performed in Microsoft Excel (vers. 2019). During data pre-processing we cleaned the missing values. Data analysis was performed in R statistical environment (R Core Team 2019). We reshaped and summarized data using the *dplyr* package, while figures were generated with the *ggplot2* package.

Results

We distributed teachers as follows: 190 kindergarten teachers and primary school teachers (266 women, 1 man), 101 of which were primary school teachers. 139 teachers (119 women, 20 men), approx. majors, 75% of which had class teacher experience. The number of children taught varied between 6 and 2000.

Responses of Kindergarten and Primary School Teachers

51% of our respondents (n = 190) believe that sexuality is part of a healthy life and should be addressed from a young age, both in the family and in the educational setting. In contrast, 58% (n=190) of kindergarten and primary school teachers are not aware of the Underwear Rule. 47% of the respondents (n = 190) would emphasize the Underwear Rule in the future, 25% do not teach this rule to children, 15% think it is the responsibility of the parent to teach it, while 13% teach the Underwear Rule.

In 91% (n = 190) of the respondents' teaching practice, there were no cases of suspected sexual abuse of a child, while 9% had experienced such cases.

Respondents perceive different factors endangering children in varying degrees (Fig. 1). However, a large proportion of kindergarten and primary school teachers consider disparaging children's bodies and watching movies with sexual content to be very dangerous (Fig. 1). In the experience of kindergarten and primary school teachers, the most frequent

incidents include children kissing each other, telling sexually charged jokes or talking obscenely (Fig. 1).

Among kindergarten and primary school teachers, 69% (n = 190) would participate in sexual education training, 4% would not participate, while 27% are undecided. According to respondents, if age-appropriate sex education were provided in all educational institutions, risks would diminish, except for that of early sexual initiation, which based on the views of respondents would not be reduced by sex education (Fig. 1).

Responses of Teachers

44% of our respondents (n = 66) believe that sexuality is part of a healthy life and it should be addressed in different environments such as family or school from a young age. In comparison with kindergarten and primary school teachers, 62% (n = 66) of teachers are not aware of the Underwear Rule. 48% of the respondents (n = 66) would emphasize the Underwear Rule in the future, 12% do not teach this rule to children, 23% think it is the responsibility of the parent to teach it, while 17% teach the Underwear Rule.

Of all teachers asked in 2022 (n = 73), on being asked how they think parents feel about sexuality, 87% gave a response, while 13% declined to answer. The majority of teachers asked in 2022 (44%) believe that parents demand sex education at school and are open to discussing this topic. 15% of respondents suggest that parents are open and can accept the sexual behaviour of their child. 25% of respondents believe that parents are averse to, forbid, condemn and punish their child's sexual behaviour, while 3% believe that parents cannot accept the sexuality of their child.

In 2023, we asked the teachers (including kindergarten and primary school teachers) about the parents' opinion regarding sexuality. 55.1% of the respondents (n = 78) said that parents detest, forbid and condemn, punish the sexual behaviour of their child, 19.2% said that parents are open to and accepting their child's sexual behaviour, while 15.4% said that parents agree to the introduction of sex education in kindergarten and school and are open to discussions on such topics. 10.3% of the respondents gave no feasible response.

The majority of our respondents (91%. n = 78) talk to children about sexuality, gender identity, sexual diseases, fertilisation, abortion, sexual hygiene and young people's physical and mental health.

The largest proportion of respondents said that adolescents are at high risk of unwanted physical contact and of being belittled, negatively commented on, or receive comments about their body or gender (Fig. 2). In a lower proportion, films and images with sexual content can also be very dangerous for adolescents (Fig. 2). According to teachers, the commonest sexual behaviour is obscene language, while a higher proportion of sexually charged jokes, body image problems and stripping and nudity occur side by side (Fig. 2). Most of the teachers agreed with the statement that if age-appropriate sex education were provided in all educational institutions, it would reduce the amount of misconceptions about sexuality, decrease adolescent body image problems, and reduce the number of abortions (Fig. 2). Similar to kindergarten teachers, teachers agreed in a lower proportion that sex education would reduce the early initiation of adolescent sexuality (Fig. 2).

In 82% (n = 139) of the respondents' teaching practice, there were no cases of suspected sexual abuse of a child, while 18% had experienced such cases.

If training on sexual education were to be introduced in Romania, 36% (n = 139) of the surveyed would gladly participate, also 36% would not participate, while 28% are undecided.

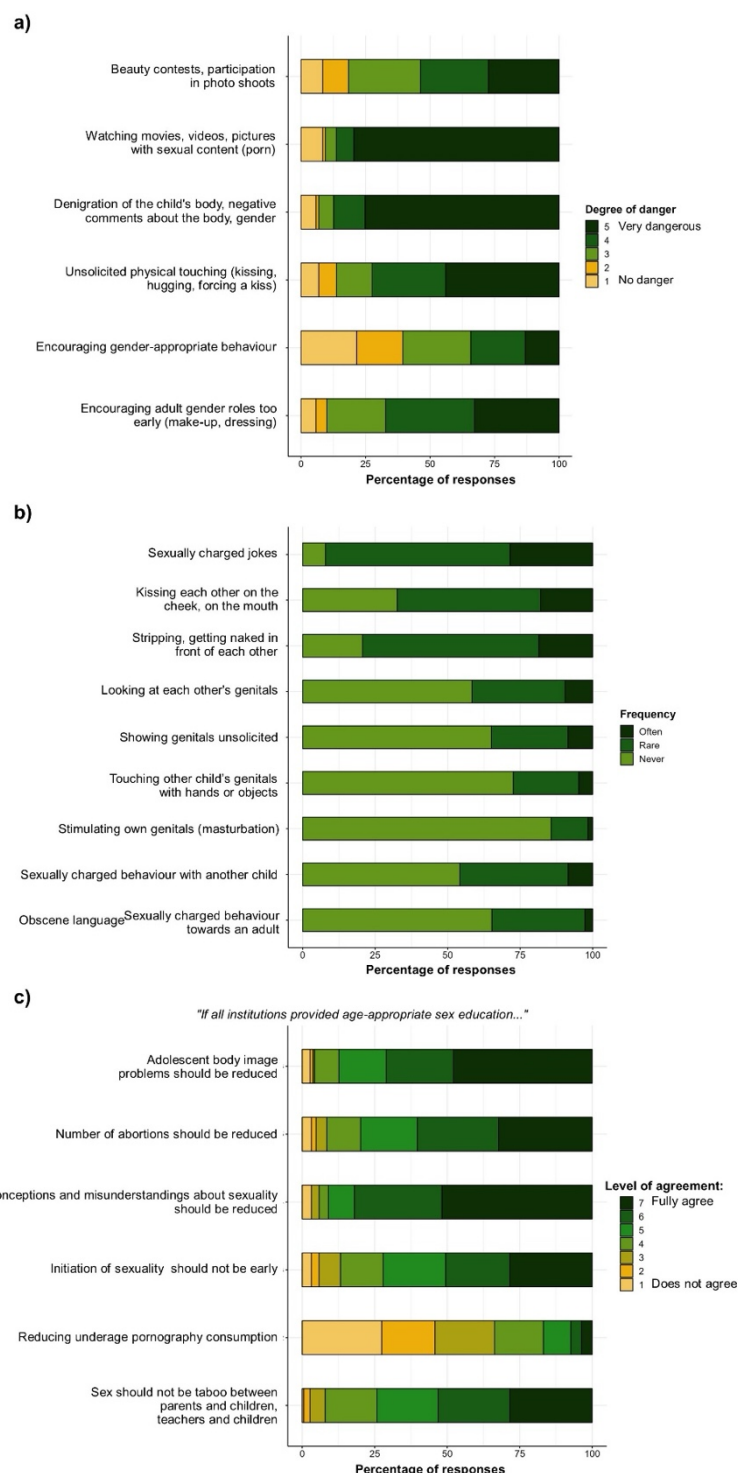


Figure 1: Panel a) Assessment by kindergarten and primary school teachers of certain factors that can be dangerous for children. Panel b) The frequency categories of different sexually charged behaviours perceived by kindergarten and primary school teachers. Panel c) Attitudes of kindergarten and primary school teachers about possible outcomes of appropriate sexual education in school. The sample size for each question is 190.

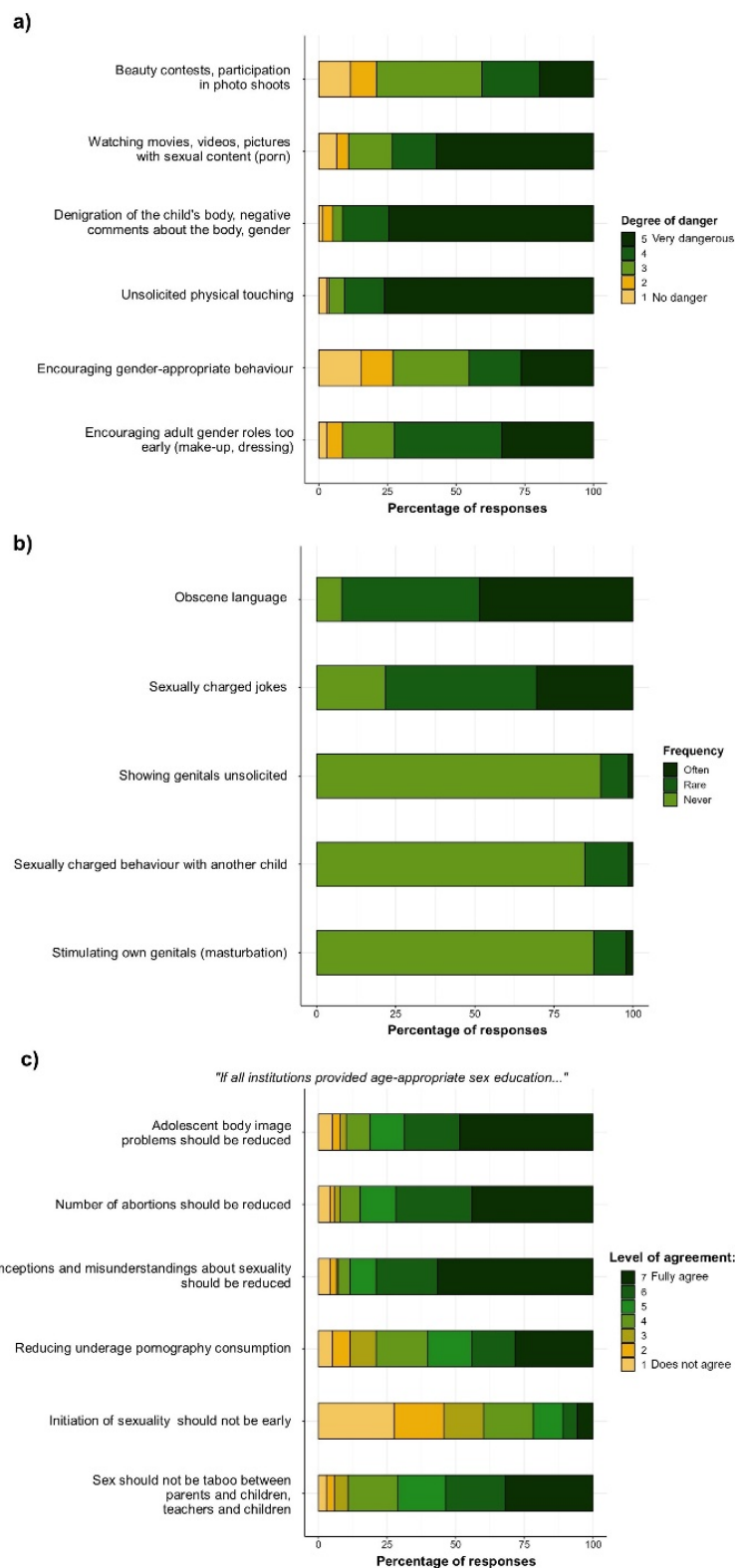


Figure 2: Panel a) Assessment by teachers of certain factors that can be dangerous for adolescents. Panel b) The frequency categories of different sexually charged behaviours perceived by teachers. Panel c) Attitudes of teachers about the possible outcomes of appropriate sexual education in school. The sample size for each question is 139.

They also recommended 27 related topics in 7 categories, that should all be covered by the said training (Table 1).

Table 1: Topics in sex education proposed by teachers for possible future training.

Proposed categories	Topics
Introduction to biological processes	conception, ovulation, menstruation, pregnancy, childbirth, body changes during adolescence
Preventions	contraception, unplanned pregnancy, consequences of early childbearing, disease prevention, importance of hygiene
Mate choice and family planning	how to choose the right partner, family planning, marriage
Sexual abuse	sexual abuse, implications of sex work
Sexual gratification	sexual intercourse and the corresponding level of emotional development, masturbation, the effects of pornographic content, body awareness, what happens in the body during sex
Communication and psychology	teaching assertive communication strategies, communicating with partners, developing good body image
Gender identity	gender identity, LGBTQ (+) propaganda and its dangers, acceptance of difference

Conclusion

In several countries and cultures, the question arises: who is the most competent person in providing sexual education for children and the young? According to *Szilágyi* (2013) sexual education is the task of all those who are charged with the education of children. The most proper solution would certainly be if parents could answer sensitive questions and thus help the development of a secure atmosphere at home, but everybody is not fit to do this. Parents know that the most important factors in the sexual education of their children are trust and open-mindedness. The age of children and parents, the personal experience accumulated by parents, their communication skills should be taken into consideration, and still, only a few are prepared to undertake these tasks (Iorga *et al.*, 2021; Mocanu, L. 2018, Noorman *et al.*, 2022). In most cases, parents delay sexual education, usually with the excuse of children being too young for the process, until the task is transferred to teachers, who are unable to find the necessary time within their kindergarten or school curriculum to perform the difficult task. A number of studies found that parents need information, motivation and strategies in order to reach optimal results. From among factors characteristic of individuals and families in relation to the sexual education of children, the literature considers the following important: genetic factors, social and economic status, family structure, family atmosphere, the gender of parents, their educational and communicational style, the sexual education level of parents, parent attitudes, values and convictions (Walker, 2004; Bersamin *et al.*, 2008; Vidourek, Bernard & King, 2009; Goldman, 2008; Pop-Rusu, 2015). Shtarkshall *et al.* (2007)

concluded, that health and educational systems must provide sexual education for adolescents and young adults. This education is best provided in institutions by the end of the primary school section, while it most often begins in high school, at an age when young people have already begun their sex life. The question arises: where from, then, comes the knowledge of children on sex life and related techniques. Initiation is most often provided by an older friend, but it also can come from multi-media devices. The age of Internet and easily available porn allows early access to certain dimensions where young people can collect erroneous information and experience.

According to data in the literature, sexual education programs in schools are not properly implemented, they are less effective and lose their preventive character (by being introduced too late) (Pop-Rusu, 2015), and this is yet another argument for laying the bases of sexual education (attitudes, beliefs, behaviour, values) at an early age and in close cooperation with families (Colarossi *et al.*, 2014). Some researches report how teachers are insufficiently or poorly educated within sexual education programs, consequently they cannot properly answer questions arising in class (Howard-Barr, Rienzo, Pigg & James, 2005). A positive approach is not enough to enable someone to teach information, attitudes, views on sexuality, teachers need the proper set of information at their disposal in this field, they need to develop skills and self-assurance as well (Mkumbo, 2012; Gonzales-Acquaro & College, 2009). According to Brown and Pirtle (2008) a set of factors determine the way sexuality is expressed and understood, such as culture, religion, social and economic situation, even history. In Romania, the Orthodox church has the greatest influence over political decision-making, in what pertains to sexual education and its specific topics (Turcescu & Stan, 2005). According to the results of another research (Ionescu *et al.*, 2019), age and religiousness are negatively correlated to views on and attitudes toward sexuality. Older and more religious teachers are much more conservative. Depending on the personal views and individual experiences of teachers in the field of sexuality, the content and style of their teaching may vary. Even if teachers recognize the necessity of sexual education, their majority reports difficulties in the teaching process, either due to a lack of proper scientific or personal training, or because of worries related to the eventual reactions from the families of their pupils (Maia *et al.*, 2015).

Contrary to the situation in Romania, in most European countries sexual education is compulsory at school (from 1955 in Sweden, 1970 in Austria, 1996 on Estonia, 1998 in France) and in certain countries the subject is taught in an interdisciplinary approach (the Netherlands, Finland) (BGZA, 2018). In Romania, in 2001 the optional subject “Health education in Romanian schools” was introduced, it was not compulsory, and it had to be opted for by schools, as it also depended on the expertise of teachers. Data show that only 7-9% percent of pupils have received health education. The last effective law (45/2020) required at least one session of “Life Education” per semester (which also includes sexual education) to prevent the spread of sexually transmitted diseases and teenage pregnancy.

According to the presently effective stance (decision reached in June 2022), sexual education within the frame of the subject “Life Education” can only be provided with parental consent and beginning from the age of 14 years, and the subject should ideally be taught by teachers of biology, psychologists or properly trained health workers. According to a survey performed in Romania (Oncioiu, 2021) 78% of the interviewed pupils would prefer the subject Sexual Education to be compulsory and also to be mainly taught at school. Pupils would like to know more on the prevention of pregnancy, venereal diseases and contraceptive methods. They would like to talk openly about the joys of the sexual act, the difficulties of

the first love-making, they would like to avoid being judged for beginning their sex life, and they would also prefer a safe space where to express their feelings, fears and curiosity.

Based on our results, the majority of teachers consider sexuality to be a natural part of a healthy life, and the subject should be approached both in family and in educational institutions from the earliest possible age. This is in accordance with the opinion of several professional fora (WHO, 2010) and with the results of other research as well (Varga-Tóth *et al.*, 2019, Hercz & Lassú, 2018). If training on sexual education were introduced in Romania, the majority of our respondents would gladly participate. Results called attention upon educational and pedagogical lacks in the field of reproductive life. The correction of this is a complex task. To solve this problem, a change of approach is needed within the educational system in the sense of accepting and following guiding lines based on scientific proof. Parents, teachers and educators need to be aware of the mental image children have of themselves, and the influence this image has upon the roles these children will adopt in society. Sexual education needs to be incorporated into the educational process with no delay, beginning from an early age (toddlers) and right until the age of young adults.

The conclusion reached here is the following: as sexual education is a multidimensional concept, it requires equally multidimensional and interdisciplinary approaches both in planning sexual education programs, in implementing them and in interpreting their results.

Acknowledgements

We would like to thank the teachers involved for filling out our questionnaires and Noémi László for her help in producing an English version of this paper.

References

- Adolescent pregnancy in Romania. UNICEF Report, January 2021, Accessed 05 September 2022, Retrieved from <https://www.unicef.org/romania/reports/adolescent-pregnancy-romania>
- Bersamin, M., Todd, M., Fisher, M. D. A., Hill, D.L., Grube, J. W. & Walker, S. (2008). Parenting practices and adolescent sexual behavior: A longitudinal study. *Journal of Marriage and Family*, 70(1), 97-112.
- Brown, R. D. & Pirtle, T. (2008). Beliefs of professional and family caregivers about the sexuality of individuals with intellectual disabilities: examining beliefs using a Q-methodology approach. *Sex Education*, 8, 59-75.
- Colarossi, L., Silver, L., E. J., Dean R., Perez, A. & Rivera, A. (2014). Adult Role Models: Feasibility, Acceptability, and Initial Outcomes for Sex Education. *American journal of sexuality education*, 9(2), 155-175.
- Goldman, J.D. (2008). Responding to parental objections to school sexuality education: A selection of 12 objections. *Sex Education*, 8, 415-438.
- Gonzalez-Acquaro, K. & College, W. (2009). Teacher Training, Sexuality Education, and Intellectual Disabilities: An Online Workshop. *Current Issues in Education*, 11(9), 1-24.
- Hercz, M. & Lassú, Zs. (2018). Kinek mi a dolga? Szülői nézetek a családi és intézményes szexuális nevelés feladatairól, tartalmáról. Változás az állandóságban: A Magyar Pszichológiai Társaság XXVII. Országos Tudományos Nagygyűlése, 71-72.
- Howard-Barr, E., Rienzo, B., Pigg, R. & James, D. (2005). Teachers' beliefs, professional preparation, and practices regarding exceptional students and sex education. *Journal of School Health*, 75(3), 99-104.
- Ionescu, C. E., Rusu, A. S. & Costea-Bărluțiu, C. (2019). Attitudes of Special Education teachers towards sexual education of students with intellectual disabilities: Effects of religiosity and professional experiences. *Educția 21 Journal*, 17, 102-111.
- Iorga, M., Pop, L. M., Gimiga, N., Păduraru, L., & Diaconu, S. (2021). Assessing the Opinion of Mothers about School-Based Sexual Education in Romania, the Country with the Highest Rate of Teenage Pregnancy in Europe. *Medicina*, 57(841), 13.
- Kilander, H. F. (1970). *Sex Education in the Schools—A Study of Objectives, Content, Methods, Materials and Evaluation*. The Macmillan Company.
- Maia, C., Yamauti, V. L., Schiavo, R. A., Capellini, V. L. M. & Valle, T. G. M. (2015). Teacher opinions on sexuality and Sexual Education of students with intellectual disability. *Estudos de psicologia (Campinas)*, 32(3), 427-435.
- Mkumbo, K. A. (2012). Teachers' Attitudes towards and Comfort about Teaching School-Based Sexuality Education. *Urban and Rural Tanzania*, 4(4), 149-158.

- Mocanu, L. (2018). Sex Education is considered a Taboo Subject in Schools from Romania. *New Trends in Psychology*, 13, 310-312.
- Noorman, M. A. J., den Daas, D. & de Wit, J.B.F. (2022). How Parents' Ideals are offset by uncertainty fears: A Systematic Review of the Experiences of European Parents regarding the Sexual Education of their Children. *The Journal of Sex Research*, 1-11.
- Oncioiu, D. (2021). "Unii s-au smintit de tot". Cum acționează rețeaua de influență care se asigură că educația sexuală nu ajunge în școli. *Jurnalul Decretului* la 22 octombrie 2022, retrieved from <https://jurnaluldecretului.ro/reteaua-de-influenta-impotriva-educatiei-sexuale>
- Pop, M. V., & Rusu, A. S. (2015). The role of parents in shaping and improving the sexual health of children / Lines of developing parental sexuality educational programs, *Procedia – Social and Behavioral Sciences*, 209, 395-401.
- R Core Team. (2021). R: A Language and Environment for Statistical Computing. Vienna, Austria, 2021. Accessed 02 August 2022, retrieved from <https://www.r-project.org/>
- Shtarkshall, R. A., Santelli, J. S. & Hirsch, J. S. (2007). Sex education and sexual socialization: Roles for educators and parents, *Perspect. Sex. Reprod. Health*, 39, 116–119.
- Szilágyi, V. (2003). A szexuális nevelés nálunk és másutt. *Új pedagógiai szemle*, 53(11), 104-107.
- Szilágyi, V. (2013). *Nemiségünk: sorsunk „alapköve” és kitöltendő kerete: válogatott írások egy életműből*. Szerző, Budapest.
- Turcescu, L. & Stan, L. (2005). Religion, Politics and Sexuality in Romania. *Europe-Asia Studies*, 57(2), 291-300.
- Varga-Tóth, A., Németh, G., & Paulik, E. (2019). Medical aspects of sexual education according to national data and international guidelines. *Orvosi Hetilap*, 160(13), 494–501.
- Vidourek, R. A., Bernard, A. L. & Ches, K. A. K. (2009). Effective parent connectedness components in sexuality education interventions for African American youth: A review of the literature. *American Journal of Sexuality Education*, 4, 225-247.
- Walker, J. (2004). Parents and sex education—looking beyond ‘the birds and the bees. *Sex Education*, 4(3), 239-254.
- WHO Regional Office for Europe and BZgA, Standards for Sexuality Education in Europe. A framework for policy makers, educational and health authorities, and specialists. Federal Centre for Health Education, BZgA, Cologne, 2010, Accessed 06 September 2022, Retrieved from <https://www.icmec.org/wp-content/uploads/2017/03/WHO-Curriculum-Matrix-for-CSE-in-Europe.pdf>

Contact email: noemi.szallassy@ubbcluj.ro

The Importance of Professional Self-Knowledge in the Initial and In-Service Training of Teachers

Noémi Birta-Székely, Babeş-Bolyai University, Romania

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Rogers's person-centered approach has had a major impact on the social professions and the methods used in this field, so I have tried to briefly present the methods that can be used in the initial and in-service training of teachers. As professional self-knowledge is an important area of becoming a teacher and pedagogical work, I emphasize the importance of this area in the initial and in-service training of teachers. In this research, I undertook to find a connection between teachers' professional self-awareness, mental health status and professional well-being. In my questionnaire, I used an adapted version of Jacqueline Royer's (2005) test of metamorphoses. The results allow us to conclude that most teachers in the sample have a need for mental health help, and in the absence of it, they see themselves negatively. In the case of the examined sample, the level of professional well-being is related to the years spent on the field and the state of mental health.

Keywords: Professional Self-Knowledge, Teacher Training, Person-Centered Approach

iafor

The International Academic Forum
www.iafor.org

Introduction

The importance of professional self-awareness and its development as an essential element of a teacher's career is outlined in the teacher training literature of the early 21st century (Diamond, 1991; Kagan, 1992; Winitzky&Kauchak, 1997). However, its uptake in teacher training practice is still lagging behind. In Romania, at the levels of training where it is present, it is not preceded by an individual or group experience of personal self-awareness, which would be an important basis and starting point for professional self-awareness. Of course, the two (personal and professional self-awareness) are intertwined, but from the point of view of training, it would be ideal for them to be built on each other.

Mental health, as one of the most important pedagogical competences of teachers, is becoming an increasingly widespread professional requirement in teacher training, although it is still being dealt with on the theoretical level. In Romania, there are few teacher training institutions that include educational units on self-awareness in their curricula. For the time being, the focus is on the development of reflection as an important pedagogical skill (Schön, 1983; Zeichner&Liston, 1996; Westbury, Hopmann & Riquarts, 1999) and the practical possibilities and methods of its development.

Theoretical Foundations and Scientific Significance

Carl Rogers's person-centred approach (2013) has had a significant impact on the helping professions in recent decades. The same is true for teacher training and the in-service training of teachers. A teacher's most important tool is their personality and therefore their mental health is of utmost importance. Through self-awareness activities and development, we can support teachers' mental health.

The person-centred approach (Rogers, 2013) is a way of being, whereby people living together turn towards each other as persons. According to this, every person is equally important, every individual and everyone's individuality must be respected, and everyone must be given the opportunity to develop and to receive attention. Rogers, drawing on his experience of leading person-centred group work, has provided a wealth of theoretical and practical insights into the legitimacy of this approach in areas where the personality of the professional is also a fundamental work tool. It is important that in the person-centred approach, the key factor of positive change in personality is primarily the individual and not the external conditions and influences (e.g., therapeutic methods). The importance of a person-centred approach to teacher training is supported by research on beliefs that appeared in the early 1990s (Pajares, 1992; Zhihui, 1996; Calderhead, 1996), showing that the teachers' preconceived beliefs influence their professional effectiveness. Exploring beliefs is therefore important, right from the start of training.

Person-centredness provides an excellent theoretical basis for the development of teachers' personal development and professional self-awareness. The person-centred approach originated in psychotherapy, but quickly spread to the social and educational arenas, where it took root in the orientation towards group methods and proved to be a powerful tool for building resilience in individuals and organisations. In later years, it also became the basis for development methods such as video training in schools, the Bálint group, the self-awareness psychodrama group, the Gordon method, encounter groups, bibliotherapy or the audio diary. (Brophy, 2004; Elder, 2007; Gordon, 2003; Káplár, Dorner, 2020; Birta-Székely, 2022a; 2022b).

Research Questions and Methods

The primary aim of this research is to explore the links between teachers' professional self-awareness and their mental health. I wanted to know how teachers who have been in the profession for several years see themselves, and whether the presence or absence of mental health support could be linked to this self-image or not. The research questions are the following:

1. Is there a correlation between professional self-awareness and mental health?
2. Does teaching experience influence mental health?

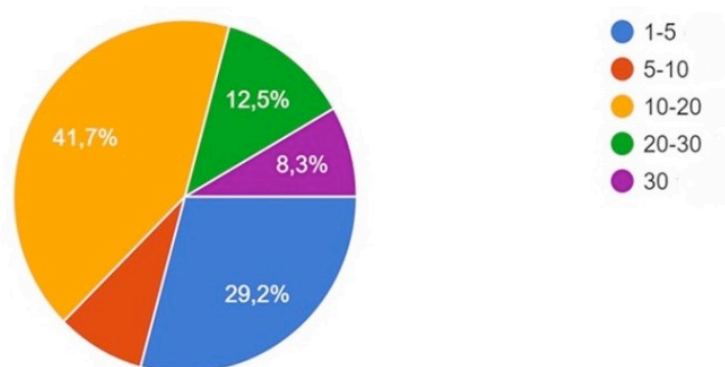


Figure 1: Teaching experience (N=157)

157 Romanian teachers participated in the questionnaire survey; the number of years in the profession is shown in Figure 1. 63% have more than ten years' experience.

I measured how teachers perceive themselves using an adapted version of Jacqueline Royer's Metamorphoses Test (1963). The personality test relies on symbolic thinking by switching off the control of rationality. It works similarly to role-playing, where stepping into someone else's shoes provides a shield in which the person can be more honest and braver about themselves. The test asks for identification across several categories, i.e., a positive response or a negative response in the same category (e.g., Which colour would you be and which not?).

I used three items of the personality test in my questionnaire (animal, object, famous person), but I was only interested in the negative object choices, and I processed the answers given to this. I used content analysis of metaphors to analyse. I classified participants' negative object choices into three categories: strongly negative, moderately negative, and neutral.

Results and Discussion

Based on content analysis and the summary of the negative choices (Table 1), 97% of teachers who have been teaching for more than ten years chose an object with strong or moderately negative content. Most of the objects in the neutral category (87%) were chosen by early career teachers.

What object would I NOT be?			
The analysis of metaphors			
Strongly negative	e.g. doormat, dustbin, dishwashing sponge, mop, toilet paper	45%	97% 10+ years teaching experience
Mildly negative	e.g. slippers, snow shovel, dagger, knife, needle, leaky jar	30%	
Neutral	e.g. mobile phone, pendulum clock, road, stationery, door knob	25%	87% under 10 years teaching experience

Table 1. What object would I NOT be?

As shown in Table 2, only 2% of participating teachers have used any mental health services in the last five years. Nevertheless, a larger proportion (69%) noted that they would have a great need for it. 2% chose self-awareness training as an answer to this question.

<i>Have you benefited from any mental health services in the last 5 years?</i>	
YES	NO
2%	98%

Table 2. Have you benefited from any mental health services in the last 5 years?

I also wanted to know what pedagogical and professional beliefs the participating teachers identified with. For this purpose, they had to choose between two quotes (Table 3). The Zsigmond M6ricz quote focuses on teaching, sharing knowledge, while the Karl Menninger quote focuses on the personality of the teacher. Teachers were almost evenly split between the two quotes, but the balance tipped towards the Menninger quote, with 59% choosing it, indicating that they believe the teacher's personality to be more important than what they teach. The respondents' teaching experience was not relevant in this case. It was interesting, however, that the majority of those who chose the Zsigmond M6ricz quote gave strongly negative answers in the metamorphosis test. This result can also indicate that teachers who focus professionally on teaching express their lower level of mental health through negative metaphors. Teachers who emphasise personality, chose moderately negative or neutral metaphors. This is since they are more conscious of themselves and their professional self-awareness. They were also the ones who indicated their need for mental health services.

Which of the following quotes is closest to your professional beliefs?	
"I believe that there is no greater joy than teaching someone something they don't know." (M6ricz Zsigmond)	41%
"The teacher personality is more important than what they teach." (Karl Menninger)	59%

Table 3. Professional beliefs

Conclusion

The results suggest that the teachers in the survey have a high need for mental health support, i.e., teachers need mental health support as much as any other helping profession. This can be started in early teacher training by using self-awareness activities, with an increasing shift towards professional self-awareness.

A further development of the research could be to include a larger number of items and a target group, such as university students, who would act as a control group of the above group with several years of teaching experience.

Acknowledgements

The research was carried out with the support of the Communitas Foundation travel program.

References

- Birta Székely, N. (2022a). Supporting teachers' professional self-awareness with bibliotherapy methods, ICERI2022 Proceedings, 6598-6605.
- Birta Székely, N. (2022b). Audio Diaries: Developing Pre-Service Teachers' Reflective Practices, Proceedings of The 5th World Conference on Future of Education, 1-8.
- Brophy, J. (2004). Using video in teacher education. Amsterdam, Netherlands: Elsevier.
- Calderhead, J. (1996). Teachers: Beliefs and knowledge. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (709–725). Macmillan Library Reference Usa; Prentice Hall International.
- Diamond, C. T. P. (1991). *Teacher Education as Transformation. A Psychological Perspective*. Milton-Keynes, Philadelphia, Open University Press.
- Elder, A. (2007). The Role of the Balint Group Leader. *Journal of the Balint Society*; 35: 15-18.
- Gordon T., Bruch, N. (2003). *Teacher Effectiveness Training, The Program Proven to Help Teachers Bring Out the Best in Students of All Ages*. Three Rivers Press.
- Káplár-Kodácsy, K., Dorner, H. (2020). The use of audio diaries to support reflective mentoring practice in Hungarian teacher training. *International Journal of Mentoring and Coaching in Education*, Volume 9. Issue 3. 257-277.
- Kagan, D. M. (1992). Professional growth among pre-service and beginning teachers. *Review of educational research*, 62, 129-169.
- Pajares, M. F. (1992). Teachers' Beliefs and Educational Research: Cleaning Up a Messy Construct. *Review of Educational Research*, 62(3), 307–332.
- Rogers, C., Lyon, H., C., & Tausch, R. (2013). *On Becoming an Effective Teacher—Person-centered Teaching, Psychology, Philosophy, and Dialogues with Carl R. Rogers and Harold Lyon*. London: Routledge.
- Royer, J. (1963). Le test des métamorphoses. In: *Bulletin de psychologie*, tome 17 n°225. Psychologie projective - théories et techniques, 358-360.
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.
- Westbury, I., Hopmann, S., & Riquarts, K. (Eds.). (1999). *Teaching as a Reflective Practice: The German Didaktik Tradition* (1st ed.). Routledge.
- Winitzky, N. & Kauchak, D. (1997). Constructivism in Teacher Education: Applying Cognitive Theory to Teacher Learning. In V. Richardson (Ed.), *Constructivist Teacher Education: Building New Understandings* (59-83). Washington, D.C.: The Falmer Press.

Zeichner, K. M., & Liston, D. P. (1996). *Reflective teaching: An introduction*. Mahwah, NJ: Erlbaum.

Zhihui F., (1996). A review of research on teacher beliefs and practices, *Educational Research*, 38:1, 47-65.

Contact email: noemi.birta@ubbcluj.ro

Exploring Content and Tools Tailored on Gen Z University Courses: A Case Study

Franca Cantoni, Università Cattolica del Sacro Cuore, Italy
Barbara Barabaschi, Università Cattolica del Sacro Cuore, Italy
Roberta Virtuani, Università Cattolica del Sacro Cuore, Italy

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

University education plays a crucial role in the development of young individuals, serving as a vital foundation. However, it is not uncommon for there to be a concealed sense of discontentment regarding the quality of services provided by universities. Because of Generation Z (Gen Z) members particular traits, traditional methods to course design are sometimes criticized for being excessively theoretical and disconnected from reality. The suggested set of guidelines reverses the conventional training cycle to solve these problems by beginning with a study of Generation Z students' requirements and preferences. To engage students and close knowledge gaps, the set stresses the value of employing a multimodal strategy that incorporates ad-hoc material, flipped classrooms, massive open online courses (MOOCs), gamification, and imitating reality in a trading room. A case study of a finance course that was developed using these suggestions - and might perhaps serve as the basis for a new university policy that better meets the needs of students - is presented. Conclusions underline the importance to personalize educational programs and teaching methods to the students features and needs in order to optimize learning outcomes.

Keywords: Analysis of the Needs, Course Design, Gen Z, Money Management Perspective, Student's Experience

iafor

The International Academic Forum
www.iafor.org

Introduction

When prospective young students choose a university course, they consider a multitude of features to ensure the best fit for their educational and career goals, such as courses that align with their interests, passions and career aspirations (Ma et al., 2021; Baert et al. 2021) and simultaneously they value the academic reputation of both the university and the specific program along with faculty's teaching methods, accessibility, and support significantly influence their choice (Breen, 2003).

Career prospects associated with the chosen course are of great importance to young consumers. They consider the university's industry connections, availability of career services, internships, and job placement rates. They may also research the university's alumni network and success stories of graduates in their desired field (Fischer, Gorshko et al., 2021).

Support services and campus life also weigh heavily in the decision-making process. Young consumers consider the availability of counselling, academic advising, mentorship programs, and extracurricular activities. The overall campus life, including student organizations, clubs, sports facilities, and the general atmosphere of the university, play a significant role in their choice.

This study contributes to the ongoing conversations on how the typifying features of Generation Z are driving universities to redefine their teaching models to engage a student population that has undergone profound changes.

By examining these areas, we aim to provide insights into how universities can better cater to the evolving needs and preferences of young consumers in the realm of higher education by focusing on the aspects of course content and tools.

In this paper we propose a set of guidelines based on reversing the Universities' training cycle, starting from the analysis of the needs of the students who are currently going through the university process to define contents effective in healing the knowledge and skills gap surveyed. We consider the needs of generation, intended not simply as a question of age: according to Pilcher (1994) social generations are "*cohort members who have similar attitudes, worldview and beliefs grounded in their shared context and experiences accumulated over time*" (p. 482). Students who are now taking college courses belong to the Z Generation (students born 1996-2010). They have easy, facilitated access to technology and are characterized by an instant ability to retrieve and transmit information. It is unthinkable that these features do not influence their learning style (Bouilheres & McDonald, 2020).

Among several courses, we decided to focus on a finance course. Gen Zers grew up during the recession of 2007–2009, during which they witnessed adults experiencing financial trouble and employment instability. As they began to grow up, the Gen Zers wanted to avoid the difficulties that plagued the generations before them. Finance plays a central role in everyone's life and in the curriculum of a business school where it carries several credits (Squires & Ho, 2023).

Considering these factors, we contend that it is critical to comprehend, evaluate, and analyse Generation Z's money management perspective (MMP) to build "fit-for-purpose" financial courses that can pique their interest and appeal. The training needs analysis (TNA) process might begin with this analysis and assessment. Being a personal, subjective attitude, it varies from person to person as well as broadly and more generally from generation to generation.

Given that the absence of money management skills could have negative effects on an individual's life our research aims to understand the role that universities can take in developing and consolidating the Gen Z's MMP by offering a multimodal approach to bring it closer to the world of asset management. This study is based on the same database used by Lippi and Rossi (2022) through the administration of a questionnaire that together we constructed and validated.

The paper is organised as follows: the first paragraph highlights the need to change learning tools and methods according to Gen Z way to line, while the second analyses the MMP based on recent literature and the third presents the research method. The fourth proposes the findings that confirm the validity of our study while with the fifth chapter we suggest a “fit-for-purpose approach” to design a finance course. Some limits and suggestions for future research are discussed in the final paragraph.

1. The Evolution of Learning Tools and Methods and the “Student Experience”

Final evaluations collecting course satisfaction represent a critical moment for the traditional teacher: the three themes that reoccur most frequently are general discontent, a high dropout rate, and low involvement (Levander, 2022). This is followed by final exam results that reflect neither the teacher's expectations of the class nor the expectations of the student who must concentrate all the efforts in a single final test (Borch et al., 2020). The disparity between the student and instructor, who interact according to rigorous and predetermined patterns, tools, and duties, is most likely also to blame for this mismatch of expectations (Nairz-Wirth & Feldmann, 2017).

Traditional teaching also proved to be poorly effective in pandemic times where classroom conditions for face-to-face lectures could not be perfectly recreated: the mediation of the technological tool proved useful and essential but not fully effective (Fernández-Castro, 2022; Ma et al., 2022).

Adoption of blended methods and tools can lead to greater and reciprocal benefits. According to Sowl et al. (2022) blended learning merges scenarios where online, physical, and working settings are present. It also involves instructors and students in experiential learning. Zimmerman & Schunk (2008) noted a cyclical causal relationship between students' motivation, conduct, and feedback from their teachers. In response, the instructor's effort, persistence, and enthusiasm for teaching are influenced by the students' feedback and performance in a reciprocal manner.

Some innovations in pedagogy have occurred and produced a variety of alternatives to traditional lecture-based teaching formats. On the other side, Gen Zs are recognized as the first generation to regard the physical and digital world as borderless (Garver et al., 2022), actively involved in the definition of their learning preferences (Mijatovic, 2020) and with a preference for technologically mediated communication and interaction.

Universities must thus alter their teaching-learning approaches and achieve a balance in combining. They must include technology, social media, and networking, and they must be more interactive, visible, and instantly available with information.

Technologies can also help students become more involved in the learning process. By collaborating with instructors to create their own learning experience, they might become

active participants. Students' participation in co-creation processes encourages meaningful learning opportunities by recognizing student voices, according to constructivist learning theory, which holds that learners generate knowledge and meaning from lived experiences rather than from passively absorbing information.

We thus employed a questionnaire to explore the lived experiences, preferences, and family financial practices of students as part of our study design. They could feel defeated if they are asked to co-create but then are not given time to consider how it went. Such reflections benefit students' metacognitive development while also giving teachers insightful feedback (Bovill, 2020).

While there has been a lot of writing in the literature about tools (Al-Samarraie & Saeed, 2018) and benefits (Burvill et al., 2022), there has been a dearth of research on appropriate content for Generation Z. The main drawback of blended techniques is the increased focus on tools as opposed to content (Viebig, 2002).

Our hypothesis is founded on the premise that a "fit-for-purpose" course finds its foundation in the study and evaluation of the demands, which can interest and actively engage students and teachers and so favorably effect reaction. The first phase of the Training Needs Analysis (TNA) (Moore & Dutton, 1978; Clarke, 2003) in this instance takes the shape of a fact-finding conversation. Students enrolled in a Faculty of Economics serve as the sample population for our study's analysis, which employs a case study of finance courses at a university as its context. The goal is to identify the gaps that Gen Z students have in terms of managing their savings, investments, and money in order for the institution to provide adequate instruction and resources.

2. Unpacking and Analysing the MMP: Aim of the Research and Methodology

To define suitable course content, it is first necessary to identify the knowledge and skill gaps of the participants (Cilliers, 2017). For this reason, we contend that understanding the gaps of the participants—in our instance, members of Generation Z—is crucial for the aim of building a finance course. Therefore, we begin by getting a sense of how they view financial management.

Numerous studies show that a person's financial well-being is strongly influenced by their attitude about money. The literature has highlighted several parameters that can influence the MMP, such as age (Bamforth & Geursen, 2017), gender (Pahlevan-Sharif et al., 2020), income, financial education (Bernheim et al., 2001; Boon et al., 2011; Kaiser & Menkhoff, 2017; Lusardi et al., 2010), the family role (Gudmunson & Danes, 2011; Jorgensen & Jyoti, 2010; Xiao et al., 2009), and psychological factors such as self-efficacy and self-regulation (Tang & Baker, 2016).

This research investigates the MMP of the next generation of investors as a first step in building the content of a finance course in line with the characteristics and expectations of Generation Z, that is, the generation of students who are currently taking college courses.

As highlighted in the previous paragraph, the abundance of literature on the subject invites us to focus the TNA on a few drivers. In this regard, the following research questions was “Which factors influence the Gen Z’s MMP?”

To complement the MMP analysis, we are also investigated if Gen' Zs have developed their own (autonomous) management style or if they rely on trusted family financial advisors, with the second research question "Does Gen Z rely on a trusted family financial advisor?"

The sample used in the survey was composed of 273 students from a faculty of Economics and Law. To allow results generalization, the respondents belonged to different ethnic groups, came from various backgrounds, and had pursued their higher education studies nationally and internationally. They have been chosen as representative of a population familiar with management, investment, and savings topics (Uzelac & Lučić, 2020).

Students did not receive any response incentives but simply an invitation to collaborate through their institutional emails, preceded by a concise explanation on the general objectives of the research carried out by the teacher in the classroom.

The questionnaire, submitted online, was organized in three sections:

- 1) details on the respondents' attitudes toward money, savings, and investments, as well as the role that families play;
- 2) details on the sources of financial resources that respondents can access, to gauge their level of independence, and details on how they save money;
- 3) sociodemographic details and the make-up of the families¹.

3. Findings and Proposal of a Multimodal Approach to Craft a "Fit-for-Purpose" University Course

The survey conducted clearly shows that Gen Z is approaching savings in a deconstructed way and without a clear vision of future scenarios, not assisted or supported by any financial advisor or even in touch with their family's one.

The empirical analysis, like that of Lippi and Rossi (2022) reveals trends consistent with the main literature on young people's financial behaviour, highlighting the positive role of education and available income. Interestingly, it also shows contradictory results on gender (there is no distinction between males and females) and the influence of family. Respondents do not share financial decisions with parents, and this is probably due to their specific education.

Universities should take these peculiarities into account when designing pedagogical tools.

¹ We ran the following logit regression:

$$MMP_i = \sum_{k=1}^n \beta_k X_{k,i} \sum_{y=1}^m \beta_y Z_{y,i} + \varepsilon_i$$

where:

- MMP represents the positive attitude to managing money from the perspective of i ;
- X_k are the n respondents' objective status variables;
- Z_y are the m respondents' personal judgements;
- ε_i denotes the error component at the respondent level.

MMP VARIABLES	GEN Z FEATURES	CONTENTS	LEARNING OUTCOMES
(+) family comfort (+) Monitoring (+) Save_products (+) Economic Autonomy Age Gender Mother_job (-) Consultants	<div>Customization</div> <div>Sustainability</div> <div>Privacy and security</div> <div>Mobility/Connectivity</div> <div>Interactive experiences</div>	<div>Introduction to Personal Finance</div> <div>Autonomy in Finance</div> <div>Monitoring Your Finances</div> <div>Saving Products</div> <div>Managing Debt</div> <div>Building Wealth</div> <div>Ethics and Responsibility in Finance</div> <div>TOOLS</div> <div>Flipped classromms</div> <div>MOOCs</div> <div>Chat GPT</div> <div>Gamification</div> <div>Trading rooms</div>	<div> Awareness (improved financial literacy, increased confidence, greater financial responsibility, improved financial habits, increased interest in financial-related careers) </div> <div> Knowledge (knowledge of financial concepts, understanding of financial risks, knowledge of financial regulation, understanding of personal finance) </div> <div> Competencies (financial planning skills, investment skills, financial analysis skills, communication and teamwork skills) </div>

As shown in Tab. 1, the results emerged from the survey on MMP place universities in the position of having to think about the adoption of proper contents and tools suitable for providing Gen Z with correct, gradual, and effective learning outcomes on financial wealth.

Table 1. – Contents, tools and learning outcomes

3.1 Learning Outcomes, Contents and Tools

The learning outcomes are represented by three aspects: awareness, knowledge, and competences (as described by Allan in 1996 and Svanström et al. in 2008). Being aware entails having the capacity to increase one's financial literacy, experience stronger levels of self-assurance, and exercise greater fiscal responsibility. Students may find themselves more motivated to save money and stay out of debt if they comprehend the effects of their financial actions and learn how to plan ahead. Students get new understanding from the financial course, which covers topics including budgeting, saving, investing, credit, and debt management. The financial system, financial goods, financial rules, and the function of financial institutions are all things they could learn about. Students should be able to put what they have learnt into practice during the course, improve existing competences, and pick up new skills including collaboration, communication, and financial planning, investment, and analysis.

Among the elements that affect MMP Universities can work to develop content that combines monitoring, save_products, and autonomy (being obviously unable to act on family comfort) by choosing effective teaching strategies to elicit a favourable response from students, interest in the material, and a change in saving and investing habits.

Introduction to Personal Finance
The importance of personal finance
Understanding the basics of budgeting
Developing a financial plan for the future
Autonomy in Finance
Understanding financial independence
Building a credit score and how it affects financial autonomy
Setting financial goals and creating a plan to achieve them
Monitoring Your Finances
Understanding income and expenses
Budgeting tools and apps
Tracking your spending and staying on track
Saving Products
Types of savings accounts and their benefits
Investing for the future
Understanding the stock market and other investment options
Managing Debt
Understanding types of debt
Strategies for paying off debt
How to avoid debt and stay financially healthy
Building Wealth
Understanding the difference between saving and investing
How to build a diversified investment portfolio
Long-term investment strategies for building wealth
Ethics and Responsibility in Finance
The importance of responsible financial decision-making
Ethical considerations in investing and personal finance
Using your financial resources to create positive change

Finally, we discussed the development of pertinent contents that consider autonomy, monitoring, and product saving—the three factors that positively affect the MMP. In Tab. 2 a proposal is summarized:

Table 2 – Proposal of contents tailored on Gen Z's MMP

This frame could then be developed in a customised manner according to the characteristics of the specific class (bachelor or master).

In this paper, we suggest the use of flipped classes using massive open online courses (MOOCs) and gamification as novel techniques to encourage young people's learning processes on monitoring and save products and to provide university students with a comprehensive financial education.

Flipped classrooms make inventive use of time while skillfully utilizing technology to promote learning processes (Roblek et al., 2019). Students are expected to actively engage with the material they have already acquired through remote activities during class, with professors supporting them in the mechanisms of processing and consolidation (F2F session).

MOOCs, or massive open online courses, can be utilized to help students build the core knowledge foundation necessary for eventual active engagement in the class (Wang & Zhu, 2019). Group projects may be used to learn, and the instructor can support the students by providing scaffolding, one-on-one assistance, and opportunities for idea development and sharing. Flipped classrooms can also represent a solution for unengaged students in that increased opportunities to collaborate with peers can improve motivation and engagement, increase the sense of responsibility, and decrease the fear of individual failure (Swart & Wuensch, 2016).

Gamification, which is the integration of game aspects into non-game situations, is another technique that may be used to include young people in the "monitoring" and "savings" learning process. It has been demonstrated that playing board games, acting out roles, and playing 2D or 3D digital games may increase student engagement and promote learning. All of these games increase perseverance and shorten the feedback loop, giving students the chance to reflect on their progress and identify any areas for improvement by putting new ideas into practice. Gamification helps pupils to learn by doing in more sophisticated disciplines like finance (Johnson & Sherraden, 2007).

Conclusions and Implications for Practice

Offering great, high-quality services may be a differentiating feature in a market for university training offers that is becoming more competitive, fragmented, and diverse. Student happiness is a key factor in the evaluation of a university course.

In developing the general culture of future generations, universities are important players. The learning potential of Gen Z is overly constrained by traditional teaching approaches. Along with the content, new teaching methods like gamification, flipped classrooms with MOOCs, and virtual trading rooms can be useful in engaging students and fostering financial education.

This strategy is not the sole domain of a single course; rather, it forms the foundation of a whole university's culture and mission. In order to be effective, it needs an institution-wide plan and adequate funding. The essential shift is anything but quick; it calls for a review of long-standing paradigms and enough lead time to allow for the smooth introduction of new educational instruments. It demands a substantial investment in specialized and practical teacher training (instruction is more participatory, technical, and less frontal).

However, it is challenging to carve out enough time to reflect in-depth on teaching given that the academic system is significantly raising the bar for research quality assessment. The university, the faculty, and the students may all profit greatly from this new method of teaching, notwithstanding potential resistance to change on the side of the staff.

From the perspective of educational institutions, developing courses that focus on Gen Z's features can deliver advantages by:

- improving the quality of the service offered and the satisfaction indicators with respect to accreditation processes and competition of web initiatives that are becoming more and more appealing;
- attracting new engaged students and decreasing drop-out rates;
- strengthening the student-teacher relationship;

The teacher may spend less time preparing lectures (using it for research) and receive more stimulating input when students contribute actively and richly in class. Some universities created "centers for teaching innovation" with experts who work as teachers to address this need.

From the viewpoint of students, they may concentrate on learning, literacy, and life skills by connecting the subject matter knowledge to practical applications and issue scenarios, creating a sort of "synergistic combo". High levels of contact help students develop personally as they work together with lecturers and peers. They speak out, provide suggestions, exercise their imagination, get over their shyness, developing skills useful also into the labor market. Students

in Generation Z must be more visual, interactive, have access to knowledge instantly, and, most importantly, integrate technology and social media/networking. To assist universities tailor their responses, they also want, and now may be included in the decision-making and implementation processes (Ng & Forbes, 2009). This change of strategy may also serve as motivation for the instructor from the standpoint of lifelong learning and as a type of reverse mentorship used in commercial settings to facilitate intergenerational cooperation. Even a technological improvement is more powerful if it is coupled with the development of life skills and if it stimulate learning processes in favor of all actors involved (students, teachers, university administrators).

For all these reasons, our work is an example of management for stakeholders (Barabaschi, 2020) addressed to social and economic sustainability, having the wider aim to foster changes in educational institutions culture and policy.

References

- Allan, J. (1996). Learning outcomes in higher education, *Studies in Higher Education*, 21(1), 93-108, DOI: 10.1080/03075079612331381487
- Al-Samarraie H. & Saeed N. (2018). A scoping review of cloud computing tools for collaborative learning: Opportunities and challenges to the blended-learning environment. *Computers & Education*, 124, 77-91
doi:10.1016/j.compedu.2018.05.016
- Baert S., Neyt B., Siedler T., Tobback I., Verhaest D., (2021). Student internships and employment opportunities after graduation: A field experiment, *Economic of Education Review*, 83, 2-11.
- Bamforth, J., & Geursen, G. (2017). Categorising the money management behaviour of young consumers. *Young Consumers*, 18(3), 205–222. <https://doi.org/10.1108/YC-01-2017-00658>
- Barabaschi B., (2020). *Management for stakeholder approach for a socially sustainable governance of megaprojects*, in Cantoni F., Favari E., Large Engineering Project Management, Springer, Switzerland, 2020: 27-42.
- Bernheim, B. D., Garrett, D. M., & Maki, D. M. (2001). Education and saving: The long-term effects of high school financial curriculum mandates. *Journal of Public Economics*, 80(3), 435–465. [https://doi.org/10.1016/S0047-2727\(00\)00120-1](https://doi.org/10.1016/S0047-2727(00)00120-1)
- Boon, T. H., Yee, H. S., & Ting, H. W. (2011). Financial literacy and personal financial planning in Klang Valley, Malaysia. *International Journal of Economics and Management*, 5(1), 149–168.
- Borch, I., Sandvoll, R. & Risør, T. (2020). Discrepancies in purposes of student course evaluations: what does it mean to be “satisfied”? *Educational Assessment, Evaluation & Accountability*, 32, 83–102.
- Bouilheres, F., Le, L.T.V.H., McDonald, S. et al. (2020). Defining student learning experience through blended learning. *Education and Information Technologies*, 25, 3049–3069.
- Bovill, C., (2020). Co-creation in learning and teaching: the case for a whole-class approach in higher education. *Higher Education* 79(1). doi:10.1007/s10734-019-00453-w
- Breen R. (2003). Attracting the right students to University courses. *Planet*, 9(1), 15-17, DOI:10.11120/plan.2003.00090015
- Burvill, S., Owens, S., & Organ, K. (2022). The digital explosion: It's impact on international student achievement. *International Journal of Management Education*, 20(1), 100585. doi:10.1016/j.ijme.2021.100585
- Cilliers E.J., (2017). The challenge of teaching generation Z. *PEOPLE: International Journal of Social Sciences*, 3(1), 188-198.

- Clarke, N. (2003). The politics of training needs analysis. *Journal of Workplace Learning*, 15(4), 141–153. <https://doi.org/10.1108/13665620310474598>
- Fernández-Castro, A. M., Sánchez-Cabrero, R., Eiadat, Y. H. (2022). Academic impact of sudden and unforeseen changes in the learning environment due to the COVID-19 pandemic. *International Journal of Innovation and Learning*, 32(4), 380-396. doi:10.1504/ijil.2022.126631
- Fischer A., Gorshkov A., Tr'ondur M. Sandoy, & Walldorf J.(2021). Peers and Careers: Labour Market Effects of Alumni Networks, Conference.iza.org.
- Garver, M., Divine, R., & Dahlquist, S. (2022). Analysis of Gen Z Marketing Student Preference for Different Instructional Methods: An Abstract. *Developments in Marketing Science: Proceedings of the Academy of Marketing Science*. Springer Nature, 393-394. https://doi.org/10.1007/978-3-030-95346-1_126
- Graham, J. F., Stendardi, E. J., Myers, J. K., & Graham, M. J. (2002). Gender differences in investment strategies: An information processing perspective. *International Journal of Bank Marketing*, 20(1), 17–26. <https://doi.org/10.1108/02652320210415953>
- Gudmunson, C., & Danes, S. (2011). Family financial socialization. Theory and critical review. *Journal of Family and Economic Issues*, 32(4), 644–668. <https://doi.org/10.1007/s10834-011-9275-y>
- Johnson, E., & Sherraden, M. S. (2007). From financial literacy to financial capability among youth. *The Journal of Sociology & Social Welfare*, 34(3), Article 7. <https://scholarworks.wmich.edu/jssw/vol34/iss3/7>
- Jorgensen, B. L., & Jyoti, S. (2010). Financial literacy of young adults: The importance of parental socialization. *Family Relations*, 59(4), 465–478.
- Kaiser, T., & Menkhoff, L. (2017). Does financial education impact financial literacy and financial behavior, and if so, when? *The World Bank Economic Review*, 31(3), 611–630. <https://doi.org/10.1093/wber/lhx018>
- Kirkpatrick, D. L., & Kirkpatrick, J. D. (2006). *Evaluating training programs: The four levels* (3rd ed.). Berrett-Koehler Publication.
- Levander, S. (2022). Construction of educational proficiency in academia: peer review of educational merits in academic recruitment in Sweden. *Education Inquiry* 13(2), 151-168.
- Lippi, A., & Rossi, S. (2022). Next generation investors and financial advice consumption: An empirical analysis. *International Journal of Financial Research*, 13(2).
- Lusardi, A., Mitchell, O. S., & Curto, V. (2010). Financial literacy among the young. *Journal of Consumer Affairs*, 44(2), 358–380.

- Ma, B., Lu, M., Taniguchi, Y. et al., (2021). Investigating course choice motivations in university environments. *Smart Learning Environments*, 8(31).
<https://doi.org/10.1186/s40561-021-00177-4>
- Ma, G., Yang, R., Minefield, A., Gu, X., Gan, Y., Li, L., & Wu, Y. (2022). A practical analysis of blended training efficacy on organizational outcomes. *Industrial and Commercial Training*, 54(4), 637-646. doi:10.1108/ICT-12-2021-0085
- Moore, M. L., & Dutton, P. J. (1978). Training needs analysis: Review and critique. *Academy of Management Review*, 3, 532–545.
- Nairz-Wirth, E., & Feldmann, K., (2017). Teachers' views on the impact of teacher–student relationships on school dropout: a Bourdieusian analysis of misrecognition. *Pedagogy, Culture & Society*, 25(1), 121-136. Doi: 10.1080/14681366.2016.1230881
- Ng, C.L., & Forbes, J., (2009). Education as Service: The Understanding of University Experience Through the Service Logic, *Journal of Marketing for Higher Education*, 19(1). doi:10.1080/08841240902904703
- OECD (2018). Effective financial education for sustainable and inclusive growth, 5th OECD-GFLEC Global Policy Research Symposium to Advance Financial Literacy. Proceedings, Paris, 18 May. <https://www.oecd.org/daf/fin/financial-education/FinLit-Paris-2018-Proceedings.pdf>
- Pahlevan-Sharif, S., Ahadzadeh, A. S., & Turner, J. J. (2020). Gender differences in financial literacy and financial behaviour among young adults: The role of parents and information seeking. *Journal of Family Economic Issues*, 41, 672–690.
- Pilcher, J. (1994). Mannheim's sociology of generations: An undervalued legacy. *British Journal of Sociology*, 45(3), 481–495.
- Roblek V., Mesko M., Peterlin J. (2019). Smart technologies as social innovation and complex social issues of the Z generation. *Kybernetes*, 48(1), 91–107.
- Sowl, S., Amrein-Beardsley, A., Collins, C. (2022). Teaching program evaluation: How blending theory and practice enhance student-evaluator competencies in an education policy graduate program. *Evaluation and Program Planning*, 94
doi:10.1016/j.evalprogplan.2022.1021
- Squires, S. & Ho, H.W.L. (2023). Generation Z's perceptions and attitudes toward debt: a case study of young consumers in rural Michigan, USA. *Young Consumers*, 24(2), 133-148. <https://doi.org/10.1108/YC-07-2022-1567>
- Svanström, M., Lozano-García, F.J., Rowe, D. (2008). Learning outcomes for sustainable development in higher education, *International Journal of Sustainability in Higher Education*, 9(3), 339-351.
- Swart, W., & Wuensch, K. L. (2016). Flipping quantitative classes: A triple win. *Decision Sciences Journal of Innovative Education*, 14(1), 67-89. doi:10.1111/dsji.12088

- Tang, N., & Baker A. (2016). Self-esteem, financial knowledge and financial behavior. *Journal of Economic Psychology*, 54, 164–176.
- Uzelac, M., & Lučić A. (2020). The investigation of saving habits of Generation Z's young adults. In *Proceedings of the 35th International Business Information Management Association Conference (IBIMA)*, 1-2 April 2020, Seville, Spain (14940–14952).
- Viebig, C. (2022). "Blended learning in entrepreneurship education: a systematic literature review", *Education + Training*, 64(4), 533-558. <https://doi.org/10.1108/ET-05-2021-0164>
- Wang, K., & Zhu, C. (2019). MOOC-based flipped learning in higher education: Students' participation, experience and learning performance. *International Journal of Educational Technology in Higher Education*, 16(33), 1–18.
- Xiao, J. J., Tang, C., & Shim S. (2009). Acting for happiness: Financial behavior and life satisfaction of college students. *Social Indicators Research*, 92(1), 53–68.
- Xiao, H., & Xin, Z. (2022). Financial literacy is better than income to predict happiness. *Journal of Neuroscience, Psychology, and Economics*, 15(3), 119–136.
- Zimmerman, B. J., & Schunk, D. H. (2008). Motivation: An essential dimension of self-regulated learning. In D. H. Schunk & B. J. Zimmerman (Eds.), *Motivation and self-regulated learning: Theory, research, and applications* (pp. 1–30). Mahwah, NJ: Erlbaum.

Contact email: barbara.barabaschi@unicatt.it

An Italian Large Case Study on Emergency Remote Teaching: Factors and Predictors Which Affect Higher Education Students' Attitude

Matteo Bozzi, Politecnico di Milano, Italy

Roberto Mazzola, Politecnico di Milano, Italy

Italo Testa, Università Federico II, Italy

Juliana Elisa Raffaghelli, Università degli Studi di Padova, Italy

Susanna Sancassani, Politecnico di Milano, Italy

Maurizio Zani, Politecnico di Milano, Italy

The Paris Conference on Education 2023

Official Conference Proceedings

Abstract

In the last few years many studies on concerns about Emergency Remote Teaching have been implemented, but few focused on the Italian academia. The present large case study involved 3,670 undergraduate and postgraduate learners enrolled on both Architecture and Engineering at the Politecnico di Milano. It aimed to investigate their assessment of remote teaching through an online questionnaire, with reference to changes in their subjective perception of difficulties in the switch from in-presence to remote teaching. Students' opinion was expressed based on a five-point Likert scale. The overall questionnaire, consisting of 66 items which referred to 6 different constructs, was empirically validated through factor analysis and a positive reliability analysis was completed. Our results highlighted that the overall participants' perception of difficulties worsened. These findings did not depend on the students' educational level of degree, while the faculty which they were attending influenced the females' evaluation. While females enrolled on Architecture did not appear to suffer the change of educational approach, the subjective perception of the ones enrolled on Engineering was markedly worse. On the contrary, faculty did not seem to influence the males' opinion, which was negative but not as negative as the opinion expressed by the females enrolled on Engineering.

Keywords: COVID-19, Distance Learning, Online Education, Online Learning, Remote Learning, Emergency Remote Teaching, Online Teaching, Higher Education, Engineering, Architecture

iafor

The International Academic Forum

www.iafor.org

Introduction

The 21st century has just begun. Yet we are all witnesses to an epochal event which will probably feature in history books. In December 2019 a sequence of pneumonia cases of unknown origin occurred in Wuhan, Hubei, China: a new coronavirus, later named SARS-CoV-2 (Severe Acute Respiratory Syndrome-Corona Virus-2), was circulating and spreading at an inconceivable rate (Huang et al., 2020; Yang et al., 2020). Before long this virus spread throughout the world, becoming a global health emergency which was declared a pandemic by the World Health Organization on 11th March 2020 (World Health Organization, 2020a, 2020b).

Among the most notable consequences of this worldwide sanitary crisis, we may include its dire impact on the education systems of almost every country all over the world (Aristovnik et al., 2020; Chierichetti & Backer, 2021; Colclasure et al., 2021; Gillis & Krull, 2020; Kuhfeld et al., 2020; Owusu-Fordjour et al., 2020). To tackle the crisis and limit the viral circulation, indeed, many countries of all continents decided to close their educational institutions (Bond et al., 2021; Chou & Chou, 2021; Costado Dios & Piñero Charlo, 2021; Crawford et al., 2020; Education Bureau, Government Secretariat (Hong Kong), 2020; König et al., 2020), with a consequent and sudden transition from in-presence to distance learning. To understand the true dimension of this phenomenon, 1,598 billion students from 194 countries were affected by the closure of education institutions in April 2020 (UNESCO, 2020), while at the beginning of 2021 the number of learners forced not to attend them was still 250 millions (Tang et al., 2021).

In this panorama, Italy was an interesting case due to the fact that it was probably the first Western nation hit by the COVID-19 pandemic and one of the most seriously affected by its huge wave (Crawford et al., 2020). Before the declaration of pandemic by the World Health Organization, the Italian government had already adopted a nationwide lockdown since 9th March 2020 (Italian Prime Minister, 2020a); consequently, schools of every order and tertiary education institutions were forced to adopt distance learning abruptly, which was later identified by Hodges et al (Hodges et al., 2020) as an Emergency Remote Teaching (ERT). Despite the gradual easing of the most stringent restrictions from May 2020 (President of the Italian Republic, 2020), the academic year ended in the online modality. Moreover, on account of the cyclical worsening of the health emergency (Italian Prime Minister, 2020b, 2020c, 2020d, 2020e; President of the Italian Republic, 2021), remote and blended learning were adopted also in the following academic year, until July 2021.

In the Italian academic scenario, hegemonically dominated by the traditional methodology of transmittal lectures in a number of programmes, despite some exceptions (Bozzi et al., 2018, 2019; Bozzi, Ghislandi, et al., 2021; Bozzi, Raffaghelli, et al., 2021; Zani & Bozzi, 2018), this sudden health emergency forced higher education institutions to experience new educational approaches for a long time. Although the acute phase of COVID-19 emergency appears to be behind, the students' opinion about the remote and blended learning experienced during the pandemic should be analysed to better design the new academic courses of the next years. Given the fact that ERT was associated with social isolation and the connected stressful consequences on students and teachers (Chen & Lucock, 2022), it is extremely important to identify the factors affecting students' experiences, and to understand the predictors that have influenced their perception of teaching and learning during that period. Indeed, the pandemic may represent an extreme scenario in which researchers can investigate how students respond to innovation in teaching and learning methodologies.

In the present research we examined the remote teaching adopted during the COVID-19 pandemic at the Politecnico di Milano, the largest Italian university which offers Architecture, Design and Engineering degrees. The study, which was conducted in the second term of the academic year 2019- 2020 and across the next academic year 2020-2021, focused on both Architecture and Engineering students' evaluation of ERT, with specific reference to changes in their subjective perception of difficulties in the passage from pre-pandemic teaching methodology to remote teaching. The research questions (RQ) were:

- (RQ1) Did the Politecnico di Milano students' perception of difficulties change in the switch from in-presence educational strategy to remote instruction?
- (RQ2) If this is the case, did the perceived difficulties increase or decrease?
- (RQ3) How were these results influenced by independent variables like faculty, students' gender and educational level of degree?

Materials and Methods Research Design

In March 2020 the COVID-19 pandemic compelled all the Italian educational institutions to suddenly pass from in-presence to remote teaching. Due to the fact that the health emergency periodically deteriorated in Italy, Politecnico di Milano was forced to alternate blended and remote teaching also in the following academic year 2020-2021.

To investigate the learners' opinion about ERT and its effects on these students, we adopted a survey method and created an ad-hoc questionnaire which was administered online in July 2021, at the end of the second term of the academic year 2020-2021. Submitted to both Politecnico di Milano bachelor students (B) and master's students (Ma), this questionnaire consisted of 66 items pertaining to 6 different constructs, as illustrated with more detail in previous studies (Mazzola et al., 2022, 2023). The overall number of learners enrolled on Architecture, Design and Engineering who participated voluntarily in this survey, was 3,920 and they gave explicit consent to use the collected data for research purposes. According to Cohen et al. (2018, pp. 217–218) this was a quota sample, a type of non-probability sample, thus it represented itself or examples of itself in a comparable population. However, on account of the massive amount of data collected in the present large case study we focus on 3,670 students enrolled on Architecture (A) and Engineering (E), who correspond to about 93.6 percent of the sample, and analyse only one out of six aforementioned constructs, named Remote Teaching.

Participants

The survey involved 3,670 learners, aged 19-25, 487 (13.3%) of whom enrolled on A and the remainders 3,183 (86.7%) on E. With regard to a specific item of the questionnaire, 1,366 participants self-reported as female (F), 2,304 as male (M) and nobody chose other alternatives. Furthermore, taking into account their educational level of degree, 2,497 learners were bachelor students (B) and the remainders 1,173 master's students (Ma).

Assessment Tool

The present study focuses on one of the six constructs which characterise the overall questionnaire. Participants expressed their evaluation of 14 items through a five-point Likert scale, whereby a score equal to 3 corresponded to neutrality (neither negative nor positive, neither ineffective nor effective, neither worse nor better).

This section of the tool was adapted from previous and already used questionnaire items (Chakraborty et al., 2021; Marzoli et al., 2021; Petillion & McNeil, 2020). Considering these foregoing studies, a three independent factors structure was hypothesised. The three factors were:

- F1) Organisation and effectiveness of the remote teaching
- F2) Modification of the students' perception of difficulties in the passage from in-presence to remote teaching
- F3) Academic learners' variation in the assessment of their instructors since the period preceding the COVID-19 pandemic

However, in the present study we discuss the results regarding only the second factor.

To empirically validate this section of the questionnaire and check this hypothesis, a confirmatory factor analysis was carried out. According to Kline (2016, pp. 274–275), the calculated value of both the Tucker-Lewis Index (Steiger, 1990) ($TLI = 0.93 > 0.90$) and the Root Mean Square Error of Approximation (Tucker & Lewis, 1973) ($RMSEA = 0.073 < 0.08$ reasonable approximate fit) confirmed it.

Afterwards, to check the internal consistency of the yielded unidimensional scales Cronbach's alpha statistics was employed (Cortina, 1993; Cronbach, 1951; Field et al., 2013; Streiner, 2003; Taber, 2018). This reliability analysis, summarised in Table 1, supported the three-factor model (Field et al., 2013; Gardner, 1995; Green et al., 1977; Taber, 2018; Tavakol & Dennick, 2011).

Table 1. Reliability analysis for each factor.

Factor	Items number	Cronbach's alpha	Strength of association	average_r
Organisation and effectiveness of the remote teaching	2	0.71	Good	0.55
Modification of the students' perception of difficulties in the passage from in-presence to remote teaching	6	0.86	Very good	0.51
Academic learners' variation in the assessment of their instructors since the period preceding the COVID-19 pandemic	6	0.83	Very good	0.43

The learners' opinion about every item was expressed based on a five-point Likert scale. As a measure of the students' opinion referring to the three aforementioned factors, we considered the mean value of the Likert scores assigned to the questions regarding every specific factor.

Results

A preliminary inquiry consisted in analysing the possible modification in participants' perception of difficulties in the passage from in-presence to remote teaching (factor 2) through descriptive statistics. Moreover, the students were arranged in different groups to investigate the influence of the diverse independent variables considered, i.e. faculty, gender and educational level of degree, on these assessments. Table 2 shows some results achieved through this methodological approach.

Table 2. Descriptive statistics outcomes for different groups of learners.

Group	Independent variable	Number of students	Mean Score	Standard error
All students		3670	2.76	0.0132
A	Faculty	487	2.92	0.0397
E		3183	2.74	0.0139
M	Gender	2304	2.77	0.0168
F		1366	2.74	0.0212
B (EQF6)	Educational level of degree	2497	2.74	0.0156
Ma (EQF7)		1173	2.81	0.0244

Considering that the neutral opinion corresponded to a mean score equal to 3, the students' subjective perception appeared to have generally worsened. There seemed to be no significant differences between F and M, whose mean scores are similar and decidedly close to the mean score of the overall participants. On the contrary, the independent factor "Faculty" might have affected the learners' assessment. The opinion of the students enrolled on A, indeed, was not far from neutrality and appeared to be notably better than the one of the learners enrolled on E. Finally, more difficult to interpret was the role played by the independent factor "Education level of degree" at this step owing to the small and not negligible difference in the mean score achieved by B and Ma.

To confirm or confute the results suggested by the descriptive statistics, an inferential analysis was implemented by using the statistical opensource software R (version 4.2.2) in the integrated development environment RStudio (<https://www.rstudio.com/> accessed on 9 June 2023). On account of the large amount of students in every cohort, the central limit theorem allowed us to accept the assumption of normality of all the samples. To investigate the hypothesis of homogeneity of variances across the groups, both Levene and Brown-Forsythe tests were implemented. They were both statistically significant at α -level 0.05 (Levene: $\text{Pr}(> F) = 4.204 \cdot 10^{-5} \ll \alpha = 0.05$; Brown-Forsythe: $\text{Pr}(> F) = 9.52 \cdot 10^{-5} \ll \alpha = 0.05$), thus we could conclude that their null hypothesis was incorrect and argued that the assumption of homogeneity of variances had been violated. As a consequence, a three- way robust factorial ANOVA was carried out to analyse data. Table 3 summarises the findings of this test.

Table 3. Outcomes of a three-way robust factorial ANOVA.

Independent variable	Value	p-value
Faculty	15.4338801	0.0002 \ll 0.05
Gender	0.1103150	0.7500 \gg 0.05
Degree	0.2145333	0.6440 \gg 0.05
Faculty:Gender	7.0155564	0.0090 \ll 0.05
Faculty:Degree	2.6762057	0.1040 \gg 0.05

Gender:Degree	1.5926629	0.2090 >> 0.05
Faculty:Gender:Degree	2.0485756	0.1540 >> 0.05

This inferential test revealed a statistically significant main effect of the independent variable “Faculty” on the change in the participants’ perception of difficulty in the passage from in-presence teaching to remote teaching ($p < 0.05$), as well as a likewise statistically significant interaction effect between the independent variables faculty and gender. Nevertheless, according to Field et al. (2013, p. 522) there is no point in interpreting that main effect in the presence of this statistically significant interaction effect. Interestingly, the educational level of degree did not play any role in the learners’ subjective perception of difficulty.

To evaluate the intensity of the effects we calculated the correlational effect size r with its confidence interval at level 0.05 comparing different groups of students. Table 4 summarises the findings related to the effect sizes. A positive effect size means that the mean score of group 1 was higher than the mean score of group 2 and vice-versa.

Table 4. Effect sizes and confidence intervals.

Group	Students number	Mean score	Standard error	r	Confidence interval (95%)
A	487	2.92	0.04	0.08	[0.04; 0.11]
E	3183	2.74	0.01		
A - M	178	2.83	0.06	0.02	[-0.02; 0.06]
E - M	2126	2.76	0.02		
A - F	309	2.97	0.05	0.15	[0.10; 0.21]
E - F	1057	2.68	0.02		
A - M	178	2.83	0.06	0.07	[0.02; 0.13]
E - F	1057	2.68	0.02		
A - F	309	2.97	0.05	0.08	[0.04; 0.12]
E - M	2126	2.76	0.02		
E - M	2126	2.76	0.02	0.05	[0.02; 0.09]
E - F	1057	2.68	0.02		
A - F	309	2.97	0.05	0.07	[-0.02; 0.16]
A - M	178	2.83	0.06		

Discussion and Conclusions

The participants’ perception of difficulties seemed to change in the passage from in-presence instruction to remote teaching imposed by the COVID-19 pandemic. Considering the overall students involved in this study, it generally increased (more difficulties perceived). High levels of anxiety and depression, widely spread among students worldwide (Aristovnik et al.,

2020; Browning et al., 2021; Cao et al., 2020; Chen & Lucock, 2022), and the learners' unreadiness for remote teaching (Tang et al., 2021) might explain these findings.

Among the different cohorts taken into account, females enrolled on Engineering appeared to mostly suffer the change of educational approach. Their assessment was markedly negative (mean score 2.68) and appreciably lower than the one of all the other students' groups, as highlighted by the calculated effect sizes. On the contrary, females enrolled on Architecture assigned the best assessment (mean score 2.97), corresponding substantially to the neutral opinion, and it seemed that they did not suffer for the passage from in-presence to remote teaching. This interesting difference in the females' subjective perception could be related to their different previous educational pathway, but this issue needs to be investigated more deeply and this is a limitation of this study.

Unlike females, males' assessment was generally negative without any notable difference related to the independent variable "Faculty," as highlighted by the effect size confidence interval which crosses the zero value. Thus, males' subjective perception of difficulties worsened in the passage from in-presence educational strategy to remote instruction, but their evaluation was still appreciably better than the opinion of the females enrolled on Engineering. These findings might be related to males' higher expertise in computer skills than females enrolled on Engineering (Aristovnik et al., 2020). On the other hand, females enrolled on Architecture could have developed more effective study patterns with relation to remote teaching than males (Bisht et al., 2020) and presented more positive attitudes toward this new educational approach (Alves et al., 2020).

However, these results allow to explain the reason why there was not a statistically significant difference comparing males' and females' assessment regardless of faculty. The mean scores of females enrolled on Architecture and Engineering were very different from each other and also different from the males' mean score, but they tended to balance at the same value of the males' one. As a consequence, the overall independent variable "Gender" was not significant.

Similarly, when we compared the subjective perception of the overall learners enrolled on Architecture and Engineering a statistically notable difference could be pointed out ($p = 0.0002 < 0.05$, $r = 0.08$). Nevertheless, these findings did not allow to argue that there was a diverse opinion between the overall students enrolled on Architecture and Engineering. As already emphasised, males reported the same assessment regardless their faculty, thus this result reflected the different evaluation of females enrolled on Architecture and Engineering and was a consequence of the different impact on them of the change of educational approach. Interestingly, the educational level of degree did not appear to play any noteworthy role, even though B were younger and less experienced than Ma.

Due to the fact that we worked with a non-probability sample (Cohen et al., 2018), our findings cannot be generalised to a wider population. Nonetheless, our results yield some implications that policy makers and higher education institutions may take into account. As regards educational innovation, for instance, the students' perception of difficulties seems to suggest that a sudden and radical change may be problematic.

Policymakers, lecturers and practitioners should make the most of the experience gained in the COVID-19 pandemic, for example by promoting the information technology skills of

students and faculty members. Moreover, a specific attention to females appears to be necessary.

Acknowledgments

The authors wish to thank Claudia Andreani for editing this paper.

References

- Alves, R. F., Samorinha, C., & Precioso, J. (2020). Knowledge, attitudes and preventive behaviors toward COVID-19: A study among higher education students in Portugal. *Journal of Health Research*, 35(4), 318–328. <https://doi.org/10.1108/JHR-07-2020-0254>
- Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID- 19 Pandemic on Life of Higher Education Students: A Global Perspective. *Sustainability*, 12(20), Article 20. <https://doi.org/10.3390/su12208438>
- Bisht, R. K., Jasola, S., & Bisht, I. P. (2020). Acceptability and challenges of online higher education in the era of COVID-19: A study of students' perspective. *Asian Education and Development Studies*, 11(2), 401–414. <https://doi.org/10.1108/AEDS-05-2020-0119>
- Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2021). Emergency remote teaching in higher education: Mapping the first global online semester. *International Journal of Educational Technology in Higher Education*, 18(1), 50. <https://doi.org/10.1186/s41239-021-00282-x>
- Bozzi, M., Ghislandi, P., Tsukagoshi, K., Matsukawa, M., Wada, M., Nagaoka, N., Pnev, A. B., Zhirnov, A. A., Guillerme, G., & Zani, M. (2019). Highlight misconceptions in Physics: A T.I.M.E. project. *INTED2019 Proceedings*, 2520–2525.
- Bozzi, M., Ghislandi, P., & Zani, M. (2021). Misconception in fisica: Un'opportunità di collaborazione tra università e scuola superiore. *Nuova Secondaria*, XXXVIII(5), 81–85.
- Bozzi, M., Raffaghelli, J. E., & Zani, M. (2021). Peer Learning as a Key Component of an Integrated Teaching Method: Overcoming the Complexities of Physics Teaching in Large Size Classes. *Education Sciences*, 11(2), Article 2. <https://doi.org/10.3390/educsci11020067>
- Bozzi, M., Raffaghelli, J., & Zani, M. (2018). Peer learning for large size physics lectures in higher education: Yes, we can. *ICERI2018 Proceedings*, 8739–8747. <https://library.iated.org/view/BOZZI2018PEE>
- Browning, M. H. E. M., Larson, L. R., Sharaievska, I., Rigolon, A., McAnirlin, O., Mullenbach, L., Cloutier, S., Vu, T. M., Thomsen, J., Reigner, N., Metcalf, E. C., D'Antonio, A., Helbich, M., Bratman, G. N., & Alvarez, H. O. (2021). Psychological impacts from COVID-19 among university students: Risk factors across seven states in the United States. *PLOS ONE*, 16(1), e0245327. <https://doi.org/10.1371/journal.pone.0245327>
- Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*, 287, 112934. <https://doi.org/10.1016/j.psychres.2020.112934>

- Chakraborty, P., Mittal, P., Gupta, M. S., Yadav, S., & Arora, A. (2021). Opinion of students on online education during the COVID-19 pandemic. *Human Behavior and Emerging Technologies*, 3(3), 357–365. <https://doi.org/10.1002/hbe2.240>
- Chen, T., & Lucock, M. (2022). The mental health of university students during the COVID-19 pandemic: An online survey in the UK. *PLOS ONE*, 17(1), e0262562. <https://doi.org/10.1371/journal.pone.0262562>
- Chierichetti, M., & Backer, P. (2021). Exploring Faculty Perspectives during Emergency Remote Teaching in Engineering at a Large Public University. *Education Sciences*, 11(8), Article 8. <https://doi.org/10.3390/educsci11080419>
- Chou, H.-L., & Chou, C. (2021). A multigroup analysis of factors underlying teachers' technostress and their continuance intention toward online teaching. *Computers & Education*, 175, 104335. <https://doi.org/10.1016/j.compedu.2021.104335>
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research Methods in Education* (8th ed.). Routledge.
- Colclasure, B. C., Marlier, A., Durham, M. F., Brooks, T. D., & Kerr, M. (2021). Identified Challenges from Faculty Teaching at Predominantly Undergraduate Institutions after Abrupt Transition to Emergency Remote Teaching during the COVID-19 Pandemic. *Education Sciences*, 11(9), Article 9. <https://doi.org/10.3390/educsci11090556>
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, 78(1), 98–104. <https://doi.org/10.1037/0021-9010.78.1.98>
- Costado Dios, M. T., & Piñero Charlo, J. C. (2021). Face-to-Face vs. E-Learning Models in the COVID-19 Era: Survey Research in a Spanish University. *Education Sciences*, 11(6), Article 6. <https://doi.org/10.3390/educsci11060293>
- Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., Magni, P. A., & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning and Teaching*, 3(1), Article 1. <https://doi.org/10.37074/jalt.2020.3.1.7>
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334. <https://doi.org/10.1007/BF02310555>
- Education Bureau, Government Secretariat (Hong Kong). (2020). *Arrangements on deferral of class resumption for all schools*.
- Field, A., Miles, J., & Field, Z. (2013). *Discovering Statistics Using R*. SAGE. <https://us.sagepub.com/en-us/nam/discovering-statistics-using-r/book236067>
- Gardner, P. L. (1995). Measuring attitudes to science: Unidimensionality and internal consistency revisited. *Research in Science Education*, 25(3), 283–289. <https://doi.org/10.1007/BF02357402>

- Gillis, A., & Krull, L. M. (2020). COVID-19 Remote Learning Transition in Spring 2020: Class Structures, Student Perceptions, and Inequality in College Courses. *Teaching Sociology*, 48(4), 283–299. Scopus. <https://doi.org/10.1177/0092055X20954263>
- Green, S. B., Lissitz, R. W., & Mulaik, S. A. (1977). Limitations of Coefficient Alpha as an Index of Test Unidimensionality1. *Educational and Psychological Measurement*, 37(4), 827–838. <https://doi.org/10.1177/001316447703700403>
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). *The Difference Between Emergency Remote Teaching and Online Learning*. <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
- Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., Zhang, L., Fan, G., Xu, J., Gu, X., Cheng, Z., Yu, T., Xia, J., Wei, Y., Wu, W., Xie, X., Yin, W., Li, H., Liu, M., ... Cao, B. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*, 395(10223), 497–506. [https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5)
- Italian Prime Minister. (2020a, March 9). *Decreto del Presidente del Consiglio dei Ministri, 9 Marzo 2020 'Ulteriori disposizioni attuative del decreto-legge 23 febbraio 2020, n. 6, recante misure urgenti in materia di contenimento e gestione dell'emergenza epidemiologica da COVID-19, applicabili sull'intero territorio nazionale'*. <https://www.gazzettaufficiale.it/eli/id/2020/03/09/20A01558/sg>
- Italian Prime Minister. (2020b, August 7). *Decreto del Presidente del Consiglio dei Ministri, 7 Agosto 2020 'Ulteriori disposizioni attuative del decreto-legge 25 marzo 2020, n. 19, recante misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19, e del decreto-legge 16 maggio 2020, n. 33, recante ulteriori misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19'*. <https://www.gazzettaufficiale.it/eli/id/2020/08/08/20A04399/sg>
- Italian Prime Minister. (2020c, October 18). *Decreto del Presidente del Consiglio dei Ministri, 18 Ottobre 2020 'Ulteriori disposizioni attuative del decreto-legge 25 marzo 2020, n. 19, convertito, con modificazioni, dalla legge 25 maggio 2020, n. 35, recante «Misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19», e del decreto-legge 16 maggio 2020, n. 33, convertito, con modificazioni, dalla legge 14 luglio 2020, n. 74, recante «Ulteriori misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19»'*. <https://www.gazzettaufficiale.it/eli/id/2020/10/18/20A05727/sg>
- Italian Prime Minister. (2020d, October 24). *Decreto del Presidente del Consiglio dei Ministri, 24 Ottobre 2020 'Ulteriori disposizioni attuative del decreto-legge 25 marzo 2020, n. 19, convertito, con modificazioni, dalla legge 25 maggio 2020, n. 35, recante «Misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19», e del decreto-legge 16 maggio 2020, n. 33, convertito, con modificazioni, dalla legge 14 luglio 2020, n. 74, recante «Ulteriori misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19»'*. <https://www.gazzettaufficiale.it/eli/id/2020/10/25/20A05861/sg>

- Italian Prime Minister. (2020e, November 3). *Decreto del Presidente del Consiglio dei Ministri, 3 Novembre 2020 'Ulteriori disposizioni attuative del decreto-legge 25 marzo 2020, n. 19, convertito, con modificazioni, dalla legge 25 maggio 2020, n. 35, recante «Misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19», e del decreto-legge 16 maggio 2020, n. 33, convertito, con modificazioni, dalla legge 14 luglio 2020, n. 74, recante «Ulteriori misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19»*. <https://www.gazzettaufficiale.it/eli/id/2020/11/04/20A06109/sg>
- Kline, R. B. (2016). *Principles and practice of structural equation modeling, 4th ed* (pp. xvii, 534). Guilford Press.
- König, J., Jäger-Biela, D. J., & Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: Teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education*, 43(4), 608–622. <https://doi.org/10.1080/02619768.2020.1809650>
- Kuhfeld, M., Soland, J., Tarasawa, B., Johnson, A., Ruzek, E., & Liu, J. (2020). Projecting the Potential Impact of COVID-19 School Closures on Academic Achievement. *Educational Researcher*, 49(8), 549–565. <https://doi.org/10.3102/0013189X20965918>
- Marzoli, I., Colantonio, A., Fazio, C., Giliberti, M., Scotti di Uccio, U., & Testa, I. (2021). Effects of emergency remote instruction during the COVID-19 pandemic on university physics students in Italy. *Physical Review Physics Education Research*, 17(2), 020130. <https://doi.org/10.1103/PhysRevPhysEducRes.17.020130>
- Mazzola, R., Bozzi, M., Testa, I., Brambilla, F., & Zani, M. (2022). Perception of advantages/difficulties of remote teaching during COVID-19 pandemic: Results from a survey with 3000 Italian engineering students. *EDULEARN22 Proceedings*, 2440–2445. <https://doi.org/10.21125/edulearn.2022.0626>
- Mazzola, R., Bozzi, M., Testa, I., Sancassani, S., & Zani, M. (2023). An Extensive Questionnaire about Metacognition during Emergency Remote Teaching Involving More than 3000 Engineering Students. *Sustainability*, 15(3), Article 3. <https://doi.org/10.3390/su15032295>
- Owusu-Fordjour, C., Koomson, C. K., & Hanson, D. (2020). THE IMPACT OF COVID-19 ON LEARNING - THE PERSPECTIVE OF THE GHANAIAN STUDENT. *European Journal of Education Studies*, 7(3), Article 0. <https://doi.org/10.46827/ejes.v0i0.3000>
- Petillion, R. J., & McNeil, W. S. (2020). Student Experiences of Emergency Remote Teaching: Impacts of Instructor Practice on Student Learning, Engagement, and Well-Being. *Journal of Chemical Education*, 97(9), 2486–2493. <https://doi.org/10.1021/acs.jchemed.0c00733>
- President of the Italian Republic. (2020, May 16). *Decreto legge 16 Maggio 2020, n. 33 'Ulteriori misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19'*. <https://www.gazzettaufficiale.it/eli/id/2020/05/16/20G00051/sg>

- President of the Italian Republic. (2021, May 18). *Decreto legge 18 Maggio 2021, n. 65 'Misure urgenti relative all'emergenza epidemiologica da COVID-19'*.
<https://www.gazzettaufficiale.it/eli/id/2021/05/18/21G00078/sg>
- Steiger, J. H. (1990). Structural Model Evaluation and Modification: An Interval Estimation Approach. *Multivariate Behavioral Research*, 25(2), 173–180.
https://doi.org/10.1207/s15327906mbr2502_4
- Streiner, D. L. (2003). Starting at the Beginning: An Introduction to Coefficient Alpha and Internal Consistency. *Journal of Personality Assessment*, 80(1), 99–103.
https://doi.org/10.1207/S15327752JPA8001_18
- Taber, K. S. (2018). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Research in Science Education*, 48(6), 1273–1296.
<https://doi.org/10.1007/s11165-016-9602-2>
- Tang, Y. M., Chen, P. C., Law, K. M. Y., Wu, C. H., Lau, Y., Guan, J., He, D., & Ho, G. T. S. (2021). Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. *Computers & Education*, 168, 104211. <https://doi.org/10.1016/j.compedu.2021.104211>
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53–55. <https://doi.org/10.5116/ijme.4dfb.8dfd>
- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38, 1–10.
- UNESCO. (2020, April 1). *Education: From disruption to recovery*. UNESCO.
<https://en.unesco.org/covid19/educationresponse>
- World Health Organization. (2020a, March). *Coronavirus disease (COVID-19) – World Health Organization*. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
- World Health Organization. (2020b, March 11). *WHO Director-General's opening remarks at the media briefing on COVID-19—11 March 2020*. <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-1911-march-2020>
- Yang, X., Yu, Y., Xu, J., Shu, H., Xia, J., Liu, H., Wu, Y., Zhang, L., Yu, Z., Fang, M., Yu, T., Wang, Y., Pan, S., Zou, X., Yuan, S., & Shang, Y. (2020). Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: A single-centered, retrospective, observational study. *The Lancet Respiratory Medicine*, 8(5), 475–481. [https://doi.org/10.1016/S2213-2600\(20\)30079-5](https://doi.org/10.1016/S2213-2600(20)30079-5)
- Zani, M., & Bozzi, M. (2018). La fisica tra la scuola secondaria e l'università. Riflessioni e orientamenti. *Nuova Secondaria*, XXXV(1), 83–87.

Disrupting the Grade Imperative Through Critical Pedagogies Embedded Into Human Rights Focused Literary Study

Jessica Terbrueggen, Teachers College–Columbia University, United States

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This paper presents the story of what happened when I incorporated critical pedagogical practices, within a human rights focused unit of study, into my literature classroom and examined the effect it had on my students' perceptions regarding the purpose of their education. After providing a theoretical framework, positioning my study within existing research, and outlining my study, I then explain my methods for selecting research participants and gathering data, ultimately concluding with implications. This study took place within a highly competitive Korean American international high school where grades, GPA ranking, and admissions into Ivy League institutions are perceived by most students to be the fundamental purpose of education. My study broadly begins by examining the learning environment, perceptions, and practices of one class, eventually narrowing my research to be focused on a single student. This student's story demonstrates that even within highly competitive schooling environments, where the purpose of learning has largely been reduced to rote memorization and GPA ranking, the introduction of critical pedagogies, within a human rights focused unit of study, has the *potential* to disrupt paradigms surrounding the purpose of education; raise critical consciousness; and possibly foster transformative learning, leading to a greater sense of purpose regarding education as a means of connection to the world beyond the self.

Keywords: Critical Pedagogy, Human Rights Centered Pedagogies, Literature Classroom, Purpose, Critical Consciousness, Transformative Learning

iafor

The International Academic Forum
www.iafor.org

Introduction

My first year teaching at a private Korean-American international high school in Seoul, South Korea, I thought I had fallen into an educator's paradise. On the surface, it seemed like an educational utopia in which education was functioning the way it ought to; the way we all know it could and should. However, after a year or two, a crack appeared in the corner of the facade. As I took a closer look, and peeled back the layers, I began to uncover some of the less obvious truths about my utopian environment.

I realized that most of my students had punishing work schedules, participated in a full load of extracurriculars after school, and attended hagwon or cram school in the evenings. A hagwon is a for-profit private cram school. Often my students would not return home from hagwon until well after midnight, at which point they would most likely stay awake completing tasks into the early hours of the morning.

While the accolades, awards, and successes of my students were noteworthy, I began to understand that most were not being driven by a self-transcendent purpose, but rather by the pursuit of GPA ranking, and the expectation that they gain admittance into an Ivy League institution. Even more troubling, many of them indicated that cheating and hiring shadow tutors to complete their work was an acceptable form of attaining their educational goals.

Research indicates that “a purpose is distinct from but related to personal meaning. The former includes a person's goal and his or her motives for pursuing it. The latter refers to the sense that something matters and makes sense in the context of one's life or worldview” (Steger, Kashdan, & Oishi, 2008; Yeager & Bundick, 2009). While the external factors motivating my students to achieve high ranking marks did create *some* sense of purpose for my students, when questioned, most indicated that they did not believe they were in school to cultivate a deeper sense of self in relationship to the world, but rather, they indicated that they believed the purpose of their education was to be obedient to a larger objective – one in which their own dreams were often set aside for the fulfillment of familial and societal expectations. This external pressure placed upon my students did spur incredible feats of production and task completion, however, they often indicated that self-actualization, critical consciousness raising, and transformative learning was not an aspect of how they had been taught to approach their education.

Thus, I became increasingly concerned with the perceptions my students exhibited regarding their education. I rarely saw them engaged unless that engagement could be linked to a grade, thereby increasing their GPA ranking, and facilitating a greater chance of admittance into one of the famed Ivies. I needed to better understand how I might cultivate of a deeper sense of purpose within my students beyond that of grades and college admittance.

Yeager, et al. define a purpose for learning as “a goal that is motivated both by an opportunity to benefit the self and by the potential to have some effect on or connection to the world beyond the self” (2014). While my students were effectively motivated by the opportunity of benefiting the self, they were less accustomed to motivational factors related to purpose which have a connection to the world beyond the self. Keeping this in mind, I wanted to explore avenues which might guide my students toward possible new ways of thinking about the purpose of their education.

In the remainder of this paper, I present the story of what happened when I incorporated critical pedagogical practices embedded within a human rights focused unit of study into my literature classroom, and examined the effect it had on my students' perceptions regarding the purpose of their education. My study broadly begins by examining the learning environment, perceptions, and practices of one class, eventually narrowing my research to be focused on one student. This student's story demonstrates that even within highly competitive schooling environments, where the purpose of learning has largely been reduced to rote memorization and GPA ranking, the introduction of critical pedagogies, within a human rights focused unit of study has the *potential* to disrupt paradigms surrounding the purpose of education; raise critical consciousness; and possibly foster transformative learning, leading to a greater sense of purpose regarding education as a means of connection to the world beyond the self.

Theoretical Framework and Literature Review

When explaining the banking system of education, the famous Brazilian educator, scholar, and philosopher, Paulo Freire, (1970) argued that “the more students work at storing the deposits entrusted to them, the less they develop the critical consciousness which would result from their intervention in the world as transformers of that world” (p. 71). He further argued that “the more completely [students] accept the passive role imposed on them, the more they tend simply to adapt to the world as it is and to the fragmented view of reality deposited in them” (p. 71). When viewed through Freire's theoretical framework, it became clear that my students' perceptions about the purpose of their education as a medium for constructing meaningful experiences were stifled due to the traditional, hyper-competitive schooling environment they were immersed in. Under these conditions, my students, although accomplished, often could not articulate a greater purpose for their learning beyond GPA ranking and college admittance, thus having adapted to the “fragmented view of reality deposited in them” (p.71). When queried about possible alternative reasons for engaging in their education, my students indicated that they did not feel empowered to explore alternative frames regarding their education.

While getting into a top-tier university is certainly a worthy goal to have, the pressure to achieve this goal at all costs circumvents the purpose of transformational and authentic education. As Lee, S., & Shouse, R. (2011) points out, in Korea, “the demands of college entrance, and career success, schooling and testing serve as the nation's main engines of social reality and occupational structure” (p. 221). My students had been conditioned to view their educational status in Korean culture as tantamount to their lifelong status as an individual, thereby elevating this singular objective to one of the most defining features of their educational purpose.

Education is one of the most prominent features connected to social status in Korean society, and access to top-tier college preparatory schools are disproportionately accessible to those families with higher socioeconomic status. This phenomenon is not unique to Korean society; educational advantages accessed by those in higher socioeconomic status can be seen in all societies. That being said, South Korea does have a particularly unique set of values and circumstances which create what Lee, S., & Shouse, R. (2011) call “prestige orientation” (p.3). As such, my students were conditioned to focus only on the goal of achieving social status (a self-interested goal) and struggled to articulate any further purpose for their learning (self-transcendent goal). One of the foundational aspects of this conditioning can be traced back to Korea's roots with Confucianism.

Kim, S. (2013) confirms, “the importance of moral education and teachers’ moral authority based on Confucianism has long remained the central feature of Korean education” (p. 15). Due to this foundational belief system, most of my students were conditioned to base their decisions on familial expectations regarding schooling and career choices. Thus, a purpose for their education had already been clearly defined, leaving little room for the exploration of purpose associated with self-actualization or transformative learning.

Research has revealed a distinction between a purpose which is self-interested versus one that is self-transcendent. Eccles and Wigfield (1995), believe that “learners may view a task as likely to benefit the self, believing it will be intrinsically enjoyable or lead to a personally fulfilling career” (p. 215), or “learners may also have motives that transcend self-interest” (Eccles, 2009, p. 44). In most cases, my students were unaccustomed to identifying their own purpose with regards to their education, as they had been conditioned to value the expectations of their elders, society, and larger community in support of a collective purpose which they had internalized as self-interested, rather than to identify with individualistic notions of purpose, which may have the potential to lead to more self-transcendent views.

Research completed by Korean scholars indicates that “Korean education deprives its students of the opportunity to assist the practice and growth of their own intelligence” (Kim, 2013, p. 15). The strong roots of Confucianism still prevalent in society discourage independent thinking, in favor of a more collectivist perspective regarding the purpose of education. According to Sorensen (1994), the system of education in modern day Korea, like most educational systems, does serve the function of practically training an efficient workforce, but unlike some other educational systems, it does not, however, function “as the means by which autonomous individuals seek upward mobility through the acquisition of cultural capital” (p. 6).

Research confirms evidence which links the highly competitive nature of education in the Korean context to a deficit in authentic learning and individual meaning making. Byun, Schofer and Kimhadow (2012) confirm that “education has long been practiced as individual tutoring in Korea, but it has evolved in recent years to include cram schools (hagwon), correspondence courses (hagseupji), and online tutoring, all of which are more structured and commercialized than individual tutoring” (p. 6). Furthermore, the authors elaborate on the ethos and practice surrounding education in Korea as being “focus[ed] on helping students memorize large amounts of material for particular tests in a very short period of time, rather than fostering critical thinking” (p. 6). This research is indicative of a pervasive mindset in Korean society around the purpose of education, which largely excludes individual meaning making and self-driven purpose from the general framework.

While my students had the benefit of attending a private international school, and were thus less impacted by traditional Korean schooling methods, many were still influenced by these larger presuppositions around the purpose of their education. Through my study, I hoped to empower my students to consider possible alternatives regarding their purpose for learning. I hoped that by framing my students’ learning through Freirean critical approaches I would be able to assist my students in understanding that “they did not have to memorize description(s) mechanically, but rather learn [the] underlying significance. Only by learning the significance could they know how to memorize it, to fix it. Mechanically memorizing the description of an object does not constitute knowing an object” (p.8-9), as Freire elucidated in his 1983 essay, *The Importance of the Act of Reading*.

Ideally my student's perceptions would shift to be more in line with the Freirean idea that "education either functions as an instrument which is used to facilitate integration of the younger generation into the logic of the present system and bring about conformity or it becomes the practice of freedom, the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world" (p. 78). Through my study, I hoped to facilitate a paradigm shift in my student's perceptions regarding how they critically and creatively saw themselves within their education and the world at large.

Critical Approaches to a Human Rights Centered Literary Unit of Study

My goal was to take one of our literature units and reframe the focus of our reading to be centered around current human rights issues. In addition, I replaced most of the standardized assessments with critical pedagogical approaches to learning. While these two adjustments may sound like every day good teaching practices, they were somewhat foreign methods of instruction for most of my students, who were most comfortable with traditional modes of test taking and memorization as the main engines of their learning process.

With this goal in mind, I chose *And the Mountains Echoed*, by Khaled Hosseini as the core text for our literary unit of study. This novel explores a variety of themes such as child slavery, children's rights, and power. I chose this novel because it was around this same time that NATO forces had been withdrawn from Afghanistan. Because of this current event, I had been working with an Afghan Advocacy group in my free time, and I noticed an opportunity to bring my volunteer work into the classroom and make real-world, human rights connections with my students. I surmised this may potentially provide a window into alternative perspectives for my students regarding the purpose of education.

As we made our way through the novel, I integrated more critical pedagogical approaches into our daily learning routines and removed the standardized modes of assessment which my students were accustomed to navigating. As the unit progressed, I also lessened the link to summative grades associated with these tasks, as much as was possible. I provided enough grading to sustain the documentation of their learning, while reducing the connection between these critical pedagogical activities and their summative grades.

Throughout this unit, students engaged in a series of formal and informal interviews, kept learning journals, and met as a small group after school to discuss human rights issues which were a direct extension of the text we were reading.

Methods and Research Question

In the earliest stages of my research, I set out to understand how to best cultivate purpose, outside of grades and GPA, by attempting to scaffold more self-defined, autonomous learning activities into my daily teaching routine. The results of my earliest research found that simply providing more autonomous, self-driven learning opportunities did not yield a greater sense of personal purpose. In most instances, the results were even more lackluster than when the students had been guided by clear directives, linked to grade-oriented outcomes. By removing the typical purpose of competing for grades and ranking from my students' routine and handing them creative license to autonomously build learning activities based on their interests, most students were far less productive under these conditions than I had anticipated.

Based on this initial outcome, I learned early on in my research that having a clearly defined purpose and understanding your “why” is critical to student engagement. Thus, in the second and most recent phase of my study, I incorporated critical pedagogical approaches embedded into a human rights focused literary unit of study, and my ongoing research was guided by the following inquiry: *to what extent does the incorporation of critical pedagogical practices and human rights focused literary study contribute to the facilitation of a shift in perception regarding how my students view the purpose of their education?*

Context and Participants

This study was conducted with twelve students from one English Literature class in a private American international high school located in Seoul, South Korea, serving an affluent Korean American population. My study broadly began by examining the learning environment, perceptions, and practices of one class, and eventually narrowed my focus down to a single student, Yoobin (pseudonym). I chose to focus the story of my research on Yoobin as she is representative of the largest body of students, in that she sees the purpose of her education to be admittance into a top Ivy league school, with little ability to articulate a purpose beyond this immediate goal.

Data Collection

To conduct this study, I utilized a variety of qualitative research methods including pre-study surveys, interviews, teacher anecdotal observations, and student reflections.

Based on the results of an anonymous survey I collected at the beginning of the year, I determined which of my classes was predominately made up of students whose perceptions around education were most aligned with the objectives of GPA accumulation and college admissions and chose to focus my study on this class.

I also completed observational notes on students’ exhibited behaviors with regards to engagement and interest in activities which were not linked to summative objectives, as well as activities linked to the human rights focused literary study and critical pedagogical approaches to learning. Moreover, I conducted two sets of interviews with students from the class – one at the beginning of the study and one at the end. Additionally, once I narrowed my focus to Yoobin, I conducted follow-up interviews with her.

To complement the observational notes and interviews, I collected reflective journal entries from my students. At the close of each critical pedagogical activity or human rights focused lesson, I provided the students with an opportunity to reflect on their metacognitive process, specifically drawing their attention to the differences in their perceptions around their learning in relationship to these activities versus activities which were associated with more traditional schooling such as testing and information recall.

The interviews along with the reflective entries proved to be the most valuable data, as I was able to capture in narrative form authentic reflections through writing as well as dialogue. By engaging in the interviews with open-ended story questions, I was able to listen attentively and allow the students a space to really open up about their perspectives on education, and on how they viewed themselves within that framework.

Data Analysis

The data collected suggests that most students are interested in considering possible other motivations for learning. By the end of the study, students who had once been adamant about the purpose of their education being solely for grade accumulation, GPA ranking, and college admissions, did in fact find some interest in pursuing education for “loftier reasons.” In coding the data, I identified four larger themes: (i) the overwhelming pressure placed upon students to perform at extremely high levels, and the oppressive and limiting effect this pressure and lack of time has on students’ desires to pursue alternative concepts related to purpose, (ii) the importance of providing alternative concepts related to purpose, and not just simply removing the objective of grades and college admissions, but rather complimenting this objective with more meaningful alternatives, (iii) the positive impact human rights focused units of study have on engaging students in more self-transcendent motivations for learning, and lastly (iv) the positive impact critical pedagogical approaches have on shifting students perceptions from that of a grade imperative to that of a more self-to-world meaning making experience.

Data Discussion and Survey Data

In the initial anonymous survey, most students felt that approaching their education with the purpose of grades and college admissions was “necessary.” Some students even responded to survey questions indicating that “cheating [was] also necessary to achieve [that] goal.” While not every student was an advocate for cheating, these comments highlight the competitive and pressurized mindset that is reflective of the educational environment which these students are accustomed to navigating.

At the close of the study, there were still students who indicated that grades and college admissions were the most important aspect of their education, but even these students indicated that they enjoyed the human rights focused lessons, and the critical pedagogical approaches to learning, and even suggested they “like[d] these methods of learning more because [they felt] more comfortable having discussions and not needing to have the correct answer all the time.”

This data highlights the importance of removing the pressure of grades and superficial goals, as it allows students the opportunity to explore ideas, and reduces the focus on needing the correct answers.

Case Study

In this section I present the ways in which my students responded to the study, while also exploring general themes and trends. I explore this data through the retelling of one student’s experience as they navigated the study along with their peers. Yoobin, is representative of the largest group of students who either could not articulate a purpose for their education beyond grades and GPA ranking, or did not care to explore alternative purposes, as pressure to fulfill the grade imperative was too intense for these students to take precious time away from this objective in pursuit of another.

Yoobin

Yoobin being representative of the largest population of students at our school, as well as in her class, described herself through her survey results, interviews, and reflections, as someone who “at all costs” needed to achieve the highest grade point average in her class, and hopefully “become valedictorian, because it [would] make [her] parents very proud.” She is also one of the students in my class, who when queried further about the lengths she would go to in order to achieve this high academic status, confessed that “cheating [was] a necessary thing to do [in order] to get ahead in school and life.” She shared a few of her thoughts with me in an interview early in the study regarding her beliefs around her learning.

Yoobin, indicated at the beginning of the study that she really didn’t view school as an opportunity for engaging in meaningful experiences related to self-exploration, actualization, or transformation. When asked whether or not she would be interested in a human rights literary unit of study where the focus was on more critical pedagogical approaches, such as dialoging, and community projects, rather than grades, her response below reflects her initial reaction:

I guess I will participate, because I have to and it could be fun, but in the end, I will still be thinking about getting the highest marks because it will still be part of our grade, right? I think human rights are important, but I am not really sure what it has to do with English class.

This excerpt from Yoobin’s initial interview at the earliest stages of the study are important because it highlights how Yoobin is not unaware of concepts which could be considered of greater significance than merely a competitive grade point average, but she does not see how these larger world implications are relevant to her objectives as a student – at least in her English Literature class.

In one of Yoobin’s reflections after an early discussion-based class session, she commented on why she was not that active in the dialogue. This dialogue was held after an in-class reading of an excerpt from our core text, *And The Mountains Echoed*, and it was not linked to a grade:

I didn’t talk that much because I wasn’t feeling that great and the discussion does not count [for a grade]. I need to keep my energy for my summative later today, and my Socratic seminar in gov pol is summative next class... I am generally less active in formative activities.

The above excerpt from Yoobin’s reflection continues to highlight the emphasis on grades for most students like Yoobin. While she indicated an interest in the topic of human rights, she was not compelled to engage in the activity when it did not “count” toward her grade.

At the midway point in the study the students had recently watched various news clips related to the withdrawal of NATO troops from Afghanistan. At the same time, I was also working with a volunteer organization related to assisting Afghan refugees in locating safe places of residence and employment in the United States. We were about halfway through our core text, *And The Mountains Echoed*, and we had read fictionalized accounts of refugee struggles. I saw an opportunity to bring some of the advocacy work for refugees into the classroom as an optional activity. I proposed that any student who wanted, could draft a letter to congress

urging them to pass the Afghan Adjustment Act, which would provide greater long term assistance to Afghan refugees as they settled into the United States. This activity was not linked to a grade.

I collected the letters from students who had opted to participate and sent them off to congress. Yoobin was among the students who opted to complete this activity. This struck me as unlike Yoobin, so I was very interested in reading her reflection after completing this task. Her explanations regarding why she wrote the letter, as well as how she viewed this activity in relationship to her education demonstrated a pleasant shift in her thinking:

I wanted to write the letter because I feel so bad for these refugees. No one should have to die this way. In our book it is very sad how these refugees have to live and if they do not get a chance to leave Afghanistan then they have very little prospect for living a good life at all. I wanted to help even if my grade was not affected.

The above excerpt from Yoobin's reflection after this activity emphasizes an important shift in Yoobin's thinking around activities related to her education. In this moment, she was able to connect a piece of literature to the lived experiences of real people in the world, and was thus compelled to use her own agency and resources to try and enact change, or rather pursue some type of transformation with regards to the world she was living in. Yoobin, was able to see herself as someone who could use her education as a way to transform the world around her, and viewed herself as someone who could contribute as a change agent. The fact that Yoobin felt compelled by a desire to assist others in a time of need indicates that she is capable of viewing her education as a possible means of self-transcendence.

At the close of this study, when Yoobin and I met for a final interview, I asked her whether or not her perceptions around the purpose of education had shifted at all, what her thoughts were on the incorporation of human rights into the curriculum, and lastly how she viewed the critical pedagogical approaches to teaching in comparison to the traditional modes of learning she was accustomed to, such as testing and essay writing. Her responses are indicative of why this study is important:

I enjoyed the human rights components in our literature unit. Instead of just reading a book, we made connections to issues in the world happening right now. I also liked the discussions and projects because I felt more comfortable by the end of the unit exploring ideas once I knew the pressure of having to have the correct answer was not such a big issue, and it wouldn't impact my grade. I still think the purpose of education is to get good grades and get into college, but, I think education could be improved if more teachers added issues about human rights and had more interesting activities. I still prefer traditional tests though because I know how to study for these.

These final concluding thoughts from Yoobin, highlight the importance of providing opportunities for students like Yoobin to engage in purposeful learning beyond the grade imperative. Even though Yoobin still views the purpose of her education as a means to an end, she nonetheless, was able to find value in the critical pedagogical approaches which were introduced in this study. Though she indicates that she still prefers test taking, this admission emphasizes the importance of educators in all contexts to move away from these modes of learning as Yoobin clearly indicates her preference for this more traditional way of learning because it is easier to study for these activities, thus easier to presume a correct answer, thereby reducing the function of learning to a transactional score.

Through this case study Yoobin was able to demonstrate a small shift in her thinking around how she perceived herself within our unit of study. While this study did not completely change Yoobin's objectives regarding education, her reflections on the incorporation of critical pedagogical approaches, as well as human rights-focused study are encouraging. If a student like Yoobin working within a very sclerotic and traditional schooling environment, under immense pressure to adhere to a grade imperative, can show a small shift in her thinking, the implications for most students look promising.

Conclusion: Implications and Recommendations

This study revealed that through the incorporation of critical pedagogical approaches framed within a human rights focused unit of study, students have a greater opportunity to engage in their learning beyond the superficiality of grades. These types of approaches to teaching and learning can shift even the most reticent learner toward more self-transcendent, self-actualized learning, leading to a greater possibility for critical consciousness raising and transformative experiences.

At a time when environmental crises are on the rise and human rights abuses still plague large swaths of the population, our objective in education should focus on fostering critical thinking and compassion. Educating for a sustainable future starts with educating radically free thinkers who prioritize critical thinking rather than dogmatic adherence to traditional, normative frames. This study demonstrates that inspiring a greater, more transformative purpose for education starts in the classroom with small approaches reducing the link to grades and emphasizing the importance of meaningful experiences.

A barrier revealed during this study was that often there are outside forces which converge to cultivate a sense of purpose with regards to how students perceive objectives within a learning community. Familial, societal, and cultural forces shape students' notions of how they see themselves within education. However, this study did reveal that small adjustments made in the teacher's classroom can have a large impact on how students view their education. While one teacher in one classroom is unlikely to change an entire cultural belief around education, it is possible to plant small seeds of change which overtime can have a lasting effect.

I recommend that educators strongly consider incorporating more critical approaches to learning into their curriculum, reduce the emphasis on grades, and connect learning to real world problems, so that we may begin to imbue individuals with a greater sense of meaning, and purpose with regards to how we approach our lives, and the responsibility we have to those around us.

Lastly, while the specific context of this case study may be viewed as its own unique setting, it is nonetheless indicative of other highly competitive educational system, and as such acts as a guide for why educators, policy makers, and school leaders must remove the impediments to transformative learning experiences if we are to embody our mission as educators and continue to inspire just, compassionate, empathetic, and innovative global citizens.

References

- Byun, S., Schofer, E., & Kim, K. (2012). Revisiting the Role of Cultural Capital in East Asian Educational Systems: The Case of South Korea. *Sociology of Education*, 85(3), 219-239. <http://www.jstor.org/stable/41507160>
- Eccles, J. S. (2009). Who am I and what am I going to do with my life? Personal and collective identities as motivators of action. *Educational Psychologist*, 44, 78 – 89. doi:10.1080/00461520902832368
- Eccles, J. S., & Wigfield, A. (1995). In the mind of the actor: The structure of adolescents' achievement task values and expectancy-related beliefs. *Personality and Social Psychology Bulletin*, 21, 215–225. doi:10.1177/0146167295213003
- Freire, P., & Slover, L. (1983). *The Importance of the Act of Reading*. The Journal of Education, 165(1), 5–11. <http://www.jstor.org/stable/42772842>
- Freire, P. (1970). *Pedagogy of the Oppressed*. New York: Continuum.
<https://envs.ucsc.edu/internships/internship-readings/freire-pedagogy-of-the-oppressed.pdf>
- Kim, S. (2013). The Problem of Authority: What Can Korean Education Learn From Dewey? *Education and Culture*, 29(1), 64-83. Retrieved February 16, 2021, from <http://www.jstor.org/stable/10.5703/educationculture.29.1.64>
- KoreaTimes. “44% Of Korean Ivy League Students Quit Course Halfway.” Koreatimes, The Korea Times, 3 Oct. 2008, http://www.koreatimes.co.kr/www/news/nation/2010/03/117_32124.html#
- Lee, S., & Shouse, R. (2011). The Impact of Prestige Orientation on Shadow Education in South Korea. *Sociology of Education*, 84(3), 212-224. <http://www.jstor.org/stable/23057041>
- Sorensen, C. (1994). Success and Education in South Korea. *Comparative Education Review*, 38(1), 10-35. <http://www.jstor.org/stable/1189287>
- Steger, M. F., Kashdan, T. B., & Oishi, S. (2008). Being good by doing good: Daily eudaimonic activity and well-being. *Journal of Research in Personality*, 42, 22– 42. <http://dx.doi.org/10.1037/a0027143>
- Yeager, D. S., & Bundick, M. J. (2009). The role of purposeful work goals in promoting meaning in life and in schoolwork during adolescence. *Journal of Adolescent Research*, 24, 423– 452. <http://dx.doi.org/10.1177/0743558409336749>
- Yeager, D. S., Henderson, M. D., Paunesku, D., Walton, G. M., D'Mello, S., Spitzer, B. J., & Duckworth, A. L. (2014). Boring but important: A self-transcendent purpose for learning fosters academic self-regulation. *Journal of Personality and Social Psychology*, 107(4), 559–580. <https://doi.org/10.1037/a0037637>

Contact email: jbt2134@tc.columbia.edu

Long Distance Recordingship: Assessing the Use of Remote Recordings in Acoustic Research on Serbian EFL Students' Acquisition of English VOT

Nina Đukić, University of Belgrade, Serbia

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Though research in acoustic phonetics entails laboratory conditions, the rapid technological development accelerated by the COVID-19 pandemic bids the question of remote recording, the success of which could provide phoneticians with more research opportunities. This paper explores the feasibility of remote sample collection in the context of examining the degree of aspiration in initial voiceless stops in Serbian and English with Serbian EFL students. Since the role of positive Voice Onset Time (VOT) in English and Serbian differs significantly, a clear contrast between English long-lag and Serbian short-lag stops might prove challenging for Serbian EFL students. To examine the degree of VOT acquisition, audio recordings are made for 5 advanced and 5 proficient speakers. The participants are firstly recorded in laboratory conditions. Next, the participants are asked to read the same material in a quiet space within their homes, record their speech using mobile phones, and deliver the recordings via email. For each token, both laboratory and remote recordings are examined using the speech analysis software *Praat* (Boersma & Weenink, 2023). Results indicate that remote recording via smart phones yielded reliable samples with measurable VOT for the voiceless plosives /p t k/ in both English and Serbian. Proficient speakers displayed VOT values that approached native-like patterns. In contrast, the less proficient group exhibited shorter VOT durations, but a significantly clearer distinction between the use of aspiration in Serbian and English. Additionally, a surprising finding shows that proficient speakers assign longer VOT to Serbian plosives too, likely owing to L2 transfer.

Keywords: Remote Recording, Acoustic Phonetics, EFL Acquisition, Serbian Speakers of English, *Praat*

iafor

The International Academic Forum
www.iafor.org

Introduction

The COVID-19 pandemic has given rise to alternative approaches in experimental research, including the field of acoustic phonetics. With a significantly increased risk of contagion, conducting acoustic experiments was rendered unfeasible. Consequently, researchers have turned to alternative means of sample collection, such as remote recording. The ideal conditions for recording have typically included working in a phonetic laboratory – a controlled environment with ample opportunity for monitoring participants, providing additional instruction or simply rerecording. The advancement of technology and participants' general technological proficiency has allowed researchers to test the method of remote recording. This approach generally entails participants using various devices (laptop, mobile) and necessary software to record their own speech in an acoustically appropriate setting and deliver the samples to the researcher thereafter.

Previous research has approached this topic from various standpoints. They range from assessing and comparing the reliability of different devices to comparing how efficiently different types of phonetic data can be recorded and analyzed. Ge et al. compare common acoustic measurements using recordings made by seven different devices in a sound-attenuated lab and a quiet conference room (2021, p. 3985). The focus of their experiment is on the devices' ability to capture linguistically meaningful information in the acoustic signal, as it includes a more comprehensive range of phonetic phenomena. The study reveals varied results for measurements such as fundamental frequency, fricatives, vowels etc. Their results show that F0 (fundamental frequency) in vowels is relatively reliable among devices. (Ge et al., 2021, p. 3987). Vowel formant values, especially for F2, vary significantly among devices, and /i/ is more influenced than /u/. Their findings imply that the choice of recording device is critical in the study of vowels, as some smartphones and ZOOM recordings on laptops can lead to misleading results. Additionally, sampling frequency plays a crucial role in spectral moments, with devices below 40,000 Hz failing to capture energy concentration at high frequencies, important for some fricatives. Recordings made on the cloud using ZOOM have notable duration differences but perform inconsistently in other acoustic measurements. The study suggests that recording locally using the speaker's computer is a better solution. The authors note that various other methods of remote speech data collection are possible, but that researchers should exercise caution and document the steps clearly (Ge et al., 2021, p. 3987).

This paper will focus only on the use of mobile devices in recording VOT (Voice Onset Time) in English and Serbian voiceless plosives /p t k/, produced by Serbian speakers of English. Thus, both the aim and analysis of this paper are twofold: the assessment of remote recordings as opposed to laboratory samples which will be used as reference points and, secondly, close examination of VOT acquisition in two groups of Serbian speakers of English who differ in language proficiency.

The connection between aspiration and English stop sounds lies in their manner of articulation. English stops, namely /b d g p t k/, are produced through complex movements within the vocal tract, with a key focus on a high degree of closure or stricture where the articulators come into firm contact (Čubrović, 2009, p. 35). This closure can occur at different places in the vocal tract, leading to the categorization of stops based on their place of articulation. Regardless of their position, all stops go through three stages of articulation: approach, hold or compression, and release (Čubrović, 2009, p. 36). The release stage

involves a sudden release of air with an explosive sound, and the energy levels during this release differ based on their voicing.

In general, voiced stops /b d g/ are produced with vibrations of the vocal folds, while voiceless stops /p t k/ are not. Halle et al. also introduce an alternative classification using the terms "tense" and "lax" stops (1957, p. 107), which are also known as "fortis" and "lenis" stops (Čubrović, 2009, p. 37). These labels are considered more precise because they reflect the distinct articulation of these two groups. Tense stops like /p t k/ involve higher pressure build-up against the closure, resulting in a more forceful release (Halle et al., 1957, p. 107). On the other hand, lax stops like /b d g/ also have bursts during the release, but their key difference lies in the presence of more pronounced /h/-like sound, also known as aspiration, especially with tense stops.

Aspiration can be heard in speech, but accurately recording and perceiving this feature on a waveform or audio recording remains a challenge. The distinction between aspirated and unaspirated consonants, however, can be observed through VOT or voice onset time, which refers to the time between the release of the consonant and the onset of voicing for the following sound (Zsiga, 2020, p. 131). By measuring VOT on waveforms, linguists have explored the significance of aspiration across languages and speakers (Halle et al., 1957; Cho & Ladefoged 1999; Kim, 2011; Shimizu, 2011).

Cho and Ladefoged conducted a study on 18 endangered languages to identify VOT universals across different languages. These universals could predict VOT values based on the place of articulation of the consonant. They discovered various patterns in languages from separate language families. One significant universal is that velar stops always have a longer VOT, but this doesn't apply to languages with uvular stops. Additionally, VOT is shortest before bilabial stops and intermediate before alveolar stops for both aspirated and unaspirated stops, with exceptions in Tamil, Cantonese, and Eastern Armenian (Cho & Ladefoged, 1999, p. 208). The authors created four classes of stops based on VOT duration: unaspirated (30ms), slightly aspirated (50ms), aspirated (90ms), and highly aspirated stops (over 90ms) (Cho & Ladefoged, 1999, p. 223). While there are exceptions, this generalization aids in predicting VOT values, speech cues for perception, and the success rate of producing aspiration when learning a foreign language.

The research by Halle et al. focuses on acoustic analysis of plosives and describes the phonetic features of English stops, including their spectral features with sonograms. The study involves both articulation and perception experiments of plosives, where participants identify English plosives in isolation and in syllable form with alternating positions (initial vs. final). Here, aspiration proves to be a significant factor for perception among native speakers (Halle et al., 1957, p. 108).

For non-native speakers, the importance of aspiration depends on their native language. Kim (2011) conducted a contrastive study comparing English and Korean, where Korean speakers of English were examined to determine if accurate use of aspiration is related to language proficiency. The results indicated that more proficient speakers shortened their VOT in English, while less proficient speakers prolonged it. Interestingly, there was also evidence of cross-language phonetic influence, as Korean speakers shortened the VOT in their native language as well.

Shimizu, on the other hand, conducted a comprehensive analysis of Korean, Thai, and Mandarin Chinese in comparison to English with regard to aspiration. The study included minimal pairs and triplets in each language presented within carrier sentences. The acoustic analysis revealed significant L1 transfer in the production of English plosives by non-native speakers, with a considerable delay of voicing and strong aspiration. Additionally, velar stops across all four languages displayed more prominent aspiration compared to bilabial and alveolar stops.

Based on existing research on remote recording, as well as VOT acquisition in English as a foreign language, it can be expected that remote recording using smart phones can provide reliable samples so long as participants receive clear and detailed instructions beforehand. Additionally, the VOT results are expected to demonstrate a direct correlation between the speakers' level of English and their use of aspiration in speech: the higher the level, the more native-like the VOT values will be.

Methodology

A total of ten participants took part in this experiment. Five participants are in their first year of bachelor studies, studying for a degree that is not related to English (medicine and electrical engineering). Nonetheless, all five participants studied English during their primary and secondary education. The remaining five are all first-year students studying languages, including English as a foreign language. All participants are female and their age ranges between 20 and 26. For the purpose of distinguishing between these two groups of participants, the first five participants who do not study English at university level will hereinafter be referred to as *advanced speakers* whereas the participants who study English at university level will be termed *proficient speakers*.

The recording materials consist of target words with word-initial plosives in both English and Serbian, all of which were embedded into carrier sentences. For English, the words used were *pick*, *tick*, and *kit*, with the Serbian counterparts *pik*, *tik*, and *kit*, which include the same distribution of sounds.

Recordings were made in two different locations for the purpose of quality comparison. The first round of recording took place in the Belgrade Phonetics Lab of the Faculty of Philology, University of Belgrade. All recordings were made directly in the latest version of the *Praat* software (Boersma & Weenink, p. 2022), at the input frequency of 44100 Hz. The participants read sentences shown on PowerPoint slides. Each participant read the sentences three times, which amounted to a total of 180 lab-made tokens for both languages, i.e. 90 in Serbian and 90 in English. Next, participants were instructed to find a quiet space in their homes and read the same slides, while recording their voice using voice-recording applications on their phones – all participants possessed new generation smart phones with the necessary application. The home-made voice recordings were then delivered for analysis via email, with the exact same number of tokens – 180. Together with lab-made tokens, the total number of tokens analyzed for this research was 360.

After the recording was completed, each target word was cut from the original recording and used as a token for a twofold analysis. Firstly, each individual home-made token was compared to its lab counterpart to determine whether the sample was clear enough to analyze the VOT values. The criterion for marking a remote sample as *acceptable* were clearly visible borders between plosive production stages, which would consequently allow the

measurement of VOT. Only the values of acceptable remote samples were then entered into a table in Excel, which was used to calculate mean values and draw conclusions.

Discussion: Remote Recording

To assess the reliability of the remote recordings, the VOT values obtained from the remote samples were compared with those recorded in a controlled laboratory environment. The laboratory samples, which served as reference points, were collected while working in a traditional phonetic laboratory setting. What follows is an example of side-by-side comparison between two pairs of recordings by an advanced (Figure 1.1. and 1.2.) and proficient speaker (Figures 2.1. and 2.2.).

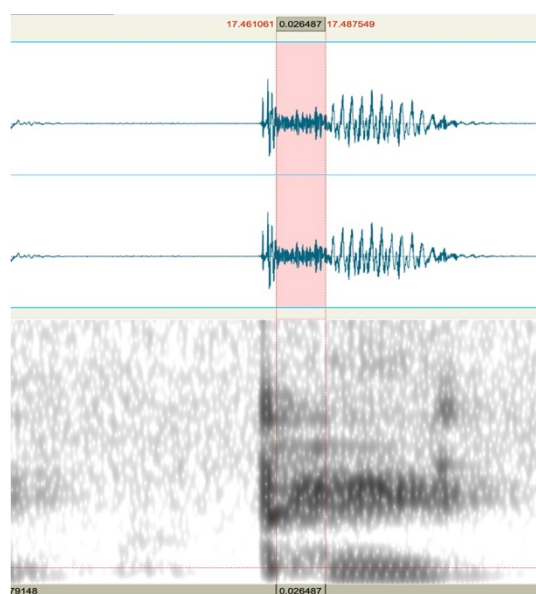


Figure 1.1. /pick/ - Proficient Speaker, LAB

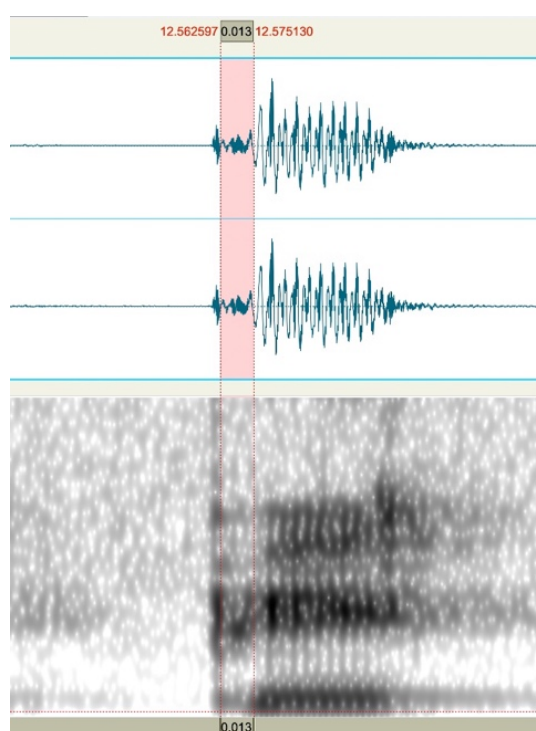


Figure 1.2. /pick/ - Proficient Speaker, HOME

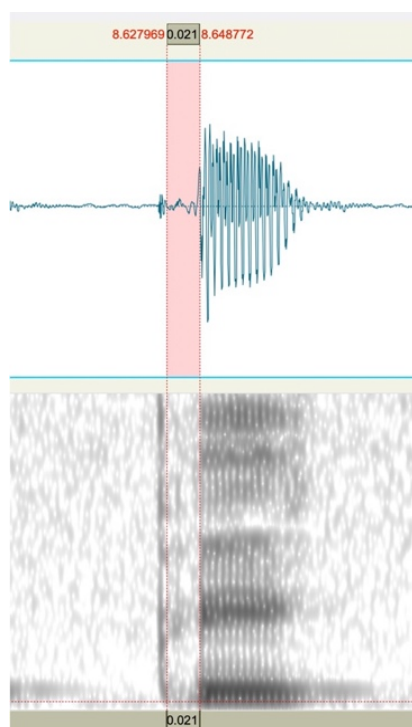


Figure 2.1. /pik/ (Eng) - Advanced Speaker, LAB

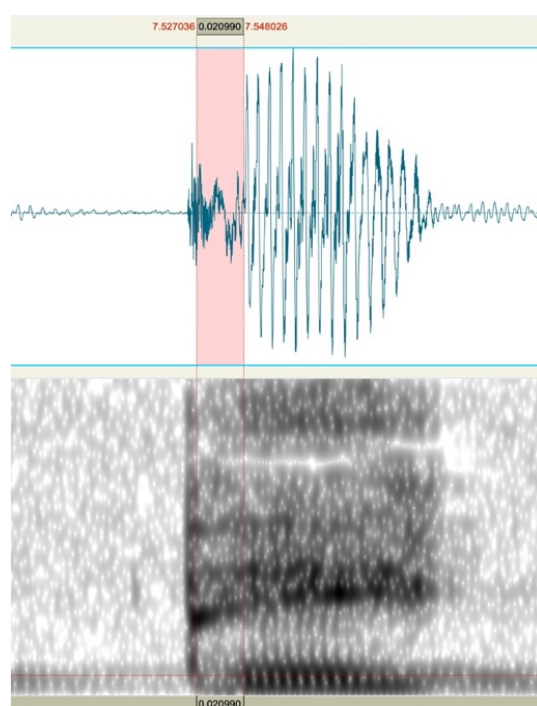


Figure 2.2. /pik/ (Eng) - Advanced Speaker, HOME

The analysis of the VOT values from both remote and laboratory recordings showed a high degree of consistency. Apart from a slight increase of background noise in the remote recordings, which can be observed by a darker shade of gray in the spectrograms' background, there were no statistically significant differences between the mean VOT values obtained from the two recording methods for each voiceless plosive in both English and Serbian. This finding suggests that remote recording is a viable alternative to traditional laboratory recordings for collecting acoustic data related to VOT.

Furthermore, the remote recordings exhibited clear patterns of aspiration in the VOT values for the voiceless plosives. The visibility of aspiration in the release stage of the voiceless stops was clear in both the remote and laboratory recordings, proving the successful capture of this phonetic feature through remote means, which is in line with the initial hypothesis of this paper.

Discussion: VOT Acquisition

Before presenting the collected values from this research, it is essential to provide reference values for English stops produced by native English speakers. These reference values, extracted from Kim (2011), will serve as reference points for a more reliable assessment of the study's results.

NATIVE SPEAKERS	p	t	k
AVG	58	70	80

Table 1: Native speakers' mean VOT values for English (Kim 2011: 4)

Table 1 confirms the universals regarding VOT duration, with velar stops exhibiting the longest offset interval, followed by intermediate alveolar VOT, and bilabial /p/ having the shortest VOT (Cho & Ladefoged, 1999, p. 208). What follows are the mean values for Advanced (Table 2) and Proficient (Table 3) Serbian speakers of English respectively.

ADVANCED L2 SPEAKERS	SRB			ENG		
	p	t	k	p	t	k
AVG	12.79	15.53	41.2	56.31	45.82	64.22

Table 2: Advanced speakers' mean VOT values for Serbian & English

In our experiment, VOT measurements were taken for the interval between the release of the plosive and the onset of voicing of the following sound, expressed in milliseconds (ms). Each target word had three repetitions per speaker, and the tables above present the average values for /p t k/ for both groups of speakers.

Comparing the values with the reference (Table 1), it becomes apparent that although advanced speakers demonstrate a more pronounced lag in word-initial stops, their VOT still differs significantly from that of native speakers. As expected, velar stops have the most prominent VOT in both languages, in accordance with the presented mean values (Cho & Ladefoged, 1999). Additionally, the mean VOT values for Serbian align with the initial hypothesis, showing less prominence and significantly shorter VOT durations compared to English.

PROFICIENT L2 SPEAKERS	SRB			ENG		
	p	t	k	p	t	k
AVG	15,88	19,335	56,5425	62,56	68,53	84,3525

Table 3: Proficient speaker's (mean) VOT values for Serbian & English

The values for proficient speakers are much closer, if not fully aligned, with the VOT values of native speakers. However, there are a few surprising observations: the average VOT value for the velar stop /k/ is the most prominent, slightly longer than that of native speakers. On the other hand, the VOT values for the Serbian /k/ are significantly higher than those of advanced speakers. Spectrograms illustrating the unusually longer VOT in English and Serbian can be seen in Spectrogram 1 and Spectrogram 2, respectively (see Appendix).

Thus, it can be assumed that higher proficiency and increased exposure to a language with a long-lag aspiration feature may affect the non-native speaker's VOT production in their mother tongue. These findings are in line with Kim's results (2011) and demonstrate the "bi-directional influence" (Grosjean, 1989) of languages. In other words, significant exposure to a foreign language (L2) is likely to influence the learner's production of their native language (L1) as well.

Regardless of the reference values, it is evident that proficient speakers have acquired the aspiration feature to a greater extent and have no difficulties in its application during pronunciation. Conversely, while advanced speakers demonstrate a slightly less prominent use of aspiration, they exhibit the ability to make a greater distinction between VOT values in Serbian and English.

Conclusions

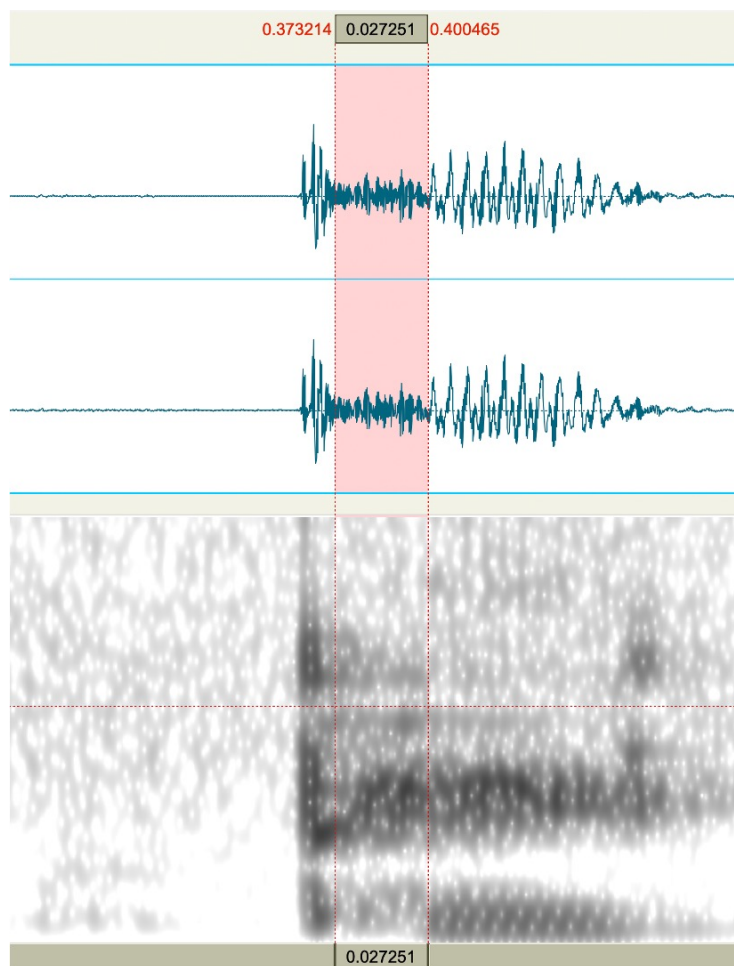
The results of the study indicate that remote recording using smart phones yielded reliable samples with measurable Voice Onset Time (VOT) values for the voiceless plosives /p t k/ in both English and Serbian. Participants in the study were able to follow clear and detailed instructions on how to record their speech, ensuring the successful acquisition of usable data. However, this conclusion is limited only to the use of mobile phones and their reliability in the context of VOT analysis. A larger sample with more variables (devices or phonological phenomena) would have to be included in the future to draw further conclusions on the matter. On the other hand, the data from remote recordings also allowed for the comparison of VOT acquisition between two groups of Serbian speakers of English who differed in their language proficiency. The more proficient group of speakers displayed VOT values that approached native-like patterns. In contrast, the less proficient group exhibited shorter VOT durations, but a significantly clearer distinction between the use of aspiration in Serbian and English. Based on the side-by-side comparison in Tables 2 and 3, it has been concluded that proficient speakers are more inclined to assign longer VOT intervals, but this tendency extends to Serbian plosives too, most likely owing to L2 transfer. It is important to note that this research is limited to voiceless plosives in combination with a single vowel. In order to fully explore the role of VOT in Serbian and English, as well as their correlation, a more comprehensive sample is needed in the future, which would assess VOT in more varied contexts.

Appendix

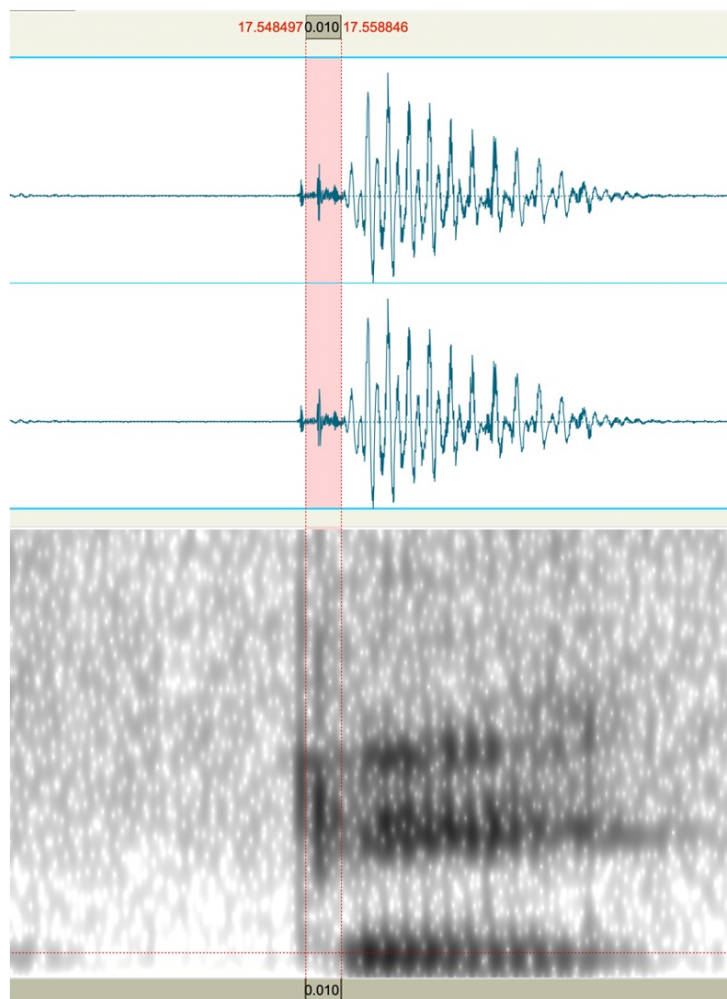
The appendix contains 2 spectral representations of recorded speech by speaker P4, who belongs to the proficient group of non-native speakers of English in this study.

Spectrogram 1

Word /pɪk/ (English) by participant P4



Spectrogram 2
Word /pɪk/ (Serbian) by participant P4



References

- Boersma, P., Weenink D. (2022). *Praat: doing phonetics by computer* [Computer program]. Version 6.2.20. <http://www.praat.org/>
- Cho, T., Ladefoged, P. (1999). Variation and universals in VOT: Evidence from 18 languages. *Journal of Phonetics*, 27(2), 207–229.
- Čubrović, B. (2009). *Profiling English Phonetics*. Belgrade: Philologia.
- Flege, J., Eefting, W. (1987). Production and perception of English stops by native Spanish speakers. *Journal Of Phonetics*, 15(1), 67–83.
- Flege, J. E. (1992). Speech Learning in a Second Language. In C.A. Ferguson, et al. (Eds.), *Phonological Development: Models, Research, Implications* (pp. 565–604). Timonium, MD: York Press.
- Flege, J. E. et al. (1995). Effects of age of second-language learning on the production of English consonants, *Speech Communication*, 16, 1–26.
- Ge, C., Xiong, Y., & Mok, P. (2021). How Reliable Are Phonetic Data Collected Remotely? Comparison of Recording Devices and Environments on Acoustic Measurements. In *Interspeech* (pp. 3984–3988).
- Grosjean, F. (1989). “Neurolinguists, beware! The bilingual is not two monolinguals in one person”, *Brain and Language*, 36, 3–15.
- Halle, M. et al. (1957). Acoustic properties of stop consonants. *Journal of the Acoustical Society of America*, 29, 107–116.
- Kim, M-R. (2011). The relationship between cross language phonetic influences and L2 proficiency in terms of VOT. *Phonetics and Speech Sciences*, 3(3), 3–10.
- Shimizu, K. (2011). A Study on VOT of Initial Stops in English Produced by Korean, Thai and Chinese Speakers as L2 Learners. *International Congress on Phonetic Sciences XVII* (pp. 1818–1821).
- Zsiga, E. (2020). *The Sounds of Language: An Introduction to Phonetics and Phonology*. Wiley-Blackwell: New Jersey.

Contact email: djukic.nina96@gmail.com

***Ingenuity in the Pandemic:
A Cross-Course Science-Literacy Integration Project***

Brittany E. Kiser, Lynn University, United States
Kelly A. Burlison, Lynn University, United States

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

When faced with compressed hybrid courses amidst the pandemic, two university teacher educators sought to leverage the opportunity into an innovative, collaborative project to increase authentic learning experiences for their students. Pre-service teachers in one elementary literacy and one elementary science education course collaborated on a science-literacy integration project, bringing their content expertise and shared understanding of strategies to modify and improve existing lessons to equally involve reading and science. The result of this integration project proved to benefit students in their presentation skills, experimentation skills, and teaching modalities, while gaining a new perspective of our intellectual climate. Within this article, the authors seek to establish the importance of incorporating science education into the literacy curriculum of pre-service teachers, as well as to share reflections on experiences, work, and insights of those pre-service teachers already exposed to these studies.

Keywords: Literacy and Science Integration, Pre-service Teachers, Virtual Instruction, Collaboration, Elementary

iafor

The International Academic Forum
www.iafor.org

Introduction

As teacher educators, it is essential that the focus is not only to prepare pre-service teachers to be impactful in the K-12 classroom, but also to regularly reflect on the power and influence exerted on future generations of students in doing so. The teacher educator's role is to recognize and utilize this power to mold pre-service teachers to be cognizant of the injustices in this world and how education can change them. Not only will current pre-service teachers be educating K-12 students with exponentially increasing technological skills; educational research also suggests the importance of blending curricula across the content areas, as opposed to teaching within segmented silos (Romance & Vitale, 2016; van Zee, Jansen, Winograd, Crowl & Devit, 2013).

To begin with, science, when implemented in the classroom effectively, involves a great deal of critical thinking, real-world application and transdisciplinary content. Students must be adept at research, interpret, read, apply mathematical concepts and communicate both orally and in written format. In other words, immersion in science activities necessitates the 21st century skills that global market leaders insist our future workforce have. The United States Bureau of Labor Statistics projected that careers in STEM fields would grow by approximately one million more by the year 2022 than those in 2012 (Vilorio, 2014). If this proves to be accurate, today's students require, at the very least, exposure to the science fields, which may realistically be their future career. However, increasing pressures of accountability in elementary schools, with a particular focus on mathematics and English language arts, leaves little room for science education (Webb & Rule, 2014). This issue of concern is compounded when elementary students matriculate to the secondary level, now woefully unprepared for the rigors of scientific thinking and content at this standing. Given that research has shown students' general academic interests to decline from elementary to middle school, the average student is not likely to seek out the foundational science concepts necessary for success on their own (Schunk, Pintrich, & Meece, 2013). When considering the role of schools in society, it is clear that schools are, at the very least, intended to produce students that are capable, productive, happy citizens. If current career projections and research are to be taken into account, and we do wish to meet the aforementioned goal, the increased participation in science activities, clubs and courses is indisputable. The integration of science and literacy instruction in early years may be the beginning of this journey toward student success in future science education; thus our pre-service educators must be familiar with this process of integration in order to effectively teach it in their own elementary classrooms.

However, it is not enough to merely add science content within the reading block or vice-versa, lest we inadvertently negatively impact student achievement. One of these practices which has particularly been studied is reading from the textbook. In a study attempting to correlate course grade and score on the American College Testing (ACT) college readiness assessment with time spent reading the textbook in high school Biology, the amount of time spent reading the textbook in class was found to be neither a predictor for course grade or achievement on the ACT (Wyss, Dolenc, Xiaoqing and Tai, 2013). In a similar manner, it was determined by Su (2014) that the sole act of reading from the textbook in United States middle school science classrooms is associated with low performance on the Trends in International Mathematics and Science Study (TIMSS). Thus, it is essential that instruction and activities in pre-service teachers' classrooms are carefully planned to integrate science content and literacy education at a high cognitive level which may later be transferred to the K-12 classroom as discussed above.

Background

The COVID-19 pandemic presented a number of unique challenges to educators over the past year. In higher education, institutions which had primarily provided face-to-face instruction were required to shift to blended and online instruction in mere days (Paudel, 2021). At the university site where this science-literacy integration project was implemented, the administration developed an innovative scheduling format to address these challenges, ensure continued learning and overall maintain a safe environment for faculty, staff and students. In an effort to meet the aforementioned goals, the four-week term was created. To minimize contact with other individuals across the university, students took no more than two courses per four-week term and were split into groups, alternately attending class face-to-face and via a Zoom Cloud Meeting, to curtail the number of individuals in a classroom at a given time. This form of blended learning has been shown to be effective in higher education settings (Paudel, 2021). In addition, instead of meeting two or three times per week with a professor, the format involved class meetings for 150 minutes at a time, Mondays through Thursdays. Within this novel schedule, students maintained the standard instructional hours but with less exposure to others, alongside required face masks and increased sanitization and social distancing, thus a higher safety factor. As practitioners of education, the professors authoring this paper recognized the value and significance of providing students with a unique opportunity under such circumstances.

Within one term, one professor taught *Literacy in the Primary Grades* during the same time block in which another professor was teaching *Science in the Elementary School*, both required education courses for pre-service teachers enrolled in this institution. The professors collaborated on the development of an assignment that consisted of an interactive peer-teaching presentation in which aspects of a science-literacy integrated curriculum were shared. Both believe that by introducing science and literacy curricula as an integrated unit rather than stand-alone subjects, students can link personal experiences to concepts, develop connections across content and draw conclusions. The goal of this collaborative, integrated project was to engage pre-service teachers in hands-on activities and discourse surrounding the efficacy of science-literacy integration programs in the teacher preparation program setting. The pre-service teachers presented various exemplars of their lessons and insights, which foster an emphasis on student voice and student choice through the use of technology.

Materials and Methods: The Approach

The literacy professor had become aware of a set of curriculum created by a community partner, built around science and STEM concepts alongside a literacy component. These activities were developed with the goal of helping children to “build on prior knowledge, promote curiosity and [help children] learn important cooperation and teamwork skills” (Literacy Coalition of Palm Beach County, 2021, para. 1). The activities were leveled, one for grades K-2 and one for grades 3-5, each focused on a different topic that can be applied to a science concept, such as bubbles and windmills. The curriculum for each included a nonfiction text, hands-on activity and brief description of the science behind the activity. The literacy professor took note of the teaching opportunity offered through these activities and taught students to align the STEM stories to a well-written lesson plan aligned to state standards, learning objectives, literacy instructional strategies and assessments. The students partnered with a community literacy program that provides reading activities to after-school children. The children participate in fun and engaging reading lessons, hands-on activities and introduce young creative minds to various ways of thinking and exploring the world

(Literacy Coalition of Palm Beach County, 2021). The community literacy program needed assistance with providing state standards to their STEM stories as well as an extended learning activity that can help promote curiosity while building teamwork and collaboration.

Planning for Collaboration

As the students had been working toward demonstrating mastery of content and instructional strategies through the development of effective lesson plans in their respective courses, the professors planned for the students to spend one, 150-minute class meeting with both classes together. With various students meeting for class in two different Zoom Cloud Meetings and two different classrooms, the professors felt it would be most productive to have all students from both courses meet online in a single Zoom Cloud Meeting. This would allow for all students to receive the same instruction, exchange contact information as needed, and provide time to begin work on this collaborative project, with the rest of the task to be completed outside of class and due nine days later. The professors further determined to utilize the Gradual Release of Responsibility instructional framework for this task, popularized by Pearson and Gallagher (1983), in which the activity would be modeled with feedback prior to setting the students to work on their own.

Students were enrolled in either *Science in the Elementary School* or *Literacy in the Primary Grades*. Between the two courses, there were a total of 24 students, which were broken into five collaborative groups-- four groups of five students and one group of four students. Having the advantage of familiarity with their students' abilities, strengths and deficiencies, the professors were able to select the group members to account for and balance the known capacities. For example, students with the most solid lesson-writing skills were assigned to different groups, as were those with strong points in the varied content areas. Each group contained at least two students from the literacy course and two students from the science course.

Modeling the Collaborative Process

Being part of a small university and an even smaller college, education majors frequently take their courses with the same individuals, getting to know their cohorts over time. To ensure the students recognized one another in this virtual environment, the professors began the first of the two-class meetings with a brief activity, requesting that each student identify one individual in the opposite class with whom they shared something in common and to share this in whole-group format. Once familiarized, the students were introduced to the collaborative project, followed by a brief explanation by the literacy professor regarding the work already completed in this course, as discussed above. The science professor then discussed the importance of incorporating an aligned science standard alongside the activity and variations on the provided activities to make these suitable for use in a virtual or hybrid classroom environment, such as those created by the pandemic. The students were then split into Zoom Cloud Meeting breakout rooms with the following instructions: In their respective small groups, the literacy students were instructed to share their starting activity along with the literacy standard and informational text selected to correspond with the lesson. The group would then work together to modify or alter the initial activity for a digital learning environment and to seek an appropriate state science standard that corresponded with both the informational text and the activity. During this time, the professors moved from breakout room to breakout room to provide clarification and guidance. When completed, all groups

returned to the main room to share what they had come up with and to receive feedback, comments and suggestions.

The Task

At the conclusion of the modeled activity and critique, each group was assigned a new topic from the community partner supplied list that was not previously covered. Each topic included two starter activities and a fictional text. Student groups were tasked with developing six lesson activities, one for each grade level K-5, with each to include:

- an aligned state literacy standard
- an aligned state science standard
- an informational text which corresponded with the science topic and state literacy standard
- a virtual adaptation of the activity for the online classroom, appropriate for the grade level, which aligned with the state science standard, and
- an assessment addressing both content standards.

Students were encouraged to consider how the content and skills of each lesson would build upon one another across grade levels. The Zoom Cloud Meeting breakout rooms were then re-opened to allow the small groups to begin their work. Once again, the professors shifted from room to room to ensure students did not have any questions on the assignment and to provide guidance and suggestions as needed.

All students returned to the whole group one final time to revisit the assignment instructions, ask for clarifying information and complete a brief closing activity. For the summary question, students responded to the prompt “Name one skill you practiced today.” via an online application that processed the answers into a word cloud, making trending responses larger in font than those less prominent. Key themes identified from this short evaluation included the following terms: teamwork, creativity, literacy.

Results: Lessons Learned

Nine days later, the two classes met once again in a single Zoom Cloud Meeting for an intended 150-minute timeframe, in which each group would present for all students their six lesson activities as described in the previous section. After each presentation, the class and professors would pose probing questions and provide feedback regarding what was shared. Ultimately, this process took over 180 minutes, thirty minutes beyond the allotted class time.

The professors felt it was vital that the pre-service teachers recognize the value in cross-curricular instruction in the elementary classroom, particularly with regard to the integration of science and literacy instruction, thus while other groups presented, each individual student completed a professor-developed graphic organizer of “glows and grows” for each group, referring to the strengths and weaknesses of the shared lessons as shown in Figure 1 on the subsequent page. The objective of this particular task was to actively engage the pre-service teachers in examining the components of the science-literacy integration lessons developed by their peers in comparison to those of their own group. Students then submitted these graphic organizers for a grade at the close of the presentations.

Constructive Feedback

Group	Topic	<i>GLOWS</i>	<i>GROWS</i>

Figure 1: “Glows and Grows” Graphic Organizer

At the close of the presentation and feedback portions of the class meeting, all students were instructed to complete a brief reflection, in which they identified which set of lessons best exemplified science-literacy integration. Students were then to send a private message using the Zoom Cloud Meeting chat feature to their professor of recording indicating their response. Interestingly, the general consensus of answers aligned with the viewpoint of the professors, indicating that students were able to identify those groups of lessons that were best integrated, despite not being as successful at creating these themselves. The professors met together afterward to debrief and reflect upon the science-literacy integration project, discussing the merits of and lessons learned from this experience. The professors worked through each set of submitted group lessons and peer feedback graphic organizers, together examining, grading and providing written evaluations.

The professors learned valuable information regarding the performance of their respective students through these activities, which would not have been apparent without this collaborative project. The nature of this assignment involved higher-order thinking skills, wherein it was noted that some students struggled. A typical misconception that both professors noticed were the use of the state standards, how they aligned to the lesson, and the appropriateness of grade level activities. The professors were aware that students had some difficulty unpacking the standards; however, it was evident that students did not understand how to combine standards that were cross-curricular and provide grade-level activities and assessments upon questioning and requested explanations. This collaborative project allowed the professors to delve deeper into the lesson plan and provide specific feedback on scientific knowledge, literacy instruction, assessment and strategies for incorporating all within a single lesson. By integrating both science and literacy, the professors found that students were more likely to master both disciplines and would apply this type of interdisciplinary instructional methods to their future classrooms.

Discussion: Analysis and Insights

Several implications emerged following the analysis related to this science-literacy integration project that can help explain students' growth. In examining the students' peer feedback, such as those shown in Figures 2 and 3¹ below, common themes included

¹ Written permission to use the student work has been secured from each student.

appropriateness of activity to grade level, alignment of assessment to standards, alignment of standards to grade level, connection between informational text and science standard. Interestingly, as the majority of student participants most often noted these aspects, the authors wonder if this is due to simplicity, a certain apparentness, or merely that these are components most often focused on throughout the college of education courses.

Topic	GLOWS	Grows
Wind	Their activities were relevant to the topic	Standards that align and add more visuals
Weather	Very organized, books were relevant to the topics	activities that are more easy or hard according to grade level
Owls	their activities were appropriate to the grade levels.	Standards were not aligned.
Gravity	The assessments were appropriate and matched the standard.	reading portion and activities were ok.

Figure 2: Sample student A completed feedback graphic organizer

Topic	GLOWS	Grows
Weather vanes	Activities with KAHOOT use great questions They used a lot of class discussions to help keep students informed.	More specific on class discussions and linking to the literacy standards
Kinetic and Potential Energy	Activities were great to use for each grade and allowed for different activities to work well with the content	More clearly explain their activities and the connection to the standards and how it is used virtually as well.
Owl Pellets	I really enjoyed the field trip idea for Kindergarten and using flipgrid as a good virtual assessment for students	Have more clear connections with the reading standards and how it will play a part in the lesson
Gravity & Motion	Using a graphic organizer is a fantastic idea They really help with students to learn more vocabulary, build on their knowledge and be used as a guide for help	Assigning the standards to the assessments and activities is again important. After all groups have gone I've noticed this to be a overall challenge for everyone

Figure 3: Sample student B completed feedback graphic organizer

In contrast, the professor's evaluation of the groups' work focused on differing core similarities. Noted strengths of the various group projects included: strong selection of informational texts to align with the science content, incorporation of nature of science standards alongside the content standards (physical science, earth/space science, life science), and interactive read-alouds which made good use of the strategies taught. Flaws and opportunities for growth were also explained to each group and as teachable moments to all students on the whole, which most notably encompassed the following skills: reading and understanding what the standard is asking the student to do in order to align properly to

activities and assessments; ensuring activities can be realistically applied to the online or hybrid learning environment; developing clear connections of all components within the lessons to the standards; taking age-appropriate vocabulary and instructions into account; including a separate, science-focused activity; and creating assessments which are separate from the learning activities. Ediger (2010) stated that it is essential that school students are able to utilize the knowledge gained from ongoing reading experiences and apply this knowledge to other educational situations. Because students in today's society spend such little time on reading during their daily lives, a struggling reader is often not engaged in prior literacy experiences (Biancarosa & Snow, 2006).

Conclusion

If it is the goal of education to prepare students for future careers, it is clear that both literacy and science must be a strong component of the curriculum. Odom and Bell (2015) stress the need to better understand the associations among teacher demonstration lectures, student attitudes and the subsequent student performance in science courses. In a similar strain, Su (2014) recommends a study of classroom science instructional approaches through observation, an in-depth analysis of educator perceptions related to science teaching and a review of student perspectives with regards to science education and cultural background. Moreover, it is suggested that there is a need for science education worldwide to increase the level of cognitive demand upon our students (Calado, Neves & Morais, 2013). Similarly, in the United States, only 31% of 8th-grade and 12th-grade students met the NAEP reading proficiency standard for their respective grade levels (Fritz et al., 2009). Therefore reading instruction throughout the country has failed to meet the proficiency mark as well. It is necessary for all students to receive interventions that will help them attain the foundational academic skills that are essential for college and career readiness (Just Read! Florida, 2011). One method to do so is to promote further study into the maintenance of high caliber metacognitive demand between curriculum standards and curriculum delivery (Calado, Neves & Morais, 2013).

While current research continues to point to the importance of cross-curricular integration in the K-12 classroom setting, teacher education programs must proceed to do the same. Research has articulated a demand for higher quality teacher preparation and professional development programs, which may be exacerbated by the traditional teaching methods to which educators were themselves introduced (Kiser, 2018; Odom & Bell, 2015). Pre-service teachers cannot be expected to successfully design and implement units of instruction that address more than one content area unless they are taught the whys and hows and allotted the opportunity to practice these vital skills within their preparation coursework. The pre-service teacher must be furnished with appropriate intellectual challenges which empower them to engage with material and construct their individual understanding while employing and applying transdisciplinary connections (Bruner, 1960). This includes providing the time to collaborate with peers, experiment with technological resources and develop presentation aptitudes, all with the support of continuous, specific feedback. This paper has described one such project of literacy and science integration, which has demonstrated the value of educating pre-service teachers in the art of integration, an impossible feat sans the successful collaboration of professors as well as students. When pre-service teachers are encouraged to work together in applying technology, science content and literacy strategies in an equally balanced lesson to state standards, students expand their understanding of all that is involved.

References

- Allington, R. L. (2011). Research on reading/learning disability interventions. In S. J. Samuels & A. E. Farstrup (Eds.), *What research has to say about reading instruction* (4th ed., pp. 236-265). International Reading Association.
- Biancarosa, G., & Snow, C. (2006). *Reading next-a vision for action and research in middle and high school literacy: A report to Carnegie Corporation of New York* (2nd ed.). Alliance for Excellent Education, Carnegie Corporation.
- Bruner, J. S. (1960). *The Process of education*. Harvard University Press.
http://edci770.pbworks.com/w/file/45494576/Bruner_Processes_of_Education.pdf
- Calado, S., Neves, I. P., & Morais, A. M. (2013). Conceptual Demand of Science Curricula: A Study at The Middle School Level. *Pedagogies*, 8(3), 255-277.
 doi:10.1080/1554480X.2013.795698
- Ediger, M. (2010). Struggling readers in high school. *Reading Improvement*, 47(2), 105-110.
- Fritz, A., Cooner, D., & Stevenson, C. (2009). Training new content area secondary teachers to teach literacy: The university/public school partnership. *Reading Improvement*, 46(1), 19-28. Just Read! Florida. (2011). <http://www.justread@fldoe.org>
- Kiser, Brittany E., "An Examination of Pedagogy in Middle School Science and Its Effect on Student Achievement" (2018). *Student Theses, Dissertations, Portfolios and Projects*. 316. <https://spiral.lynn.edu/etds/316>
- Literacy Coalition of Palm Beach County. (2021). *Stories and STEM*. Literacy Coalition of Palm Beach County. <https://www.literacypbc.org/literacy-impact/resources/resources-stories-and-stem/>
- Odom, A. L., & Bell, C. V. (2015). Associations of Middle School Student Science Achievement And Attitudes About Science with Student-reported Frequency of Teacher Lecture Demonstrations And Student-centered Learning. *International Journal of Environmental & Science Education*, 10(1), 87-98.
 doi:10.12973/Ijese.2015.232a
- Paudel, P. (2021). Online education: Benefits, challenges and strategies during and after COVID-19 in higher education. *International Journal on Studies in Education* (IJonSE), 3(2), 70-85. <https://doi.org/10.46328/ijonse.32>
- Pearson, P. D. & M. C. Gallagher. (1983). The instruction of reading comprehension. *Contemporary Educational Psychology*, 8(3), 317-344.
- Romance, N. & Vitale, M.R. (2016). Implications of a cognitive science model integrating literacy in science on achievement in science and reading: Direct effects in grades 3–5 with transfer to grades 6–7. *International Journal of Science and Mathematics Education*, 15(6). DOI: 10.1007/s10763-016-9721-2

- Schunk, D.H, Pintrich, P.R., & Meece, J. L. (2013). *Motivation in education: Theory, research, and applications (4th ed.)*. Pearson Merrill Prentice Hall.
- Su, G. (2014). Relationship Between Science Teaching Practices and Students' Achievement In Singapore, Chinese Taipei, And The US: An Analysis Using TIMSS 2011 Data. *Frontiers of Education In China*, 9(4), 519-551. Doi:10.3868/S110-003-014-0043-x
- van Zee, E. H., Jansen, H., Winograd, K., Crowl, M., & Devitt, A. (2013). Integrating physics and literacy learning in a physics course for prospective elementary and middle school teachers. *Journal of Science Teacher Education*, 24(4), 665–691. <https://doi.org/10.1007/s10972-012-9323-y>
- Vilorio, D. (2014). STEM 101: Intro to tomorrow's jobs. <https://www.bls.gov/careeroutlook/2014/spring/art01.pdf>
- Webb, A. N., & Rule, A. C. (2014). Effects of teacher lesson introduction on second graders' creativity in a science/literacy integrated unit on health and nutrition. *Early Childhood Education Journal*, 42(5), 351–360. <https://doi.org/10.1007/s10643-013-0615-4>
- Wyss, V. L., Dolenc, N., Xiaoqing, K., & Tai, R. H. (2013). Time On Text And Science Achievement For High School Biology Students. *American Secondary Education*, 41(2), 49-59.

Contact email: bkiser@lynn.edu

Mapping the Field of Quality Assurance and Transnational Higher Education Through a Bibliometrics Analysis

Wang Jing, Japan Advanced Institute of Science and Technology, Japan
Eunyoung Kim, Japan Advanced Institute of Science and Technology, Japan

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Quality assurance (QA) has become an increasingly important research subject due to globalization and the consequent international expansion of higher education institutions. Such expansion entails obstacles and challenges since national frameworks for QA and the recognition of qualifications do not cover transnational higher education (TNHE). With enthusiastic debate amongst all stakeholders and academics, further exploration is needed to produce more theoretical guidance and good practicing of QA in future TNHE. Thus, the current paper investigated, based on a literature review, the research content of QA in TNHE. To explore this mapping, 4,562 academic papers from 570 journals published between 1990 and 2023, and indexed in Scopus and Web of Science, were assembled. Co-citation analysis and cluster analysis using VOS viewer were applied to explore the answers to the following research questions: What are the principal topics that handle the gaps in TNHE and QA, and how do they correlate with each other? The bibliometric method was applied to verify the following main research groups: (a) assessment; (b) quality; (c) management; (d) learning-teaching. The results revealed the rearrangement of knowledge structure, emerging topics, and potential future directions of research concerning QA and TNHE. They also indicated that educational string and knowledge management strings are the main topics in this realm, and QA is a research topic of great importance for knowledge creation in overall quality stimulation in TNHE.

Keywords: Quality Assurance, Transnational Higher Education, Co-citation and Cluster Analysis

iafor

The International Academic Forum
www.iafor.org

1. Introduction

Quality assurance (QA) has become an increasingly important research subject due to globalization and the consequent international expansion of higher education institutions. Such expansion entails obstacles and challenges since national frameworks for QA and the recognition of qualifications do not cover transnational higher education (TNHE). With enthusiastic debate amongst all stakeholders and academics, further exploration is needed to produce more theoretical guidance and good practicing of QA in future TNHE.

In the 1990s, the internationalization of quality assurance and accreditation began with the implementation of the Lisbon Recognition Convention, signifying a significant change in the acknowledgment of qualifications worldwide (<https://www.coe.int/en/web/>). This convention played a crucial role in establishing a more comprehensive approach to recognizing qualifications globally. QA can be regarded as a significant focal point for reform within higher education on a global scale (Bordogna, 2020). QA processes act as a means of accountability employed by both institutions and QA agencies to uphold high-quality standards. TNHE refers to the process in which a higher education institution expands its study programs to foreign countries, assuring the delivery and quality of the programs (Kleibert et al., 2020). QA processes in institutions increase accountability by guaranteeing that the services they offer to society adhere to rigorous standards. Before the advancements in quality assurance, there was a notable emphasis on enhancing internationalization in higher education, with a specific focus on promoting academic mobility (Bovill et al, 2015).

On the other hand, in the context of public policies, the changing dynamics of internationalization and commodification call for QA measures that promote greater responsibility within higher education systems. Thus, mapping quality assurance in transnational higher education is an ongoing and dynamic process that requires collaboration and adherence to research to maintain the highest standards of education across borders.

2. Literature Review

2.1 Quality Assurance

Quality assurance in TNHE is a crucial aspect to ensure that the academic standards, learning outcomes, and student experiences are consistent and aligned across different international locations and institutions (Carvalho et al, 2022). Transnational higher education refers to educational programs or courses offered by one institution (often based in one country) that are delivered in another country, either through partnerships with local institutions or via online platforms (Trifiro, 2018). Accreditation and recognition ensure that the transnational programs are accredited and recognized by relevant education authorities in both the host and home countries is essential. This process may involve complying with specific national or regional accreditation standards.

The governance and quality management of higher education institutions now places significant emphasis on the quality assurance of transnational higher education. Quality assurance has gained immense importance as a reform priority in higher education globally. Despite being a shared primary goal, different countries pursue specific sub-objectives, including enhancing educational quality, ensuring transparency in quality and standards, implementing accreditation mechanisms, and fostering public accountability (Garuana, 2016). The implementation of quality management systems within universities is motivated

by the escalating global competition for both funding and student enrollment, particularly in nations where tuition fees are substantial. Nevertheless, the understanding and evaluation of quality vary across various higher education systems, given the absence of a universally accepted definition of quality. According to Carvalho et al (2022), the concept of quality is multifaceted, leading to confusion, as each person's understanding of quality may vary. Additionally, the objectives and viewpoints on quality also differ among various groups of stakeholders.

At the nation-state level, governments play a crucial role in promoting the global “quality movement” (Zwanikken et al., 2013). The adoption of quality assurance systems in one nation can serve as a model or best practice for others to emulate and implement.

2.2 Transnational Higher Education

Transnational higher education (TNHE) encompasses higher education programs or opportunities that are available and accessible in multiple countries (Wakefield & Dismore, 2015). TNHE is characterized by students studying in a country different from the one where the awarding institution is based (home country). This type of education encompasses various delivery modes, such as franchising, branch campuses, twinning programs, and distance learning arrangements. (Altbach, 2004). Each of these models requires a specific governance framework to ensure effective collaboration, quality standards, and compliance with relevant regulations (Hou, 2014).

The diversity of educational systems, cultural differences, and varying legal frameworks across countries make it difficult to ensure consistent and effective quality assurance in TNHE. As a result, maintaining and upholding quality standards in TNHE becomes a complex task for regulatory bodies and institutions involved (Hou et al., 2015). These guidelines have been widely disseminated and discussed, especially among the quality assurance community, and are expected to be a major reference document as transnational education grows in response to international demand.

A notable increase in higher education offerings that are not tied to a specific national education system, is observed in certain regions globally. While this phenomenon is not entirely novel, it has become more prevalent in recent years and has taken on various diverse manifestations. Some higher education institutions, which are part of a national education system, have established branch campuses in foreign countries for a considerable period (De Wit, 2002). And maintaining consistent academic quality across borders is crucial in transnational education. Effective governance in transnational education includes provisions for student support services, including admissions, orientation, counseling, and academic advising (Sella & Lingard, 2013). Governance frameworks should balance the autonomy of each participating institution with the need for collaborative decision-making. The allocation of decision-making authority, such as curriculum development, admissions criteria, and faculty appointments, should be clearly defined and agreed upon by all partners.

2.3 Research Questions

Based on the above findings, we attempt to answer the research question: What are the principal topics that handle the gaps in TNHE and QA, and how do they correlate with each other?

This study was conducted to systematically chart the evolution and substance of the literature on quality assurance (QA) in transnational higher education (TNHE). The goal was to create a comprehensive and multidisciplinary overview of this field. To achieve this, a bibliometric analysis was employed, involving the examination of 1,468 articles sourced from 236 distinct academic journals. Specific search criteria were applied to identify relevant articles published between the years 2012 and 2022.

The analysis utilized VOS viewer to examine social and knowledge structures, enabling us to analyze cognitive structures and networks related to quality assurance within the realm of TNHE. The study also assessed aspects like network size and the growth in the number of publications to determine whether the research field of quality assurance in TNHE is well-defined and coherent, rather than just a collection of disconnected topics. The research sought to provide valuable insights into the state of knowledge in the domain of quality assurance in TNHE and its interconnectedness, contributing to a deeper understanding of the subject within the academic area.

3. Research Methodology

3.1 Co-citation Analysis

Co-citation is a bibliometric concept used to analyze and understand the relationship between scholarly works based on their citation patterns (Small, 1973). It is a measure of how often two documents are cited together by other works, indicating a degree of similarity or relatedness in the content of the cited documents. By analyzing the frequency of co-citations among literature, scholars can uncover common themes, concepts, and connections that reflect the shared understanding and collaboration among researchers (Trujillo & Long, 2018). The co-occurrence matrix aids in identifying key works and influential ideas that have shaped the field, and this approach contributes to a better understanding of the research landscape and fosters insights into knowledge dissemination and collaboration within the scientific community. According to Braam et al. (1991), bibliometric analysis provides insights into the relationships and interactions within the academic community, helping to understand the dissemination of knowledge, research trends, and the formation of research networks. Thus, among the 1468 articles selected, 438 articles were cited a minimum of two times. These articles were utilized to conduct a co-citation analysis.

VOS Viewer is a software application developed by the Centre for Science and Technology Studies (CWTS) at Leiden University (<https://www.vosviewer.com>). It is used for bibliometric visualization and analysis, particularly for exploring and visualizing bibliographic data and scientific networks. VOS Viewer allows users to create visualizations of scientific collaboration networks, co-citation networks, and co-authorship networks (van Eck & Waltman, 2009). It uses bibliographic data, such as publications, authors, and citations, to create maps and visual representations that help researchers gain insights into research trends, collaborations, and the structure of scientific knowledge in a particular field. In this study, the researchers utilized VOS Viewer to perform co-citation analysis, which is a fundamental quantitative method. This approach allowed them to explore research questions by examining selected journal articles and identifying the connections and relationships between cited works.

3.2 Web of Science

Web of Science is a widely recognized and competitive citation database used worldwide for academic research (<https://www.webofscience.com>). Its core collection, known as the three classical journal citation indexes, includes the Science Citation Index Expanded, Social Sciences Citation Index, and Arts and Humanities Citation Index. These indexes are highly popular and extensively utilized by scholars in various academic disciplines. In this study, the researchers opted for a different approach to article selection. Instead of choosing journals and subject categories, WoS citation databases and specific search strings were employed to select relevant articles. This alternative method allowed them to focus on specific research questions and uncover insights based on the retrieved articles, diverging from the more conventional approach of journal and subject category selection. (Zhu & Liu, 2020).

The researchers performed a comprehensive search using specific phrases within the titles, keywords, and abstracts of articles. These search strings were formulated based on a glossary that comprised essential terms along with their corresponding definitions. This approach ensured a systematic and structured exploration of the relevant academic literature (Vlasceanu, 2007). Among the 21 different search phrases that were tested, only 9 of them produced pertinent and applicable data. These specific search strings were aligned with the terms and definitions outlined in Vlasceanu's glossary, indicating their effectiveness in retrieving relevant academic information for the study (2007). Selection of search strings includes accreditation, transnational education, studying; accreditation, transnational education, teaching; accreditation, transnational education, studying; competition, transnational education, studying, quality; competition, transnational education, teaching; competition, transnational education, studying; quality; competition, transnational education, teaching, quality; enhancement, transnational education, studying, quality; enhancement, transnational education, teaching, quality; enhancement, transnational education, studying, quality.

4. Results and Discussion

4.1 Core Journals for Quality Assurance of Transnational Higher Education

The research identified three distinct zones of journals based on geophysics and lubrication. Figure 1 presents empirical evidence indicating an unequal distribution among these zones. Zone 1, which pertains to higher education, comprises core journals and accounts for approximately one-third of all articles published. In Zone 2, scattered three sub-zone articles have been published in journals of Studies in Higher Education Research, British Journal of Education, and Teaching in Higher Education. The last zone of the articles is distributed in the Asia Pacific Education Review.

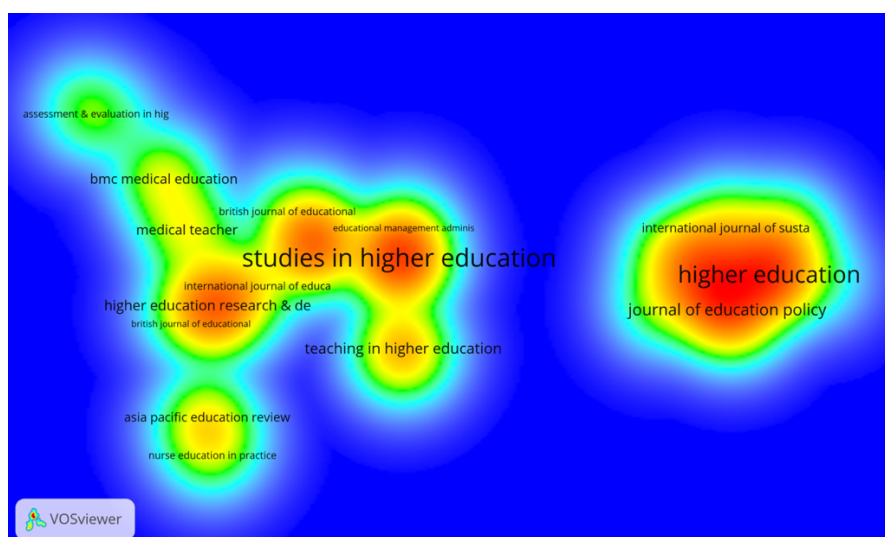


Figure 1: Core journals for publication of quality assurance of transnational higher education

4.2 Co-citation Analysis

By analyzing co-citations, the QA of TNHE can be visually represented by studying the subjects, groupings of subjects (topic clusters), and the relationships linking these subjects and clusters, as depicted in Figure 2. This diagram is produced using the VOS Viewer software, which employs a visualization technique akin to multi-dimensional scaling, to display similarities. Within the diagram, there are four distinct groupings (clusters) as evident in Figure 2. Lines on the map indicate the interconnections between these clusters. In the visual representation depicted in Figure 2, articles are linked in space based on author names. Larger font sizes for names indicate greater centrality within the network.

The Motivation-Cluster (represented in yellow) and the Governance-Management-Cluster (in green) as well as the Learning-Teaching-Cluster (in blue) exhibit robust interconnections with each other. In contrast, the Commercialization-Market-Cluster (depicted in red) demonstrates weaker links to the remaining clusters. The limited number of lines connecting the Commercialization-Market-Cluster to the other three clusters indicates a lower degree of connectivity. This configuration suggests that discussions surrounding the quality assurance of TNHE are characterized by a loose coupling of four distinct topics in scientific communication.

Initially, a preliminary comprehension of the subjects encompassed within each cluster was attained through the execution of a word count analysis applied to the titles of the articles. This approach holds academic significance as it aids in discerning the overarching themes of the articles before engaging in a more comprehensive analysis. Subsequently, a closer examination of the articles led to the identification of key categories within each cluster. Through the classification of the top six most frequently cited articles, the primary themes of each cluster became apparent, and the subjects gained increased subtlety without the necessity of introducing novel categories. Within the Motivation Cluster, the discussion revolves around methodological analysis concerning the validity and impact of quality assurance in TNHE. Furthermore, the distribution of articles across journals reveals that a significant portion of learning-teaching articles were published in the years 2007 and 2012.

Motivations and efforts to monitor international initiatives and ensure quality are integral to the international higher education environment. (Altbach & Knight, 2007; Wilkins et al., 2011). A core perspective of the motivations cluster regards Quality assurance helps to maintain consistent educational standards across different locations and institutions. It ensures that the educational programs offered in transnational settings meet the same level of quality as those offered domestically. This motivation arises from the belief that students should receive a comparable quality of education regardless of the geographical location of the institution. Another strand of literature in the motivation cluster develops a framework for quality assurance to protect the interests of students who pursue education in transnational settings. The discussion of Motivation as a belief in quality assurance also created a link to the governance and management cluster, which is the second largest cluster on this map.

Another significant observation that arose pertains to the significance of governance and management, grounded in transnational directives and global QA agencies. However, this approach introduces certain challenges associated with the domestic context within TNHE functions. This is because international and regional quality assurance mechanisms often adopt broader criteria to accommodate the diverse array of institutions, potentially overlooking national particularities (Castle & Kelly, 2004). Coleman (2003) also explored the quality assurance body differences by comparing British Quality Assurance Agency and Australian Universities Quality Agency. This cluster is closely related to the teaching and learning cluster. Because governance in transnational higher education requires ongoing monitoring and evaluation to assess the effectiveness and quality of the programs. Regular reviews, assessments, and evaluations help identify areas for improvement and ensure the continuous enhancement of the educational experience for students learning and teaching delivery. Also, some research explored transnational programs that are accredited or recognized by relevant quality assurance agencies. This helps to validate the quality and credibility of the programs offered, both in the host country and the sending country.

Among the clusters, the teaching-learning cluster stands as the most compact. Its primary categories encompass assessment, learning, students, quality, teaching, education, and evaluation. The article with the most citation in the cluster is that by Knight (2015), who explored a framework that differentiates between collaborative TNHE and independent TNE modes of delivery. Gribble and Ziguras (2003) investigate the existing pre-departure cross-cultural training offered by Australian universities to enhance comprehension regarding the sufficiency of the assistance provided to Australian educators engaged in offshore teaching. Other research focuses on learning skills and outcomes. For example, Dai et al. (2019) investigated diverse techniques encompassing self-assessment, peer assessment, and co-assessment. This comprehensive exploration delineates the individual contributions of these assessment methodologies towards the advancement of educational excellence, harmoniously aligned with the principles of lifelong learning. This implies a scholarly examination of how these assessment strategies impact and improve the educational process while being consistent with the overarching philosophy of continuous and lifelong learning. While there are numerous challenges associated with TNHE, such as issues related to qualification recognition across national higher education systems, it continues to be an appealing option for various stakeholders. Students find TNHE attractive as it enables them to obtain a foreign degree while studying in their country of residence. Higher education institutions (HEIs) view TNHE as an opportunity to expand their market and reach a broader audience. Additionally, governments, in response to the increasing demand for higher education, see TNHE as a potential solution to address the difficulties they encounter (Altbach & Knight, 2007).

The fourth cluster is distinct from the other three clusters due to its focus on a different topic, as the articles within this cluster do not address the quality of TNHE. Within this fourth cluster, the key categories revolve around commercialization and the market.

Under the framework of academic capitalism, TNHE seeks to maximize financial resources by leveraging its intellectual property, research findings, and reputation to generate income through standard quality delivery (Slaughter, 2004). By implementing robust quality assurance processes, organizations signal their commitment to delivering high-quality products or services. This can enhance their reputation, build trust with stakeholders, and attract customers or partners. Quality assurance mechanisms, such as certifications or audits, can serve as symbols of legitimacy and differentiate organizations in the educational market (DiMaggio & Powell, 2016). They regard students as customers of universities, emphasizing that students are perceived as the primary clientele. In this context, various pertinent factors, including students' needs and preferences, should be integrated into the quality assurance framework within TNHE. This viewpoint underscores the importance of aligning educational practices with student expectations and experiences to enhance overall quality.

Through a succinct examination of the content prevalent in the most frequently referenced articles across the four identified clusters, it is possible to perceive interrelated themes. These thematic connections originate from discussions encompassing the definitions, assessments, quantifications, and administration of quality. To illustrate, the exploration of motivation within the first cluster is intricately interwoven with the dialogue concerning teaching and learning within the quality management cluster. Notably, the most pronounced linkage between the teaching and learning cluster and the governance and management cluster lies in the pointed critique of quality assurance mechanisms in transnational higher education functioning as steering mechanisms.

In contrast, the Commercialization-Market cluster assumes a distinctive perspective compared to the other three clusters. This divergence arises because the articles within the Commercialization-Market cluster abstain from engaging with the subject of teaching and learning quality. Instead, the central emphasis within the commercialization cluster revolves around the multifarious strategies adopted by organizations to manifest their dedication to delivering exceptional products or services. This underscores the intricate relationships between various thematic clusters while highlighting the divergent focus and perspectives within each, contributing to a comprehensive understanding of the discourse on quality in higher education.

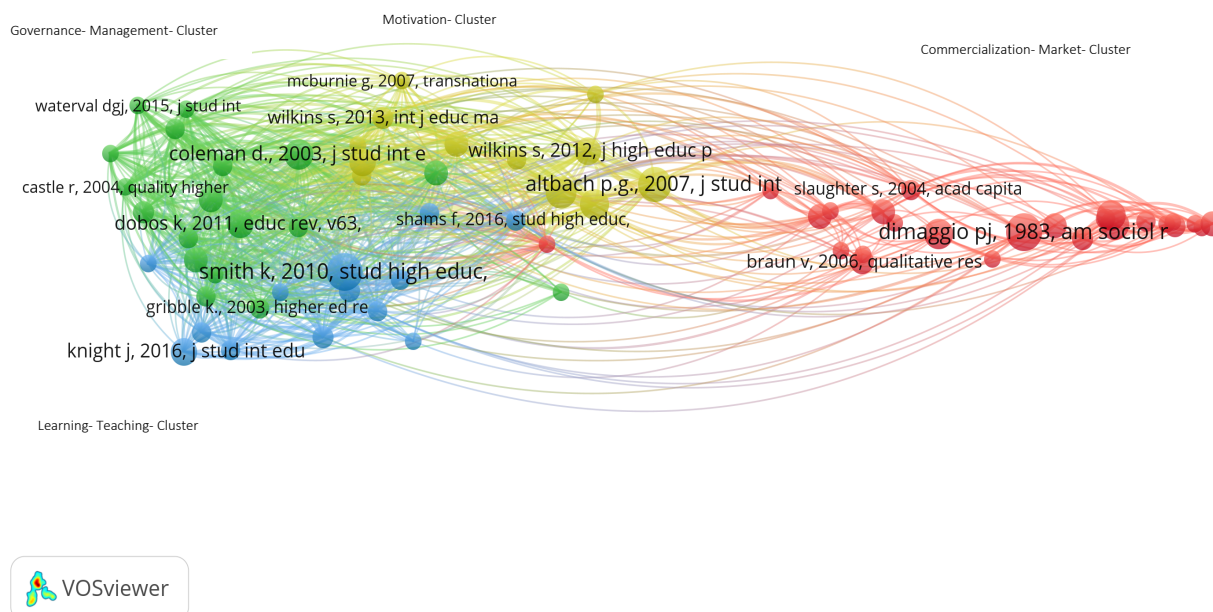


Figure 2: Co-citation analysis

4.3 Publication Rate and Cluster Affiliation

Figure 3 displays a relatively moderate pace of publication spanning from 2000 to 2013. After 2013, a notable and sudden upsurge in the volume of articles is discernible, culminating in a subsequent gradual decline in the publication rate. In terms of numerical count, the number of articles focusing on the quality assurance of TNHE escalated annually from under 10 to over 20 articles in 2013, indicating an evident surge in publication output. However, assessing this increase in the publication rate alone does not suffice to categorize the quality assurance of transnational higher education as an established research field. A disciplinary area is estimated to comprise a maximum of 100 scholars who publish annually (Price, 1986). Considering the growth trajectory of scholarly publications in recent decades, contemporary studies have indicated varying thresholds ranging from 250 to 600 authors who contribute to a field's literature yearly (Price, 1986). This indicated that more and more research focus on the realm of QA and TNHE, however, is still not a research subject. The period of relatively moderate publication rate observed between 2000 and 2013 signifies a consistent expansion of research. Beginning in 2016, a sudden surge in article numbers becomes apparent, followed by a subsequent gradual decline in the publication rate. This pattern indicates that the field of research concerning QA and TNHE has been consistently burgeoning, except for the period marked by the impact of COVID-19.

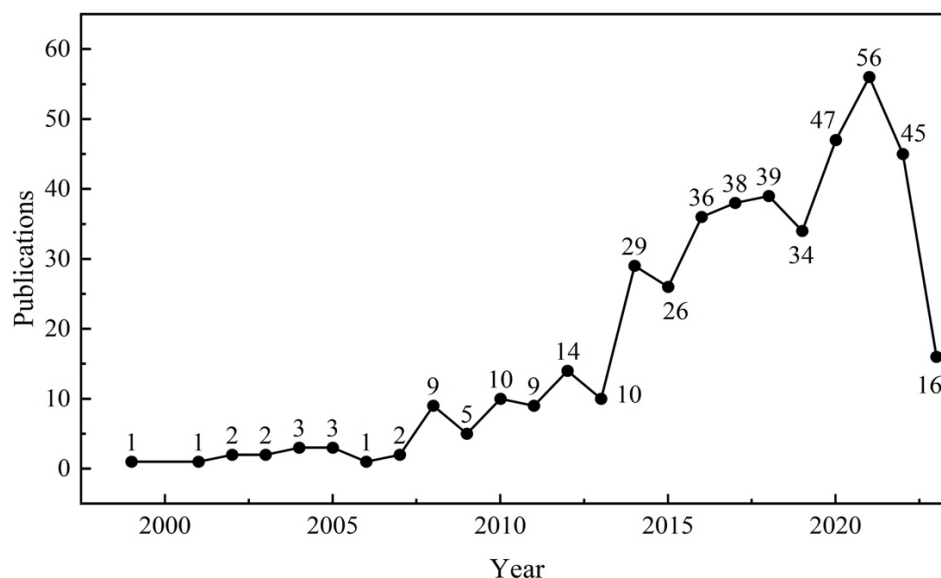


Figure 3: Publication number of articles

According to the cluster affiliation of the authors in Figure 4, most authors are situated in European and Asian countries. This could be due to the more TNHE suppliers and receivers in these countries. Because maintaining consistent academic quality across borders is crucial in transnational education, governance mechanisms include joint academic boards, shared curriculum development, faculty exchange programs, and regular quality audits to ensure compliance with agreed-upon standards, which is also an outline of the QA mechanism for both partners.

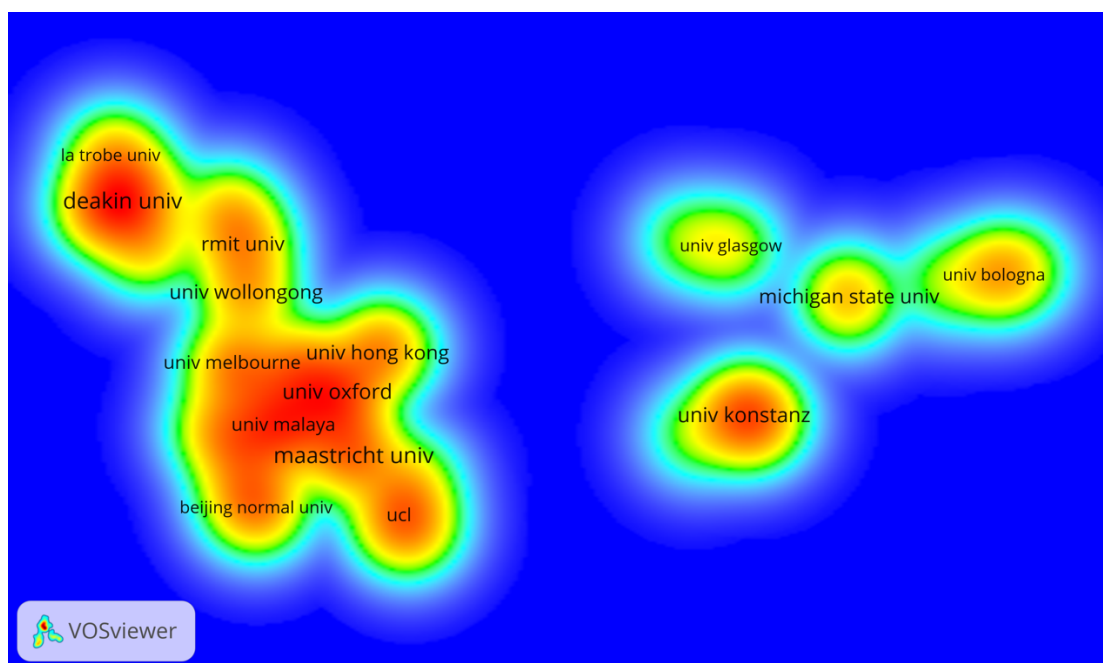


Figure 4: Cluster affiliation of the authors

5. Conclusion - Recommendations and Limitations

As discussed earlier, it is premature to definitively characterize quality assurance in TNHE as a fully developed research topic. Nevertheless, the empirical evidence presented in this paper

suggests various indicators that point toward the mapping nature of QA in TNHE. An additional signal that reinforces the perception of quality assurance in TNHE as a mapping field is derived from the publication rate. The linear decline in the publication rate can be attributed to the impact of the Covid-19 pandemic, as observed by Wang and Kim (2023).

Taking a comprehensive view of the four clusters, governance appears to encompass the overarching theme of quality assurance in transnational higher education, as highlighted by Dobbins and Knill (2017). This is particularly evident in the Motivation- Cluster, the Teaching- Learning- Cluster, and the Governance- Management- Cluster. The interplay between these clusters indicates a dual form of governance. The first involves top-down management driving governance in teaching and learning within the Commercialization-Market-Cluster and Governance-Management-Cluster. The second mode of governance is represented by the Teaching-Learning-Cluster and Motivation-Cluster, exemplifying a bottom-up form of governmentality led by individual academics. It remains intriguing to observe how these two governance approaches converge within the research domain of TNHE quality assurance.

A notable challenge emerges when a TNHE provider operates independently and lacks affiliation with any established higher education system. This situation places the provider outside the established framework of quality assurance and accreditation, leading to difficulties in ensuring the credibility and quality of TNHE offerings. This gap in oversight raises significant concerns about how these qualifications are perceived by employers and society at large. The assurance of TNHE quality becomes imperative to uphold the reputation and international recognition of qualifications granted by these providers. Establishing robust quality assurance mechanisms becomes essential to uphold the value and trustworthiness of TNHE degrees, ensuring they meet the required standards and are respected both within and beyond national borders. (Tran et al., 2022). To realize the learning outcomes, the curriculum of the transnational programs is aligned with those of the home institution. This alignment ensures that students receive the same level of education regardless of the location of the program delivery. Stakeholders need to provide adequate student support services to ensure that students have access to resources and assistance regardless of their location (Bolton & Nie, 2010). This could include academic advising, library resources, counseling, and technical support for online programs.

Quality assurance plays a crucial role in safeguarding the integrity and reputation of transnational programs and institutions. Quality assurance in transnational education addresses the overall student experience, including access to support services, academic advising, and resources (Smith, 2010). This ensures that students have a positive learning environment and receive adequate assistance throughout their studies. It promotes transparency and accountability in the delivery of transnational programs. By providing clear information about program content, delivery modes, tuition fees, and student support services, institutions build trust with their stakeholders.

Overall, quality assurance in transnational higher education is essential for maintaining academic excellence, fostering trust among stakeholders, and ensuring that students receive a high-quality education regardless of their geographic location.

Acknowledgments

Professor Eunyoung Kim proofread the outline of this research. Wang Jing conducted the research and wrote the paper.

References

- Altbach, P. (2004). Globalisation and the University: Myths and realities in an unequal world. *Tertiary Education and Management*, 10(1), 3–25. DOI:10.1080/13583883.2004.9967114
- Altbach, P.G., & Knight, J. (2007). The internationalisation of higher education: Motivations and realities. *Journal of Studies in International Education*, 11(3–4), 290–305. DOI:10.1177/1028315307303542
- Bordogna, CM. (2020). Are Degree-Awarding Institutions Doing Enough to Support the Implementation of Quality Assurance in Transnational Higher Education Partnerships? *Journal of Studies in International Education*, 24 (3), pp.371-386. DOI:10.1177/1028315319888458
- Bolton, D., & Nie, R. (2010). Creating Value in Transnational Higher Education: The Role of Stakeholder Management. *Academy of Management Learning & Education*, 9(4), 701–714. DOI:10.5465/amle.9.4.zqr701
- Braam, R. R., Moed, H. F., & van Raan, A. F. J. (1991). Mapping of science by combined co-citation and word analysis. I. Structural aspects. *Journal of the American Society for Information Science*, 42(4), 233–251. DOI:10.1002/(sici)1097-4571(199105)42:4%3C233::aid-asi1%3E3.0.co;2-i
- Caruana, V. (2016). Researching the transnational higher education policy landscape: Exploring network power and dissensus in a globalizing system. *London Review Education*, 14 (1), pp. 55-68. DOI:10.18546/LRE.14.1.07
- Carvalho, N., Rosa, M. J., & Amaral, A. (2022). Cross-border higher education and Quality Assurance. results from a systematic literature review. *Journal of Studies in International Education*, pp.136-153. DOI:10.1177/10283153221076900
- Castle, R. and Kelly, D. (2004). International Education: Quality Assurance and standards in offshore teaching: Exemplars and Problems, *Quality in Higher Education*, 10(1), pp. 51–57. DOI:10.1080/1353832042000222751
- Coleman, D. (2003). Quality Assurance in Transnational Education, *Journal of Studies in International Education*, 7(4), pp. 354–378. DOI:10.1177/1028315303255597
- Dai, K., Matthews, K. E., & Reyes, V. (2019). Chinese students' assessment and learning experiences in a transnational higher education programme. *Assessment & Evaluation in Higher Education*, 1–12. DOI:10.1080/02602938.2019.1608907
- De Wit, H. (2002). *Internationalisation of higher education in the United States of America and Europe: A historical, comparative, and conceptual analysis*. Westport: Greenwood Press.

- DiMaggio, P.J. and Powell, W.W. (2016). The iron cage revisited: Institutional isomorphism and collective rationality in Organizational Fields, *American Sociological Review*, 48, pp. 147-160, *Organizational Sociology*, pp. 517–530. DOI:10.4324/9781315247533-34
- Dobbins, M., & Knill, C. (2017). Higher education governance in France, Germany, and Italy: Change and variation in the impact of transnational soft governance. *Policy and Society*, 36(1), 67–88. DOI:10.1080/14494035.2017.1278868
- Gribble, K. and Ziguras, C. (2003). Learning to teach offshore: Pre-departure training for lecturers in transnational programs, *Higher Education Research & Development*, 22(2), pp. 205–216. DOI:10.1080/07294360304115
- Hou, et al. (2014). Exploring the diverse motivations of transnational higher education in China: complexities and contradictions, *Journal of Education for Teaching*, 40(3), pp.300-318 DOI:10.1080/02607476.2014.903028
- Hou (Angela), Y.-C., Ince, M., Tsai, S., Wang, W., Hung, V., Lin Jiang, C., & Chen, K. H.-J. (2015). Quality assurance of joint degree programs from the perspective of quality assurance agencies: experience in East Asia. *Higher Education Research & Development*, 35(3), 473–487. DOI:10.1080/07294360.2015.1107878
- Kleibert, JM et al. (2020). Transnational education zones: Towards an urban political economy of “education cities” *Urban Studies*, 58(14), pp.2845-286. DOI: 10.1177/0042098020962418
- Knight, J. (2015). Transnational Education remodeled, *Journal of Studies in International Education*, 20(1), pp. 34–47. DOI:10.1177/1028315315602927
- Price, D. (1986). *Little science, big science ... and beyond*. New York (N.Y.): Columbia University Press.
- Sellar, S., & Lingard, B. (2013). The OECD and global governance in education. *Journal of Education Policy*, 28(5), 710–725. DOI:10.1080/02680939.2013.779791
- Slaughter, S. (2004). *Academic capitalism and the new economy* [Preprint]. DOI: 10.56021/9780801879494.
- Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. *Journal of the American Society for Information Science*, 24(4), 265–269. DOI:10.1002/asi.4630240406
- Smith, K. (2010). Assuring quality in transnational higher education: a matter of collaboration or control? *Studies in Higher Education*, 35(7), 793–806. DOI: 10.1080/03075070903340559
- Tran, N. H. N., Amado, C. A. da E. F., & Santos, S. P. dos. (2022). Challenges and success factors of transnational higher education: a systematic review. *Studies in Higher Education*, 48(1), 113–136. DOI: 10.1080/03075079.2022.2121813

- Trujillo, C. M., & Long, T. M. (2018). Document co-citation analysis to enhance transdisciplinary research. *Science Advances*, 4(1), e1701130. DOI: 10.1126/sciadv.1701130
- Trifiro, F. (2018). Inter-agency cooperation in the quality assurance of transnational education: challenges and opportunities, *Quality in Higher education*, 24(2), pp.136-153. DOI:10.1080/13538322.2018.1481805
- Van Eck, N. J., & Waltman, L. (2009). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2), 523–538. DOI: 10.1007/s11192-009-0146-3
- Wakefield, K., & Dismore, H. (2015). The role of transnational networking for higher education academics. *Higher Education Research & Development*, 34(6), 1281–1296. DOI: 10.1080/07294360.2015.1024630
- Wang, J., Kim, E. The Development and Validation of an Instrument to Collaborative Teaching Assessment under the Impact of COVID-19 through the SECI Model. *Sustainability* 2023, 15, 9540. DOI:10.3390/su15129540
- Wilkins, S., Balakrishnan, M.S. and Huisman, J. (2011). Student choice in higher education, *Journal of Studies in International Education*, 16(5), pp. 413–433. DOI:10.1177/1028315311429002
- Zwanikken, P. A. C., Peterhans, B., Dardis, L., & Scherpbier, A. (2013). Quality assurance in transnational higher education: a case study of the tropEd network. *BMC Medical Education*, 13(1). DOI:10.1186/1472-6920-13-43
- Zhu, J and Liu, W. (2020). A tale of two databases: the used of Web of Science and Scopus in academic papers. *Scientometrics*, 123(1), pp.321-335. DOI:10.1007/s11192-020-033387-8

Contact email: s2120425@jaist.ac.jp

Just Between Meme and You: Online Memes as Health Communication Tools in Design and Media Arts Higher Education Curricula

Heitor Alvelos, University of Porto, Portugal
Susana Barreto, University of Porto, Portugal
Cláudia Raquel Lima, Universidade Lusófona, Portugal
Eliaana Penedos-Santiago, University of Porto, Portugal
Jorge Brandão Pereira, Polytechnic Institute of Cávado and Ave, Portugal
Pedro Alves da Veiga, Universidade Aberta, Portugal

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This study posits that current online trends of mistrust in health policies may be partly overcome through an exploratory employment of memes. It aims at filling a critical gap whereby unexpected communication channels might succeed in addressing subjective bias seemingly immune to fact-based cognitive persuasion channels. We propose that the classroom may be a particularly apt context for this exploration: as part of the core lexica of younger generations, memes may act as pathways to stimulating actual research. Furthermore, by hypothesising that scientific knowledge and policies may incorporate aesthetics and semantics of online media, we aim at unpacking an often polarised debate around health communication – as particularly evident during the recent pandemic. These premises inform a set of assignments under implementation in various higher education Design and Media Arts courses in Portugal; exercises cover a range of approaches to pandemic-related health communication, trust and behaviour, employing visual languages and semantics of memes as a primary mechanism; we aim to create an ambivalence that dilutes expectations of formality and univocal authority, thus facilitating engagement. Assignments include: translation of scientific jargon, unexpected perspectives, before/after dynamics, humour and non-threatening irony, personal testimonies, and random image-text coupling. Visual outcomes and relevant testimonies from participants are currently under validation and will be presented. We further envision a scalability and visibility beyond both the classroom environment and the disciplines in question. The study is developed under the framework of the project “An Infodemic of Disorientation: communication design as mediator between scientific knowledge and cognitive bias.”

Keywords: Health-Related Memes, Graphic Design in Social Media, Public Health Communication, Art and Design Education

iafor

The International Academic Forum
www.iafor.org

Introduction

In recent years, an empirical consensus has been forming regarding a gradual rise of public mistrust towards reliable health information; this has been particularly visible, and has become particularly poignant, throughout the recent COVID-19 pandemic (2020-23), with multiple theories and practices contesting scientific knowledge on the subject (Lazarus et al, 2002). Concomitantly, citizen adherence to health policies saw a significant decrease, often to the point of hostility, coinciding with the promotion of alternative (and ineffective) therapies, unexpected alliances between wellness communities and conspiracy-driven propaganda, and even outright fabrications (Russell, 2022).

Health policies have often been contested, with the “vaccines cause autism” (Kata, 2011; Walker, n.d.) controversy (Wakefield, 1998; redacted) laying the groundwork for a template narrative branching into multiple, ongoing variations (Germani& Biller-Andorno, 2021); however, the exponential proliferation of social media (Ortiz-Sánchez, 2020) , both in its global technological outreach and its recurring “thought bubble” communities, have amplified the issue to an unforeseen scale (Raballo et al, 2022). This may be partly explained by the exponential ease in sharing subjective, partial, unreliable, unproven or deliberately false content, coupled with a pressing, addictive need for subscribing to graspable, aggregating narratives on the part of online users.

These graspable narratives are often the opposite of what health sciences can readily provide, as methods and advancements entail degrees of epistemological complexity and require an expertise that is not necessarily readily present in the general population; this may become an additional factor in understanding the frequent accusations that health experts and authorities are involved in secretive, punishing activity, when in fact what we see is inevitable epistemological hermeticism.

A great effort is often invested in translating complex health knowledge and phenomena into concepts and linguistic formulations that the general public can understand as the basis for specific health policies; however, health researchers and authorities largely communicate via facts, infographics, statistics and logic, while large segments of the population are currently communicating via deconstructive images, humour, rumours, and individual testimonies. While understandable from a semantic viewpoint, we argue that this chasm needs a degree of dilution in order for health policies to reach skeptic segments of the population.

DiResta (2023) states this dilution as a duty in face of a changed communication landscape, and places the onus on authorities: “Institutional communicators / public health entities do not understand that the way people communicate has changed [...]: you have to begin to understand the power of storytelling” - a point often observed throughout the empirical groundwork of the present research, in how a single testimony of a vaccine reaction gone wrong presented in mainstream media may compromise, in the minds of the audience, the understanding of statistical evidence that points to such occurrence as residual.

Additionally, the expectation that the cognitive process is purely rational has by now been debunked by psychologists and cognitive neuroscientists; Goel (2022) encapsulates it as “The Reasoning Mind Recruits the Instinctive Mind.” In the present context, this phenomenon translates as the duty of health authorities to take into account subjective components in their engagement processes with the population. It is fair to recognise that an appeal to emotional components has been present in public health campaigns - particularly gratitude to health

professionals, and fear of death; however, they remain staunchly within the parameters of the expected semantics of authoritative discourse.

Given the above premises, the present research has posited and rehearsed a disruptive hypothesis to the aforementioned chasm: current online trends of disinformation and mistrust in health policies may be partly overcome through an employment of social network aesthetics and semantics on the part of authorities. Furthermore, Communication Design and Media Arts may assist in this process by capacitating students and professionals in both technical and semiotic skills required. As such, the design course classroom may be an apt context for an exploratory re-purposing of social media source materials such as and reels. As part of the native lexica of younger generations, these may act as pathways to stimulating actual knowledge-seeking by citizens, while diluting pre-emptive expectations of formality and univocal authority, thus facilitating cognitive and behavioral engagement.

Development

In order to test the aforementioned hypothesis, and following a series of anonymous interviews with COVID-19 deniers and vaccine-hesitant citizens, a set of meme-related assignments were developed in four higher education Design and Media Arts courses in Portugal, on a BA, MA and PhD level. The assignments were preceded by an introduction that addressed the above issues. The workshops were conducted with teams of one to three students using a team-based learning approach. Students of an international background (namely Portugal, Brazil, Argentina and France) were thus invited to generate memes and reels that addressed pandemic-related content under four possible categories: testimonial, informative, instructive, and deconstructive. These were further unpacked as a pragmatic set of directives, including: translation of scientific jargon, rendering complex data accessible, and employing humour and non-threatening irony.

The framework involved a series of core concepts familiar to design students: tactical media, figures of speech, storytelling, edutainment, activism, remix cultures, subvertising, culture jamming, and hacktivism; students were invited to pursue one or more of these concepts. Workshop length varied between one and two hours, and discussion was encouraged, both during the briefing and the execution. Despite the provided guidelines and frameworks, workshops tended to be open-ended and intuitive, as the exploratory nature of the hypothesis demanded further, unexpected insights to surface throughout.

Conclusions

A preliminary assessment of the conducted workshops has revealed the following evidence:

1. Humour and irony were the most popular approach; this is concurrent with the prevailing stream of semantics in social media contexts, thus revealing a compatibility of the generated specimens with the desired locus of their circulation;
2. Workshops focusing on infographics as translation of complex data and knowledge required a more structured, pedagogical approach - particularly as a measure of quantitative rigour was at stake; this balance between intuition and fact-based information is at the crux of the challenge, and will need further refinement;
3. A noteworthy number of students resisted the challenge of revisiting the recent pandemic; however, rather than a purely retrospective exercise, the research aims at laying a groundwork in communication templates that may prove useful in future instances,

health-related or otherwise. As such, resorting to the experience of the pandemic should be regarded as a mechanism for rooting the resulting specimens on empirical, lived experience, while clarifying that health (and scientific) knowledge and policy communication as a whole will ultimately be the added value emerging from the various exercises;

4. Responses have ranged from a hesitancy to participate, to a substantial commitment to testing a pedagogy of health; this is concurrent with classroom dynamics, according to students' interests and skills;
5. Students have learned the basic premises of ascertainment of credible sources of scientific information, identify red flags and manipulation techniques commonly used in disinformation, and recognize the value of evidence-based reasoning. They can therefore themselves act as pedagogues, throughout the learning process, and as future design professionals.

Further validation will occur through a public exhibition of selected specimens, in partnership with the University of Porto's Science and Technology Park, in October 2023; surveys will be conducted with visitors, in order to systematize the outcomes into a second iteration of creative production. The process of systematization is itself contributive to a model, in progress, identifying the various issues in scientific knowledge and policy, their causes and contexts of operation, and the potential roles of design in overcoming said issues. The model will ultimately form the basis of a set of recommendations regarding health communication in social media environments, aiming at content integration in design and digital media art courses, as well as policy recommendations to researchers and health authorities, including a set of core principles in communicating health information and policies beyond facts and statistics, and the presence of design and activism as consulting agents in communication processes.

A first, critical selection and taxonomy of workshop outcomes can be viewed at: <http://tiny.cc/memeandyou>

Acknowledgements

This work is funded by national funds through FCT – Fundação para a Ciência e a Tecnologia, I.P., under the scope of the project 2022.08322.PTDC (Portugal).

References

- DiResta, R. (2023, 18 May). 154: The Truth Wars [Audio podcast episode]. In *Conspirituality*. Conspirituality podcast. <https://www.conspirituality.net/episodes/154-the-truth-wars-renee-diresta>
- Germani, F., & Biller-Andorno, N. (2021). The anti-vaccination infodemic on social media: A behavioral analysis. *PLOS ONE*, 16(3), e0247642. <https://doi.org/10.1371/journal.pone.0247642>
- Goel, V. (2002). *Reason and Less: Pursuing Food, Sex, and Politics*. The MIT Press.
- Kata, A. (2011). Anti-vaccine activists, Web 2.0, and the postmodern paradigm – An overview of tactics and tropes used online by the anti-vaccination movement. *Vaccine Special Issue: The Role of Internet Use in Vaccination Decisions*. Volume 30, pp.3778-3789.
- Lazarus, J.V., Wyka, K., White, T.M. et al. Revisiting COVID-19 vaccine hesitancy around the world using data from 23 countries in 2021. *Nat Commun* 13, 3801 (2022). <https://doi.org/10.1038/s41467-022-31441-x>
- Ortiz-Sánchez, E.; Velando-Soriano, A.; Pradas-Hernández, L.; Vargas-Román, K.; Gómez-Urquiza, J.L.; Cañadas-De la Fuente, G.A.; Albendín-García, L. Analysis of the Anti-Vaccine Movement in Social Networks: A Systematic Review. *Int. J. Environ. Res. Public Health*, 17, 5394 (2020). <https://doi.org/10.3390/ijerph17155394>
- Raballo, A., Poletti, M., & Preti, A. (2022). Vaccine Hesitancy, Anti-Vax, COVID-Conspiracy: From Subcultural Convergence to Public Health and Bioethical Problems. *Frontiers in Public Health*, 10, 877490. <https://doi.org/10.3389/fpubh.2022.877490>
- Russell, F. (2022). Pox populi: Anti-vaxx, anti-politics. *Journal of Sociology*, 0(0). <https://doi.org/10.1177/14407833221101660>
- Walker, J. (n.d.) A Vaccine Hesitant Decoder Ring. Retrieved from <https://www.conspirituality.net/transmissions/a-vaccine-hesitant-decoder-ring>

Contact email: halvelos@fba.up.pt

UX Evaluation of a School Newspaper Creation Platform

Luísa Júlio, University of Aveiro, Portugal
Mariana Alves, University of Aveiro, Portugal
Martinho Mota, University of Aveiro, Portugal
Raquel Cabral, University of Aveiro, Portugal
Telmo Silva, University of Aveiro, Portugal

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Media and information literacy is an increasingly important skill, especially for the younger audiences who consume and believe in information that may not be credible. Thus, school journalism can contribute to combat misinformation and develop media literacy in young people. This paper reports on a platform developed to create school newspapers and support news writing in Portuguese. This tool has several features that can help students write news, such as detecting possible spelling errors and suggesting corrections, suggesting synonyms, and searching for related news sorted by credibility level that can be used to add information to the student's text. The goal is to encourage students' critical thinking about the content they access and create. This paper describes the tests carried out with 44 students and teachers from Portuguese schools on the platform to evaluate the quality of the user experience. The tests assessed momentary UX perception, separating participants into two user profiles, authors, and editors. The methodology applied for this evaluation was divided into four moments: (i) contextualisation of the project and scope of the platform; (ii) initial characterisation questionnaire to learn more about their writing and reading habits, participation and experience in newspapers and contact with news and familiarity with the concept of fake news; (iii) usage scenario, in which participants were able to try the platforms' functionalities; and (iv) final questionnaire, assessing usability, use of the platform and understanding the fundamental aspects of the solution, utilising the SAM and SUS scales.

Keywords: School Newspaper, Digital Platform UX Evaluation, User Experience, Media and Information Literacy

iafor

The International Academic Forum
www.iafor.org

Introduction

School journalism is a powerful pedagogical tool for improving crucial skills in students, such as collaboration, critical thinking, and writing. The shift to the digital age may increase the importance of such a tool beyond school grounds. The advance in technology and connectedness is part of the present society and acts as a social necessity for communication and information by using social media, digital platforms or apps, or news sites. Therefore, having the right tools to navigate this complex digital information ecosystem is crucial. For this, Media and Information Literacy (MIL) is a set of skills that enable users to understand, objectively assess, and respond wisely to media content (Al Zou'Bi, 2022).

It is in this context that the TRUE (Trustworthy news and Related content for a Unified writing Environment) project emerges – promoted by the Portuguese newspaper “Jornal Público,” by the company MOG Technologies and by the University of Aveiro. Its main objective is to create a technological ecosystem that allows the younger generations to write news based on a credibility analysis of information sources, as well as the identification and contextualisation of central themes, resorting to the revitalisation of school newspapers (Carvalho et al., 2023). At the centre of this platform stands the importance of enhancing MIL in the students, helping them evaluate the veracity of the news published and contextualising new content. This also helps combat misinformation and the spread of fake news, which is a malady of today's society.

A tool such as the TRUE platform can be helpful for the younger generations. Given the easy access to mobile technology and the ease with which information spreads, several forms of misleading information, such as rumours and fake news (Molina et al., 2021). This particularly affects younger audiences, which are further influenced by the spread of misinformation. According to Linden (2023), misinformation can infect human minds, and with the usage of the internet, especially social media, it can spread like a virus in a matter of minutes. Therefore, the promotion of MIL can support the awareness of students on the internet to fight hate speech, false news, and online bullying, for instance, but also to utilise media technology to promote the personal well-being of users, being a tool for self-expression and empowerment using critical thinking (Pérez-Escoda et al., 2021). In this context, creating and supporting a pedagogical approach for schools to foster MIL among the students is necessary.

According to Adjin-Tettey (2022), school journalism plays a significant role in addressing misinformation and fostering media literacy among young individuals. Building upon this premise, the TRUE project was initiated to establish school newspapers and support news writing in Portuguese. By engaging students in creating and disseminating news, the project aims to empower them with the necessary skills to navigate the media landscape critically and effectively.

Throughout the platform's development, the TRUE project was grounded on a set of guiding principles, which shaped its design and functionality. These principles included:

- **Fostering Originality:** Students were encouraged to produce original texts. To facilitate this, a plagiarism check feature was implemented to highlight and promote more authorial and creative final products.

- **Supporting Efficient News Writing:** The platform aimed to assist students in improving their news writing skills by providing tools such as spelling checks and synonyms substitution, thereby enabling better and quicker content creation.
- **Newspaper-inspired Layout:** The platform's layout was designed to resemble traditional newspapers and news articles, creating an engaging and familiar interface. Additionally, the platform offered support for including images to enhance the communicative value of the stories.
- **Customizable and Personalized Environment:** Editors were provided with a user-friendly interface to customise their newspaper's homepage, allowing them to create a unique and personalised environment. Features such as the ability to change the colours and sections of the newspaper were implemented to facilitate this customisation process.
- **Additional Supporting Features:** Numerous other features were incorporated to support online school newspapers, ensuring a comprehensive and robust news creation and publication platform.

By adhering to these principles, the TRUE project aimed to create a platform that not only empowered students to produce high-quality content but also fostered a sense of ownership, creativity, and engagement within school journalism.

The evaluation of the platform's User eXperience (UX) involved participants who were categorised into two different roles, namely editors and authors. The evaluation methodology comprised four distinct steps, which will be elaborated upon. The primary objective of this evaluation was to gather valuable information and insights that would initiate the iterative Design-Based Research (DBR) process. The platform could be improved by analysing the gathered data alongside the process, and further testing could be conducted with the refined features. This iterative approach not only allowed for continuous enhancement of the platform but also facilitated ongoing testing as new features were introduced and consolidated.

This paper focuses on assessing the UX, mainly in relation to the usability and effectiveness of the TRUE platform, through momentary tests conducted with 44 students and teachers from Portugal. The paper is divided into four chapters. The first chapter provides a detailed description of the TRUE platform. It outlines the platform's key features, functionalities, and objectives, emphasising its role in facilitating the creation of school newspapers. The second chapter focuses on reviewing and exploring existing conceptualisations of Design-Based Research (DBR) and the utilisation of usability tests and assessments. This chapter sets the methodological framework for evaluating the TRUE platform and emphasises the importance of incorporating user feedback in the iterative development process. The third chapter presents and analyses the results obtained from the UX tests. It discusses the findings and contributions of these tests towards further developing and refining the TRUE platform. Finally, the paper ends with some conclusions and final remarks on the project.

Overall, the paper aims to provide a comprehensive understanding of the TRUE platform, its usability, and its potential impact on creating school newspapers. It highlights the significance of user feedback and iterative development in improving the platform's functionality and user experience.

1. TRUE Platform

The project TRUE was developed in Portugal with the goal of reducing the consumption and spread of fake news among younger audiences. It aims to accomplish this through an innovative and intuitive platform that supports and provides unique tools for creating and supporting digital school newspapers (Carvalho et al., 2023).

The production of journalistic content can play a vital role in enhancing the critical thinking skills of young individuals, as it necessitates thorough research from reliable sources to gather information about the subject being explored. In Portugal, school newspapers are recognised as strategic and pedagogical tools that can contribute to several aspects of students' development, including fostering collaboration, responsibility, and resilience. By strengthening their capacity to seek and make informed assessments of news, such initiatives empower students to take charge of their engagement with media and effectively manage information, particularly online.

The primary goal of the evaluation process was to gain insights into the technological ecosystem utilised by students and their reading habits, both concerning news and general reading. Additionally, the project aimed to assess their proficiency in analysing the credibility of information sources and news articles while equipping them with tools to enhance their critical thinking abilities.

To achieve these objectives, dedicated environments were established for two distinct groups: student authors responsible for writing the news and student or teacher editors tasked with article editing, evaluating, and publishing. In the empirical phase of the project, the news articles were exclusively written by teachers. However, the selection of editors followed the editorial guidelines typically employed by school newspapers, comprising a mix of students and teachers. It is worth noting that throughout this research, all schools adopted an approach in which student authors and editors hailed from diverse backgrounds, thereby fostering a diverse and inclusive journalistic environment.

To ensure the robustness of the solution, the entire development process was centred around a series of iterative stages, employing the Design-Based Research (DBR) approach for technology development. DBR is a methodological approach that enables the refinement of real-world interventions through iterative design, implementation, and evaluation (McKenney & Reeves, 2014). This approach allows for continuous improvement and adaptation of the solution by incorporating feedback and insights gained from each iteration. By following the DBR framework, the project maximises its potential to create an effective and high-quality outcome.

2. Development Process

As stated previously, the development of the TRUE platform followed an iterative DBR process and thus considered the importance of conducting qualified evaluations with participants. The research encompassed all the steps considered essential to align the specific needs of schools and their newspapers, enhance publishing capabilities and promote public participation and support for the platform. The iterative DBR process employed in developing the TRUE platform is comprised of three fundamental steps, which are as follows:

- **Gathering Requirements:** The first step involved collecting and analysing requirements for the platform. These requirements informed the selection and development of the platform's features.
- **Platform Development:** The second step focused on developing the TRUE platform. The platform was designed, implemented, and refined based on the gathered requirements to align with the intended objectives and functionalities.
- **Evaluation Rounds:** The third step encompassed iterative evaluation rounds, which played a crucial role in the DBR process. During these rounds, feedback and insights from participants were collected and analysed. This feedback was then used to inform the iteration process, involving reviewing, debugging, and further evaluation phases. The iterative nature of this step ensured continuous improvement and refinement of the platform based on the insights gained from the evaluations.

By following this iterative DBR process, the TRUE platform aimed to create a solution that effectively addressed the needs of schools to create their newspapers. Feedback from evaluations played a vital role in enhancing the platform's functionality, usability, and overall support for publishing, public participation, and platform acceptance.

2.1 Platform Features

The TRUE platform comprises two primary components: a front office and a back office. The front office component, depicted in Figure 1, is responsible for displaying the newspaper to the public, with all the published news organised into different sections. It provides accessibility to readers, allowing them to access, read, and share the school news conveniently. The front-office interface was designed to facilitate a user-friendly and engaging experience for the audience.



Figure 1 – TRUE Platform front-office

On the other hand, the back-office component is where authors and editors can manage the newspaper. Authors and editors can create and publish news articles within the back office. Additionally, they can personalise the newspaper according to their preferences. This

includes customising news sections, choosing a colour palette, and configuring the layout of the front-office interface. This flexibility allows for a more customised and engaging user experience for those accessing the newspaper and those managing its content.

Moreover, the TRUE platform provides a comprehensive set of tools to support students in their news writing process. The news creation interface, as depicted in Figure 2, offers several functionalities to enhance the writing experience.

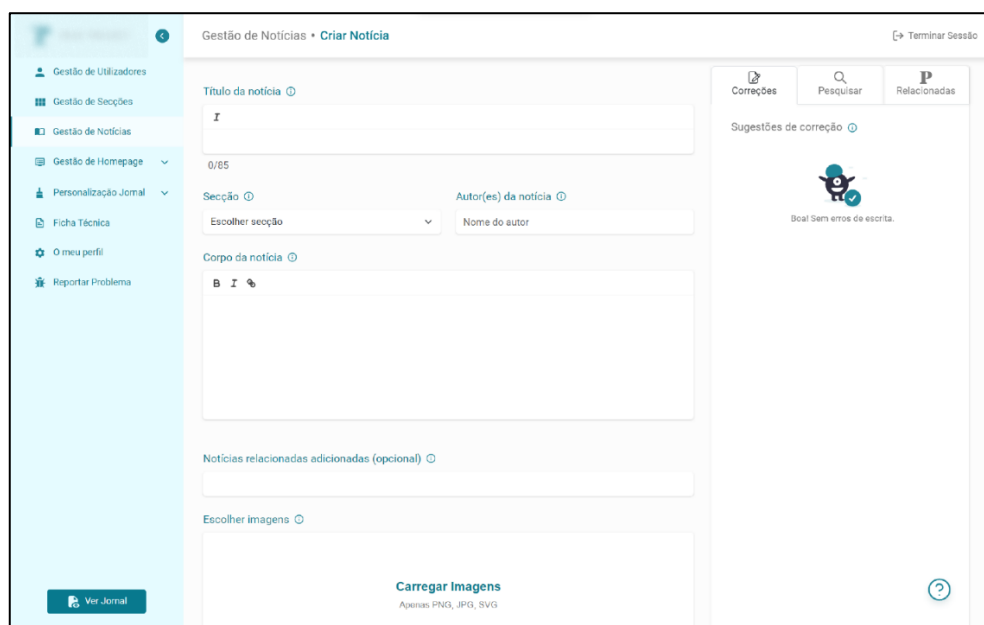


Figure 2 – TRUE Platform back-office

One of the key tools available is the spellchecker, which actively checks the text as users write and suggests corrections for any misspelt words. This feature assists students in maintaining accurate and error-free content throughout the writing process.

To further enrich their texts, users have access to a synonyms tool. This tool allows students to explore alternative word choices and expand their vocabulary, enabling them to enhance the quality and expressiveness of their writing.

To facilitate the research phase, the platform incorporates a search function that enables users to explore news from reputable Portuguese news outlets. By utilising this feature, students can gather information from reliable sources and include them as references or citations within their articles, ensuring credibility and supporting the integrity of their work.

Furthermore, the platform reinforces the significance of producing original news content. An automatic plagiarism check feature is integrated into the platform to address this. This functionality assesses whether the content has been copied or replicated from other sources on the internet, promoting the importance of creating original content.

By offering these features, the TRUE platform aims to provide comprehensive support to students throughout the news writing process, fostering their critical thinking, writing skills, and information literacy development.

3. UX Evaluation

The research methodology for assessing the UX of the TRUE platform was built upon the principles of the DBR process. The initial approach for data gathering focused on conducting a momentary UX evaluation, which aimed to capture the users' experience during platform usage and observe any perceived changes and interactions (Koonsanit & Nishiuchi, 2021).

The momentary UX evaluation method differs in terms of duration compared to other types of evaluations, such as anticipated, episodic, or cumulative UX evaluations. It explicitly emphasises the experiential aspects and the human-computer interaction, aiming to understand users' perceptions of practical aspects such as utility, ease of use, and efficiency of the product or service. This evaluation approach is particularly useful for collecting feedback from users during the early prototyping phases of the development process, as it enables the identification of user experience aspects that may evolve or change over time (Marti & Iacono, 2016).

The momentary UX evaluation for the TRUE platform comprised four distinct steps. Firstly, the project was explained, providing an understanding of the background and objectives of the research. Secondly, initial data collection was performed, which involved capturing previous user experiences and perceptions. Subsequently, the participants were invited to explore the platform in multiple scenarios, enabling users to engage with it in different contexts and settings. Finally, a final round of data collection was conducted to gather additional feedback and insights from the users' experiences with the platform.

By adopting this momentary UX evaluation methodology, the research team aimed to obtain valuable data and insights regarding the users' experience with the TRUE platform. This iterative approach allowed for identifying strengths, weaknesses, and areas of improvement, contributing to the continuous development and refinement of the platform.

3.1 Structure of the Momentary UX Evaluation

The initial data collection process for the momentary UX evaluation consisted of four distinct moments, each with its specific approach. These moments were designed to gather valuable insights into users' experiences with the TRUE platform. The following is a breakdown of each moment:

First Moment: Participants were shown a brief two-minute video¹ that provided an overview of the platform, including its aim and main features. Additionally, a step-by-step tutorial was provided to the participants that will assume the authors' profile, specifically targeting children and teenagers, to demonstrate the ease and speed of creating and publishing news on the digital platform.

Second Moment: Participants were asked to complete a questionnaire to understand their background and previous experiences with school newspapers. For authors, the questionnaire also inquired about their reading and writing habits.

¹ Available at: <https://youtu.be/8vxFWaXENkA>

Third Moment: Participants were given two minutes to freely explore the platform, allowing them to familiarise with its interface and functionalities without following a specific usage flow. The purpose of this phase was to help participants feel comfortable before proceeding to the next phase, which involved specific usage scenarios. Next, authors were given a particular scenario where they were encouraged to write a news article, while editors had two tasks: approving pending news articles and updating the homepage. During this phase, participants were also encouraged to use the think-aloud protocol, whereby they voiced their thoughts and observations while interacting with the platform (Byrd et al., 2023).

Fourth Moment: The final questionnaire focused on participants' overall user experience with the platform. It incorporated two scales, the System Usability Scale (SUS) and the Self-Assessment Manikin (SAM), to assess usability and emotional responses, respectively. Additionally, a set of open-ended questions allowed participants to provide detailed feedback and insights about their experience using the TRUE platform.

By following this multi-faceted approach, the research aimed to gather comprehensive data and feedback regarding users' experiences with the TRUE platform. The combination of tutorial videos, questionnaires, free exploration, scenario-based tasks, and post-interaction assessments provided a well-rounded understanding of usability, user satisfaction, and overall platform perceptions.

3.2 Data Collection Methods

For this study, two evaluation scales were chosen to assess the momentary UX of the TRUE platform, the System Usability Scale (SUS) and the Self-Assessment Manikin (SAM) questionnaire.

The SUS was selected for its simplicity, ability to express the platform's utility and the availability of an approved Portuguese translation. It consists of a set of 10 questions that participants rate on a five-point Likert scale and yields a usability score ranging from 0 to 100 (Brooke, 2013).

The results of the SUS evaluation, as shown in Figure 3, provide an overview of the participants' ratings and perceptions of the platform's usability. The scores obtained reflect the participants' collective judgments regarding the ease of use, learnability, efficiency, and overall user experience of the TRUE platform.

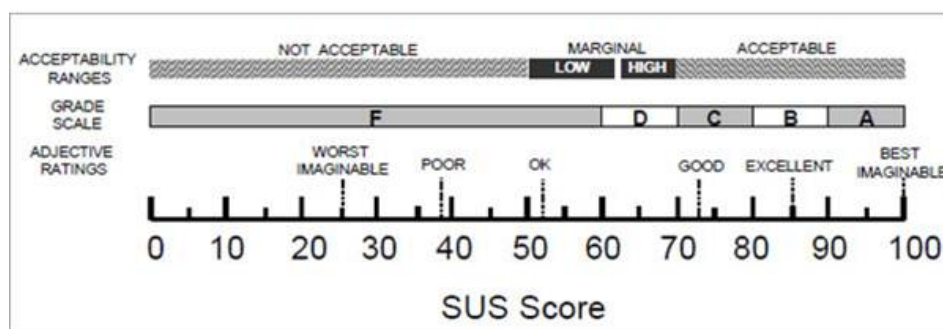


Figure 3 - SUS Score Rating (Brooke, 2013)

The SAM was utilised as an emotion assessment tool in this study. SAM employs graphical representations to capture three emotional dimensions of using the TRUE platform: satisfaction, motivation, and control. This tool was chosen for its ease of use and ability to allow students and teachers to express their emotions during their usage of the platform (Bradley & Lang, 1994).

The SAM evaluation involves participants rating each dimension using a scale of 1 to 5, representing each value by a corresponding figure. The analysis focuses on associating values with each set of figures, where higher values indicate a stronger expression of the intended emotion (Bradley & Lang, 1994).

It is important to note that there is a slight variation in the scale for the dimension of control. Unlike satisfaction and motivation, the scale for control is reversed, ranging from 5 to 1. This detail creates the need for normalising the values to align them with the data collected for the previous dimensions, ensuring consistency in the analysis and interpretation of the results.

Finally, after these scales were applied, the participants were asked a set of open-ended questions, which was crucial in gathering understanding of the participants' overall experience with the platform: what they would like to change on the platform; ii) if they found it useful and iii) if they had any additional insights that could further improve the user experience.

While closed-ended questions provide valuable quantitative data, open-ended questions allow participants to provide detailed and qualitative insights that a standardised set of multiple-choice questions cannot capture. Participants were encouraged to provide specific examples, elaborate on their responses, and share additional thoughts or feedback regarding their interaction with the platform.

The insights gained from the open-ended questions provided valuable qualitative data that complemented the quantitative data obtained from the closed-ended questions. These questions allowed for a more in-depth exploration of participants' perspectives and provided valuable input for further refining and enhancing the TRUE platform.

4. Results and Discussions

The evaluation took place at the University of Aveiro as part of the "Cientificamente Provável" event, held between February 7th and 9th, 2023. Three schools from the Aveiro district participated in the event and thus in the momentary UX evaluation.

Over the course of the three days, a total of nine test rounds were conducted, accommodating approximately five participants per session. Each evaluation lasted 50 minutes on average and was conducted individually with a researcher per participant. In total, 44 user tests were carried out, with two participants taking the user role of editors, while the remaining 42 tested with the role of author.

The evaluation results will be presented separately for the author and editor profiles to ensure a comprehensive analysis. This division is necessary as authors and editors had distinct roles and tested different features of the TRUE platform.

4.1 Author Profile Result

During the testing of the TRUE platform, 42 authors participated, representing a diverse range of grade levels. Despite the varying grade levels, there was a high level of engagement and coherent participation during the momentary UX testing. Overall, the students expressed an "excellent" opinion of the platform's usage and usability, indicating a satisfactory experience, high motivation, and a sense of control while using the platform.

Most of the authors (33 students) were in the 12th grade, five were in the 6th grade, and the remaining four were in the 5th grade, as indicated in the graph. Notably, 74% of the participants had never been involved in creating a school newspaper, making their experience with the TRUE platform wholly new and unfamiliar.

The evaluation of the platform using the System Usability Scale (SUS) yielded a score of 86.4, corresponding to an "excellent" user experience (Figure 4). This score indicates that the platform is highly intuitive, presenting an efficient flow of use that adapts to the users' needs. However, it is important worth noting that a usability assessment cannot be solely based on quantitative measures and should be complemented with qualitative analysis.

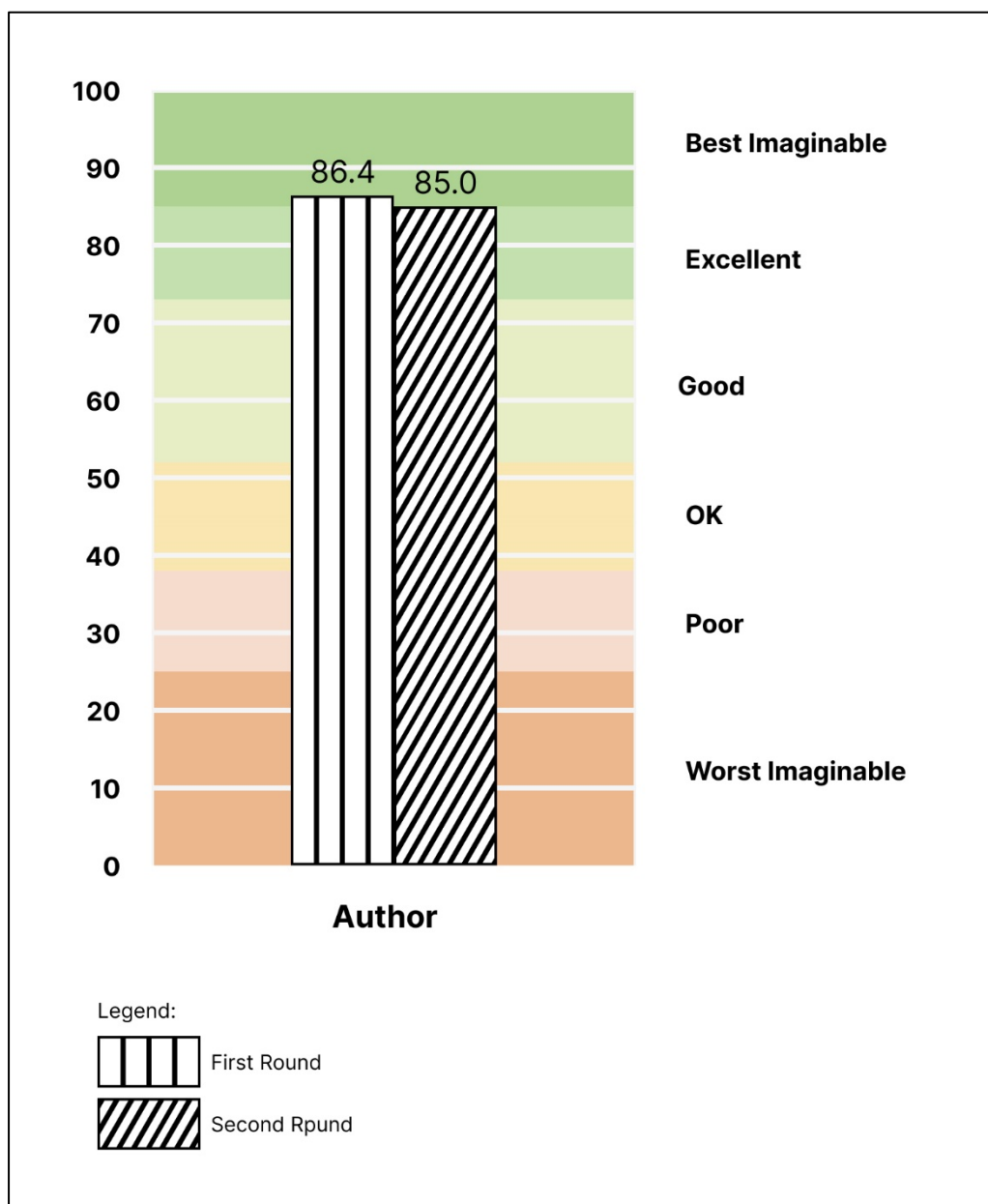


Figure 4 - SUS results of the evaluation - Authors

Regarding the SAM questionnaire, the results were also very positive (Figure 5). In terms of satisfaction, the participants reported a score of 4.6, indicating high satisfaction with the platform. This result suggests that most users reacted positively while using the platform, leading to a pleasant and satisfactory experience. The level of motivation was also high, with a score of 4.1, indicating that users felt motivated to explore the platform and carry out the usage scenarios presented to them. Additionally, the level of control recorded a score of 4.4, indicating that users felt the platform behaved as expected and gave them a sense of control.

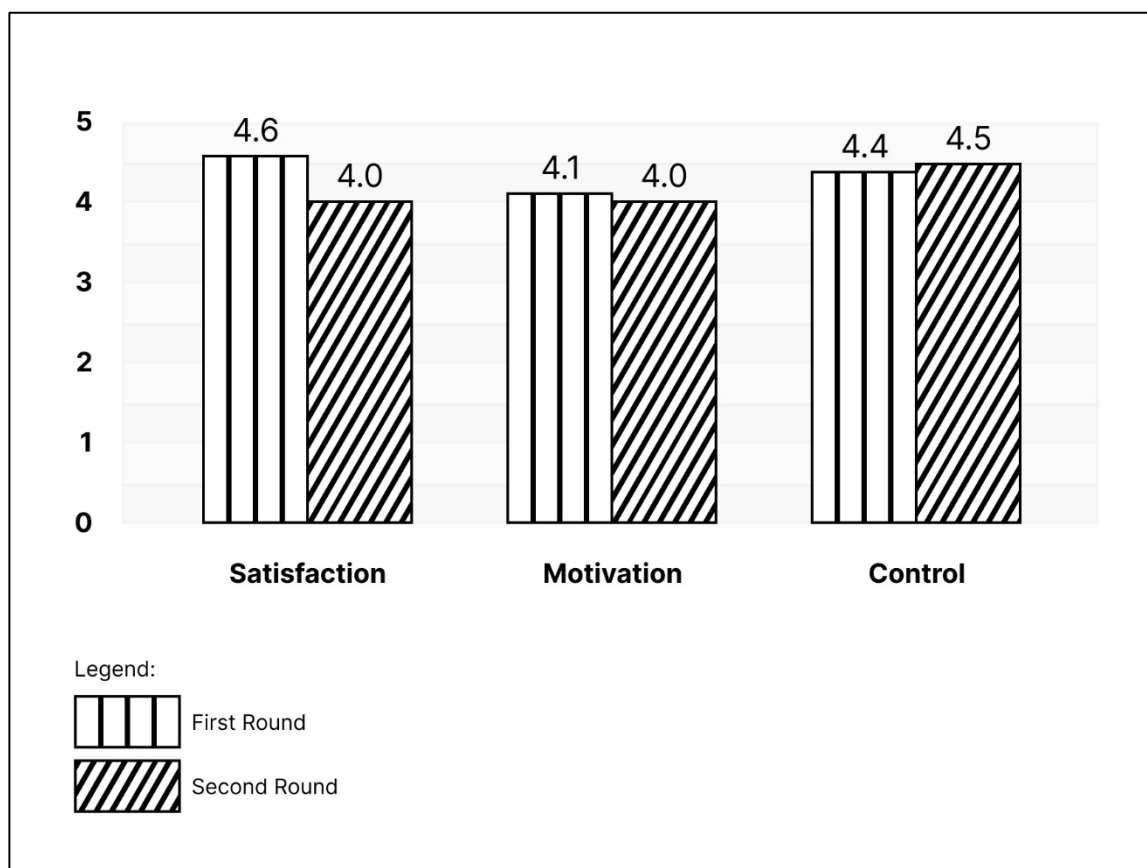


Figure 5 - SAM results of the evaluation - Authors

As stated previously, open-response questions were included after the questionnaires of SAM and SUS. The most frequently mentioned aspect requiring improvement was the inclusion of help elements in the news creation tool. Users suggested the addition of small tutorials and tooltips that would accompany each element of the news creation process, aiding in the understanding and utilisation of the platform. Another concern users raised was content management, particularly in adding images, videos, and other relevant news elements to complement their writing.

These insights and suggestions provided valuable feedback for further refining and enhancing the TRUE platform, addressing specific areas of improvement, and meeting the needs of the authors.

4.2 Editor Profile Results

In evaluating the editor profile, it is essential to note that only two participants were teachers without previous experience in school newspapers and platforms for writing news articles. Despite the small sample size, valuable feedback was obtained by applying the SUS questionnaire, indicating an "Excellent" level of usability with an average score of 87.5 (Figure 6). This result suggests the platform is user-friendly and well-organized, enabling easy interaction and navigation.

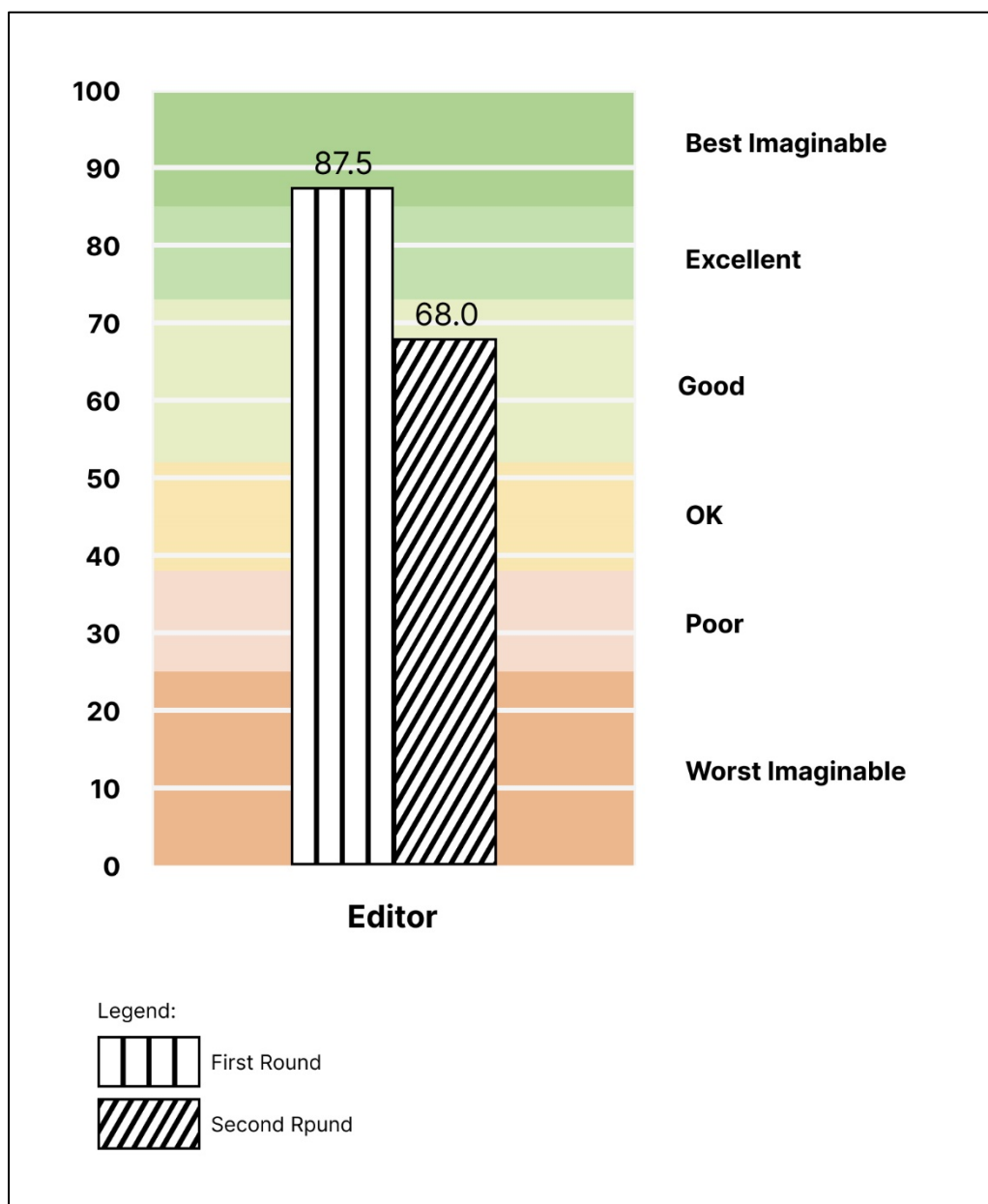


Figure 6 - SUS results of the evaluation - Editors

The analysis of the SAM questionnaire, although based on only two responses, revealed a positive experience for the participants (Figure 7). A maximum score of 5 was obtained in satisfaction, indicating a highly positive experience using the platform. The participants also expressed a high level of motivation, with a score of 4.5, thus reflecting enthusiasm for exploring the platform and engaging with the proposed scenarios. The evaluation of perceived control yielded a score of 4.5, suggesting that the platform met the participants' expectations regarding behaviour and functionality. These results indicate that the participants did not encounter significant difficulties while using the platform.

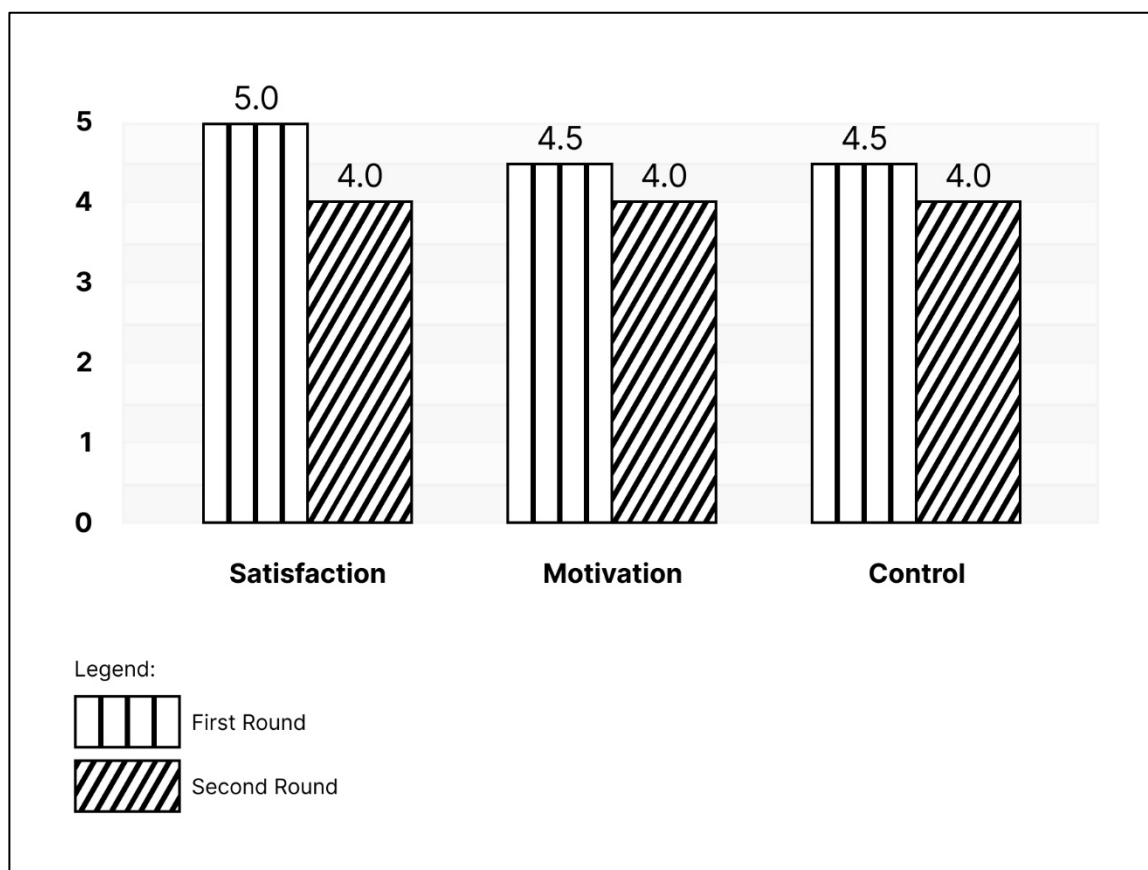


Figure 7 - SAM results of the evaluation - Editors

Through the open-ended questions at the end of each test, participants expressed that they found the tool suitable within its operational context. They highlighted the importance of functionalities such as including related news and the ability to verify credibility. Additionally, participants expressed a desire for some personalisation options, particularly in colour customisation, to enhance the user experience.

Although the sample size was limited, the feedback from the editor's profile contributed to the overall evaluation. It provides valuable insights for further refinement and enhancement of the TRUE platform, ensuring its suitability for editors and addressing their needs and preferences.

5. Conclusions

The findings from the momentary UX assessment of the TRUE platform indicate a positive impact on the users (both authors and editors) and highlight its excellence in usability and user experience. The SUS score of 86.4 for authors and 87.5 for editors reflects a high level of usability, indicating that the platform is intuitive, user-friendly, and efficiently meets the needs of its users. The SAM assessment results further demonstrate high satisfaction, motivation, and control levels among the users, reinforcing their positive experience with the platform.

The most valued points were: i) the search news functionality; ii) the incorporation of synonyms and text correction tools, and iii) the overall assistance provided in news writing.

These features were seen as valuable additions to the platform, enhancing the users' ability to create engaging and accurate content.

Regarding areas for improvement, the feedback highlighted the need for small tutorials or tooltips to guide users in using the platform effectively, refinement in content management features such as adding images, videos, and related news, and the inclusion of more personalisation options for the homepage, particularly in terms of colour customisation.

These improvement points were addressed in the subsequent phases of the DBR process, following an iterative approach to development and assessment. The feedback and suggestions gathered from the momentary UX assessment informed the refinement and enhancement of the platform, ensuring that the identified areas for improvement were addressed to enhance usability and user experience.

Overall, the momentary UX assessment goals were successfully achieved, providing valuable insights and constructive feedback to support the ongoing development of the TRUE platform. The iterative nature of the DBR process allows for continuous improvement based on user feedback, ensuring that the platform evolves to meet the needs and preferences of its users.

Acknowledgements

TRUE Project was developed in partnership with Jornal Público and the technological digital company MOG and co-financed by COMPETE 2020, Portugal 2020, through the European Regional Development Fund (POCI-01-0247-FEDER-046923). At the University of Aveiro, we would like to thank the support of Digimedia (the Digital Media and Interaction Research Center).

References

- Adjin-Tettey, T. D. (2022). Combating fake news, disinformation, and misinformation: Experimental evidence for media literacy education. *Http://Www.Editorialmanager.Com/Cogenthumanities*, 9(1). <https://doi.org/10.1080/23311983.2022.2037229>
- Al Zou'Bi, R. M. (2022). The impact of media and information literacy on students' acquisition of the skills needed to detect fake news. *Journal of Media Literacy Education*, 14(2), 58–71. <https://doi.org/10.23860/JMLE-2022-14-2-5>
- Bradley, M. M., & Lang, P. J. (1994). Measuring emotion: The self-assessment manikin and the semantic differential. *Journal of Behavior Therapy and Experimental Psychiatry*, 25(1), 49–59. [https://doi.org/10.1016/0005-7916\(94\)90063-9](https://doi.org/10.1016/0005-7916(94)90063-9)
- Brooke, J. (2013). SUS: a retrospective. *Journal of Usability Studies*, 8, 29–40. <http://uxpajournal.org/sus-a-retrospective/>
- Byrd, N., Joseph, B., Gongora, G., & Sirota, M. (2023). Tell Us What You Really Think: A Think Aloud Protocol Analysis of the Verbal Cognitive Reflection Test. *Journal of Intelligence 2023, Vol. 11, Page 76, 11(4)*, 76. <https://doi.org/10.3390/JINTELLIGENCE11040076>
- Carvalho, D. M., Júlio, L., & Silva, T. (2023). Students as Creators of Online Newspapers: A Tool's User-Interface Proposal. *Lecture Notes in Educational Technology*, 523–530. https://doi.org/10.1007/978-981-99-0942-1_54
- Koonsanit, K., & Nishiuchi, N. (2021). Predicting Final User Satisfaction Using Momentary UX Data and Machine Learning Techniques. *Journal of Theoretical and Applied Electronic Commerce Research 2021, Vol. 16, Pages 3136-3156, 16(7)*, 3136–3156. <https://doi.org/10.3390/JTAER16070171>
- Linden, S. (2023). *Foolproof: Why We Fall for Misinformation and How to Build Immunity*. Fourth Estate. <https://books.google.pt/books?id=7mGvzgEACAAJ>
- Marti, P., & Iacono, I. (2016). Anticipated, momentary, episodic, remembered: The many facets of User eXperience. *Proceedings of the 2016 Federated Conference on Computer Science and Information Systems, FedCSIS 2016*, 1647–1655. <https://doi.org/10.15439/2016F302>
- McKenney, S., & Reeves, T. C. (2014). Educational design research. *Handbook of Research on Educational Communications and Technology: Fourth Edition*, 131–140. https://doi.org/10.1007/978-1-4614-3185-5_11/COVER
- Molina, M. D., Sundar, S. S., Le, T., & Lee, D. (2021). “Fake News” Is Not Simply False Information: A Concept Explication and Taxonomy of Online Content. *American Behavioral Scientist*, 65(2), 180–212. https://doi.org/10.1177/0002764219878224/ASSET/IMAGES/LARGE/10.1177_0002764219878224-FIG1.JPEG

Pérez-Escoda, A., Miguel Pedrero-Esteban, L., Rubio-Romero, J., Jiménez-Narros, C., Puebla-Martínez, B., Gallardo-Camacho, J., Marta-Lazo, C., & Miguel Romero-Rodríguez, L. (2021). Fake News Reaching Young People on Social Networks: Distrust Challenging Media Literacy. *Publications 2021, Vol. 9, Page 24, 9(2), 24*. <https://doi.org/10.3390/PUBLICATIONS9020024>

Contact email: tsilva@ua.pt

Performing Arts in Higher Education: Sensing the Body to Learn the World

Déborah Maia de Lima, McGill University, Canada

Aron Rosenberg, McGill University, Canada

The Paris Conference on Education 2023

Official Conference Proceedings

Abstract

The arts play a fundamental role in the educational field. This paper outlines the importance of considering performing arts initiatives in higher education as an agent of transformation. The approach discussed outline the artistic/dance artistic residency developed at the *P. Lantz Initiative for Excellence in Education in the Arts*, a project that took place in the Faculty of Education at McGill University in Montreal, Canada. Knowing their own body, working with the space to recognize one's *kinesphere*, experimenting movements from other cultures, collaborating with partners and creating dance performances allowed participants to open inner spaces, physically, critically, and consciously, increasing the respect for themselves and others. These experiences were extended to university staff, providing a transformative, human and relational perception of the participant's surroundings as a communitarian space. Presented in three acts, this paper enlarges the perspectives of the educational use of performing arts as an agent of learning and teaching, allowing the development of the student's self-development, and self-care.

Keywords: Performing Arts, Higher Education, Self-Agency

iafor

The International Academic Forum

www.iafor.org

Introduction

Speaking of performing arts is also to speak of education, either education of the body in relation to sensorimotor awareness or in relation to the refinement of expressive sensitivity through the learning and development of a repertoire of movements, and creations. In the next pages, we intend to highlight the importance of art as a transformative educational agent. We will develop this article in three acts. The first highlights some thoughts about the arts in education. The second takes us to the role of the body in the educational environment. In the third, we explore the first author's experiences during her P. Lantz artistic residency at McGill University in Canada, and its effects on one of the participants.

Act I – Is Art Essential to Education?

From the Latin *ex-ducere* – to guide, to lead, to take out of oneself, to develop, to blossom – the concept of education is vast and quite diverse. According to the *Dictionnaire Actuel de l'Education* (Legendre, 2005), “[Education is] the ensemble of values, concepts, knowledge and practices whose purpose is the development of the human being and society¹.” Thinking of arts in education necessarily delves into the difficult question of *what is art?* Reflections on the context of this question are a key element to finding an answer since a definition of art is not self-evident, and even identifying what art is and what it is not presents some challenges. As Costa (2009) explains, art is such a multi-faceted and diversified phenomenon that it is not possible to find a common essence to all its manifestations, nor a condition that allows us to define it.

When we think of art, immediately comes to mind the notion of creative processes. Arts is often seen as a privileged field in which individuals have wide-ranging emotional and intellectual creativity not found in other areas (Ostrower, 2005), although the creative process is not limited to the arts. For García, Plevin and Macagno (2008), creativity is “a disposition to enter into a dynamic relationship with what the world offers, an ability to use one's imagination to discover and employ the potentialities of the environment according to one's own desire” (p. 21). Ostrower (2005) reminds us that creating is to form something new, to be able to establish a relationship between events that occur within people and in the surrounding environment... Creativity involves action and requires a body.

During the twentieth century, thinkers such as Herbert Read (2015), Margaret H'Doubler (1957), John Dewey (2008), Paulo Freire (2002), María Fux (1979) and Rudolph Laban (1990) have influenced and opened doors for the inclusion of arts in the field of education. These thinkers have understood the fundamental power of the arts in the formation of human beings. A common point among them is the vision of art as a means to transform society. Herbert Read shows us through his *Education Through Art* (2015), the importance of art in education. Drawing from Alexander Baumgarten², Read understands art as the expression of an aesthetic sensibility, an essential factor by which humans adjust "subjective feelings and emotions towards the objective world" (Meeson, 1974, p. 5). Art can be a path to personal development (self-fulfillment) and for the cognitive and emotional development of the individual.

¹ Free translation from the French : “L'ensemble de valeurs, de concepts, de savoirs et de pratiques dont l'objet est le développement de l'être humain et de la société.”

²Alexander Gottlieb Baumgarten (1714-1762) was a Prussian philosopher mainly involved with the fine arts. He was the author of *Æsthetica* in 1750, inventing the term “esthetics” that became a philosophical discipline.

For Read, formal education must include an aesthetic orientation, which he conceives of in five goals. The first, is to preserve the natural freshness of sensations and perception of the world. The second, is to facilitate the coordination and combination of these perceptions and sensations in relation to the environment. (e.g., the relationship between voice and music). The third, is to facilitate the expression of feelings with simplicity. The fourth, the promotion and teaching of modes of expression, and this leads to the fifth goal, which is the formation of artists. For Read, artists are not only those who produce artwork, but those who can express themselves in their vocational paths. Read's idea of an artist goes hand in hand with John Dewey³ (2008), for whom an artist is "...someone who is not gifted with special powers of execution, but who recognizes the qualities of things with an unusual sensitivity"⁴ (Dewey, 2008, p. 57).

Dewey questions the nature of artistic production, suggesting that rather than being a special type of creation, it evolves from the usual and necessary actions of life, adaptation to the environment, and the human need for satisfaction. He sees the experience of creation as an interaction between outside resources and the individual to find a solution to a problem or to intensify the experience. Art is a tool for emotional adjustment to the exterior world and provides humans with a way to perceive reality helping them to better live with themselves and with the environment. The conceptions of Dewey and Read are the foundation for a student-centered view of education in which art is emphasized as a fundamental element of learning.

Act II - Body: The Essential Overlooked

It is critical to consider the body in education. Cognition is deeply related to the relationship that the body establishes with the environment, reflecting the way that reasoning and thought are embodied. According to Lakoff and Johnson⁵ (1999): "Mind is inherently embodied. Thought is mostly unconscious. Abstract concepts are largely metaphorical" (p. 3). By using the term "embodied," Varela, Thompson, and Rosch (2016) highlight that "cognition depends on the kind of experience that comes from possessing a body with various sensorimotor capacities..." (pp. 172-173). Also, these capacities are embedded within the contexts of our biology, psychology, and culture. Thus, from the perspective of Embodied Cognition theory, thinking *is* body.

The interaction of the body with the environment generates an interactivity of cognitive function and the world, making possible the action of learning (Shapiro & Stoltz, 2019). The more we experience similar stimuli in the environment, the more likely we are to respond to these stimuli in a similar manner. This is how habits and worldviews are established. Bodily habits influence not only the execution of our desires but also the formation of ideas that convert desires into concrete actions (Shusterman, 2008). The presence of one's own body in the world is assumed by the perceptive experience. For Damasio (2006), the reference that the body provides to the mind is essential to develop the notion of the self.

³John Dewey (1859-1952) is recognized as the father of the progressive school (Lord & Raymond, 2018) and influenced an entire paradigm of thought about education in the 20th century.

⁴Free translation from Portuguese: "É alguém não especialmente dotado de poderes de execução, mas também de uma sensibilidade inusitada às qualidades das coisas."

⁵Lakoff and Johnson have made a huge contribution to the study of the role of the body in cognition. Their book *Philosophy in the Flesh* (1999) is the most complete statement to date of the claim that the bases of cognition are embodied, especially considering the dependence of thinking on its underlying neurological system.

Understood as total immersion in the flow of movement, dance sets up a relationship between the body and the environment. Movements (e.g., walking) depend on our physical structure, as well as on our environment (e.g., surfaces or the shoes on which we walk). The dancer and the dance are embedded in individual, cultural, and social constructions including body image, sexuality, gender, religion, and spirituality (Hanna, 1992). The image of the body and its formation is closely associated to the culture from which it originates (Arendt, 1983, Héritier, 2006).

Culture has an influence on perception, expression, and thinking (Andrieu, 2010), however, each individual perceives the world in an individualized way. We learn when we interact with others, with our culture, with our environment and we build our knowledge about ourselves through the biasing perspective of our individual body. One of the ways in which art is relevant for education and for social transformation is the way it opens us to the world. An artistic work that acknowledges each person's individuality permits the remaking and reconstruction of ingrained patterns, allowing a sort of updating of the relationship between this individual and the environment. Within the Performing Arts, dance is a relative newcomer to the formal educational system (Bonbright, 2000).

Considering that perception is a mental elaboration of sensations, the more our conscious perception expands, the more we are able to produce a *present presence* in a permanent state of sensory excitability and sensitivity in the world. Consciousness in perception protects us from alienation. Individuals that develop a sensitive perception of the world may potentially act with more empathy, compassion, and respect for differences and equality. Art comes, in this way, as a sense-fulfiller, saving us from the alienation of ourselves. Therefore, it is impossible to talk about either education or society while ignoring the body, and it is impossible to significantly improve either education or society while ignoring the body. In the next lines, we will describe the first author's artistic residency, and how dance could act as a perception modifier.

Act III – Outcomes of an Artistic Residence in Dance

I started timidly. Other artists had already sowed the seeds of the journey in previous years. My introduction to working with dance and movement in the Faculty of Education at McGill University began with an invitation from Professor Dr. Claudia Mitchell and Dr. Maria Ezcurra for a 15 days-visiting artist period with the *P. Lantz Initiative for Excellence in Education in the Arts*⁶ program. This period evolved into an artistic residency during the 2018-2019 school year. During this period, I aimed to develop activities especially related to conscious movement and performative experiences to allow the participants to understand the power of conscious movement in our lives. Among other activities, I facilitated the weekly one-hour *Dancing on Thursdays*.

Dancing on Thursdays, initiated in September 2018, had a strong connection with an expressive and artistic feature. It was important to build a welcoming and safe environment for self-awareness that could help participants explore their bodies processes. Sessions were accessible to people who were not accustomed to experiencing their bodies as creative expression, and allowed students, staff, and community to break stigmas, especially that art is for artists and dancing is for dancers. The contact with the physical body, and more particularly with the physical body in movement brings up fears and delight. The image of

⁶ For further information about the *P. Lantz Initiative for Excellence in Education in the Art* project, please visit the address <https://www.mcgill.ca/p-lantz/>

the body in dance – demanding body's motor and expressive capacities – contrasts with the image of the body in an educational environment, which privileges the immobility.

Participants' motivations for joining *Dancing on Thursdays* were diverse. Some were present at McGill's Art-Hive studio⁷ making other kinds of art and spontaneously joined the movement and dance activity when it started. Some learned about *Dancing on Thursdays* through publicity at McGill. Some were invited by other participants. Even though there was no need for a consistent weekly presence, shortly after beginning, a regular group of four McGill students became regulars. One of the regular participants was Aron Rosenberg, who had a background in theatre and was a Ph.D. student at McGill's Faculty of Education at the time of the artistic residency. He documented his participation in the *Dancing on Thursday's* activities in a *board journal*, capturing daily notes about bodily sensations and insights arising from the activities.

Because of the unpredictability in the number of people present and the diversity of participants, I prioritized working with improvisational dance forms (e.g., Contact Improvisation, contemporary, and dance-theater practices), valuing dance as a process rather than a product. Different from dance choreography, where the participants develop movements through an outside-in process, the improvisational act opens multiple potentials and permits participants to reconfigure their own learning experiences.

Performance-based dance work often requires the student to be goal oriented rather than being in a learning process, reinforcing the image of the body as an object. The conception of the body that underpinned *Dancing on Thursdays*' movement work was that of body-subject, in which rigor and physical exhaustion are not the aims (Leclerc & Andrieu, 2013). In *Dancing on Thursdays*, we opted for an artistic-pedagogical practice in the Freirean and Fuxian⁸ sense, by which, in every educational practice, we 'learn in teaching, and we teach in learning' (Freire, 2002; Fux, 1979). The educational nature of free dance is holistic, engaging the intellect, the feeling, and the spirit in a creative moving activity. As Aron Rosenberg shared:

Today's movement class was simple and was structured openly, without much direction. It allowed us to explore our bodily sensations in earnest. Time flew by and my breath became attached to my body, my thoughts became detached from the horrors of the world, and I started to exist peacefully within myself, or more accurately perhaps, as myself. (Rosenberg, January 17th, 2019)

The corporeal relationship with the world in a body-permissive environment favors the learning of movements that are not part of the participant's cultural or personal repertoire. This learning process may happen through observation or by discovering new possibilities of movement through experimentation. To provide different cultural patterns of movement to the participants, I demonstrated several structured dance styles, including reggae and samba⁹. It is often a challenge to access new patterns of learning, but since there was no demand for good performance, participants were willing to try. Although the movements were new,

⁷ It was through McGill's Art Hive that we developed the majority of the activities related to the Artistic Residency in dance. For more information, please see <https://www.mcgill.ca/arhive/>

⁸ Paulo Freire and Maria Fux have in common a strong belief that the interaction between students and teachers in a learning process makes both grow together, featuring a constant interchange in the production of knowledge.

⁹ Reggae is a musical genre originally developed in Jamaica in the late 1960s. Samba is a musical genre that originated in the *batuques* and samba circles performed by Afro-Brazilians in their moments of leisure.

engaging in the new experience helped them to widen their perception of themselves and their limitations, as indicated by Rosenberg:

I know the separation is a social construction, but my mind felt distant from my body when I tried the samba steps. I could watch what Deby showed me, and my mind understood those movements, could see them as Deby moved, but could not translate them into movements of my own body. That's when I felt the greatest separation, and it helped when Deby encouraged us not to think too much, to just feel the rhythm of the music and move our bodies as they want to move. But nevertheless, it wasn't a nice realization that neglecting my body has led to a distancing of mind and body. I want to close that distance. (Rosenberg, January 31st, 2019)

Rudolf Laban (1990), the prominent theoretician of the expressive and educational dance of the 20th century, reminds us that any type of human activity consists of a succession of movements and actions that he describes as *efforts* defined by four factors: *Weight*, *Time*, *Flow*, and *Space* (Carsile, 2011, Laban, 1990, Lord and Raymond, 2018, Pinard, 2016). Whereas in everyday life we press and twist objects to achieve some goal, in dance these same actions are performed as ends in themselves. Instead of actions to affect objects, the body itself is affected. The educational value of dance is due, in part, to the universality in which the flow of movement permeates our lives. According to Rudolph Laban, a dancer is "that new person, who does not draw his awareness one-sidedly from the brutalities of thinking, feeling or will. He is that person who strives to interweave clear intellect, deep feeling, and strong will into a harmoniously balanced and flexible whole whose parts are interrelated" (McCaw, 2012, p. 45).

As the *Dancing on Thursdays*' participants became more familiar with each other as well as with our movement practices, I began to introduce body manipulation exercises. In these practices, one participant moves their partner's body using the hand or other body parts as a guide. By using Steve Paxton¹⁰'s spinal awareness, a practice that links awareness from the spine to the periphery, we could enhance and generate a transformation in the sensory-motor organization, which significantly collaborates with the evolution of body kinetic integration.

The person that was being moved allowed their own body to become flexible to their partner so they could guide the movement as if the person being moved was made of rubber. Exploratory studies of manipulation, through activities in pairs or groups, show that the experience of having one's body moved passively leads to stretching of ligaments - body parts are pulled in opposite directions, causing joint spaces to appear or be noticed - which may increase the participant's sensitivity to movement and to others in the group (Souza, 2020). This can change emotions and increase trust, as described by Rosenberg:

We are only ever as strong as our communities, as our connections. As the movement class proceeded, people's bodies loosened. We rolled each other in a way that cracked space into ourselves, sharing trust and mutually benefiting the other. Then we rolled on the ground in a way that resisted momentum and stretched those wingless parallel points, opening space, creating breath between the shoulder blades, within the hips. And eventually-feathers dusted, feathers spread-we returned to the circle with all links much more trustingly and weightily suspended by the whole. (Rosenberg, January 22nd, 2019)

¹⁰Steve Paxton is a North American dancer, choreographer, improvisator, and dance pedagogue. He was the creator of the dance style Contact-Improvisation, in the 1970s.

In our classes, improvisation exercises included moving with or without contact with a partner while employing various metaphors to influence the participant's contact with space, as well as using Laban's (1990) four factors of movement (*Weight, Flow, Time, Space*). *Qualities of movement* is the name given to variations of those factors. *Weight* has gradations from light to strong; *Time* factor, from decelerated to accelerated; *Flow* factor from free to restrained; finally, *Space* from indirect to direct movements. These qualities are described in terms of levels (high, medium or low). Each individual has a preferred manner to move using the weight, the flow, the time and the space, and the qualities for each of the factors. These differences are often linked to their habits and unique life history (Pinard, 2016, Tremblay, 2007).

Laban (1990) distinguished between a wider space and the more intimate space that he named kinesphere, understood as one's personal space, in which the person moves, and is spatially limited by the extremities of the body from a fixed point. A strategy I used during the *Dancing on Thursday's* sessions was to play with participants' kinespheres. For example, we engaged in practices in which participants were asked to move while inside an imaginary bubble or to move using the whole space of the room. We embraced the assumption that in order to deeply meet others, it is fundamental to first have an encounter with one's own body and one's own space. Working the kinesphere may work as an opening to the world of one's own body, and eventually to the bodies of others. From a social perspective, through this opening to the other, it is possible to create healthy human relationships, and thus, support a person to develop their own abilities. Rosenberg stated:

He awoke-or maybe it was I who awoke-as he normally did-or maybe as I did-and opened his eyes-or maybe they were mine. It was unclear whether he/I awoke before or as he/I opened his/my thoughts and ideas before or as he/I spoke to them-but nevertheless, everything was on and open. (Rosenberg, February 7th, 2019)

Exploring Laban's concepts with participants at McGill was fundamental to working the connection of the individual to the environment. For example, to understand the *Time* in Laban's theory, it is important to take into consideration both the internal time of the mover (breathing, pulse) and the external time (of music and environmental sound) (Perez, 2005). Our concept of *space* (up, down, forward, back, on, in, directions, levels, orientations) is deeply tied to our bodily orientation in the world (Oreck, 2007). When we are aware of our "interior space" (i.e., kinesthetic sense), such as our body parts when we explore the movements of our joints (through rotation, flexion, extension), or when we use basic actions to move our bodies through space (e.g., by walking, running, jumping, crawling) (Perez, 2005) we realize our presence in the world – not only our physical presence but also our social presence and communitarian connections.

The artistic experience may provide a constructive and transformative sense of critical perception for an individual in which one learns about oneself in relationship with others and with the world (Laban, 1990). Another concept worked at McGill's residency, the conception of corporality – thinking about the body as a living phenomenon – fine-tuned participants' potential for reading the world within a perspective of an artistic expression towards self-consciousness. This helped participants, according to Fortin (2018), "to act, to position oneself, and to make choices according to one's own free will and not according to an external norm or ideology¹¹" (Fortin, 2018).

¹¹ Free translation from French : « [...] Rend possible la capacité d'agir, de se positionner et de faire des choix selon son libre arbitre et non en fonction d'une norme ou d'une idéologie extérieure. »

In the artistic residency, I taught in a way of having a direct relationship with the student, not in a mere transference of information, or passing on supposedly ready-made knowledge. My perspective was of humans are (trans)forming beings, capable of establishing relationships between events that occur around and within them, forming not only links to others but also to themselves. Beyond the idea of whether we fit into culture and society, the arts call us to change this reality, broaden our horizons, and create knowledge with sensitivity.

Conclusion

Art, as a modifier of reality, makes us all builders. According to Paulo Freire (2002), we are not only an object of history but also subject of this history. As we mentioned earlier, to form oneself is to give rise to a new form that will allow us to live our actions and the world differently (Oreck, 2007). We are in the world not to adapt to it, but to change it, and through education, we have its most powerful tool. Paulo Freire claims that education itself is already an artwork and the teacher, is an artist whose role is "to redo the world, to re-draw the world, to re-paint the world, to re-sing the world, re-dance the world..." 12 Months after I concluded the artistic residency, Aron Rosenberg described how the work continued to reverberate within him.

On the most basic level, I remember ending each class feeling looser, like my body had more open spaces between my backbones in my hips, feet, hands and wrists, and so on. This impacted how I oriented myself to my surroundings. I was primed to respond to the world with greater flexibility and fluency. It was like opening up more spaces in my body and also opened up more potential in my everyday choices and actions. [...] A few weeks after starting doing the movement work, I noticed myself becoming more open to ideas I had been scared before. [...] As a grad student, I sit around a lot and try to understand embodied experiences in theoretical or academic ways. There's something lacking in an approach to understanding that's limited to thinking (Descartes was wrong.) A fuller understanding of life relies on taking time to focus on the body and to nurture openness.

We hope that his testimony can stimulate more incursions of dance into universities, colleges, and educational environments, working towards creating sensitive beings and stimulating sensitive acts in the world. Being in contact with our living bodies is one of our most essential drivers and vehicles for humanization.

Acknowledgments

We would like to thank the Rossi family and especially Mrs. Pauline Smith (in memoriam) for her integrative vision of the human being and invaluable enthusiasm for valuing artistic knowledge as an active tool in the field of education to build citizens as creative creators. I also would like to thank the *Fonds de Recherche du Québec société et culture* for funding artistic research projects in education in Quebec and Canada.

References

- Andrieu, B. (2010). *Philosophie de la constitution intercorporelle : le monde corporel*. Lausanne : Éditions L'âge d'homme.
- Arendt, H. (1961). L'action. Dans *La condition de l'homme moderne*. Paris : Poquet.
- Bonbright, J. M. (2000). Dance: The discipline. *Arts Education Policy*, 100(2), 31–32.
- Carsile, A. (2011). Modern educational dance (1948). In D. McCaw (dir.), *Laban Sourcebook* (pp. 237-256). London et New York : Routledge.
- Costa, C. F. (2009). O que é “arte”? *Artefilosofia*, 4(6), 194-199. Retrieved at: <https://periodicos.ufop.br/raf/article/view/706/662>
- Damasio, A. R. (2006). *L'erreur de Descartes : la raison des émotions*. Paris: Odile Jacob.
- Dewey, J. (2008). *El arte como experiencia*. Barcelona: Paidós Ibérica.
- Fortin, S. (2018). La carcasse et l'étincelle : contributions de l'éducation somatique au faire danser à l'école. In H. Duval, C. Raymond et N. Turcotte (Ed.), *Faire danser à l'école* (pp. 173-198). Les Presses de l'Université de Laval.
- Freire, P. (2002). *Pedagogia da autonomia: saberes necessários à prática educativa*. (26 ed.). São Paulo : Paz e Terra.
- Fux, M. (1979). *Danza, experiencia de vida*. Buenos Aires : Paidós.
- García, M. E., Plevin, M. et Macagno, P. (2008). *Mouvement créatif et danse : méthode García-Plevin*. Rome : Gremese.
- H' Doubler M.N. (1957). *Dance: A creative art experience*. University of Wisconsin Press.
- Hanna, J. L. (1992). Tradition, challenge and the backlash: Gender education through dance. In L. Senelick (ed.) In: *Gender in Performance : The Presentation of Difference in The Performing Arts*. University Press of New England.
- Héritier, F. (2006). Le corps dans le corset du sens. *Champs psychosomatiques*, 42(2), 39-54. doi : 10.3917/cpsy.042.0039
- Laban, R. (1990). *Dança moderna educativa*. São Paulo : Ícone.
- Lakoff, G. & M. Johnson (1999). *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought*. New York: Basic Books.
- Leclerc, A. et Andrieu, B. (2013). *La Contorsion : Le corps à l'épreuve, à l'épreuve du corps*. Retrieved at <https://www.yumpu.com/fr/document/view/15617017/la-contorsion-le-corps-a-lepreuve-a-lepreuve-du-hors-les-murs>

- Legendre, R. (dir.). (2005). *Dictionnaire actuel de l'éducation* (3rd ed.). Montréal : Guérin.
- Lord, M. et Raymond, C. (2018). Du mouvement à l'art : Évolution des conceptions de la danse et de son enseignement à l'école québécoise de 1950 à 1980. In Dans H. Duval, C. Raymond et N. Turcotte (dir.). *Faire danser à l'école* (pp. 15-34). Laval Press University.
- McCaw, D. (Ed.). (2012). *The Laban Sourcebook*. Routledge.
- Meeson, P. (1974). Herbert Read's definition of art in "Education through art". *The Journal of Aesthetic Education*, 8(3), 5-18. doi:10.2307/3332150
- Merleau-Ponty, M. (1999). *Fenomenologia da percepção*. São Paulo : Martins fontes.
- Oreck, B. (2007). To see and to share: Evaluating the dance experience in education. In *International handbook of research in arts education*, 341-359. Springer, Dordrecht.
- Ostrower, F. (2005). *Criatividade e processos de criação*. 19th ed. Editora Vozes: Petrópolis.
- Perez, T. (2005). Danser en milieu scolaire. *CUFOCEP*. Retrieved at www.cufocep.be
- Pinard, S. (2016). *L'invisible visible : transmission d'outils d'interprétation en danse*. Montreal : Bibliothèque et Archives nationales du Québec.
- Read, H. (2015). *Education through art*. London : Faber and Faber Limited.
- Shapiro, L., & Stolz, S. A. (2019). Embodied cognition and its significance for education. *Theory and Research in Education*, 17(1), 19-39.
- Shusterman, R. (2008). Dewey's somatic philosophy. *Journal internationale de philosophie*, (3), 293-311.
- Souza, Elisa Teixeira de. (2020). *Embodiment (Corporalização), Soma e Dança: alguns nexos possíveis*. *Revista Brasileira de Estudos da Presença*, 10(4). doi:10.1590/2237-266092446
- Tremblay, M. (2007). *Définition partielle des concepts de kinésphère et de dynamosphère comme outils d'interprétation en danse contemporaine* (unpublished master's thesis). Montreal, Université du Québec à Montréal.
- Varela, F. J., Thompson, E., & Rosch, E. (2016). *The Embodied Mind: Cognitive Science and Human Experience* (revised). MIT press.

Contact email: deborah.maiadelima@mail.mcgill.ca

Diagnosing Misconceptions in First-Year Calculus

Elsabe Weyer, North-West University, South Africa

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Learning tertiary mathematics is challenging and has been an obstacle for many students. Calculus students are unaware of their misconceptions. This makes understanding and progress difficult and prevents students from being successful in mathematics, especially in first-year calculus modules. Focusing on misconceptions in calculus is essential for enhancing student learning and is needed in developing conceptual understanding. Action research and reflective practice have both change and enhancement as aims. This paper reports on the first phase of the action research cycle – the diagnosing phase. Since the lecturer-as-researcher endeavors to be a reflective practitioner and given that reflective practice can lead to improved learning, the reflective practice method was used to diagnose misconceptions in first-year calculus and to develop an understanding of what students know about important concepts in first-year calculus. Two misconceptions were identified, namely limits of a function and the notation of inverse functions. Provided that the limit of a function is a fundamental part of learning calculus, and the inverse function is one of the concepts which is compulsory to be learned in calculus and appears to be a concept indispensable for some students in different study programs, these two misconceptions will be the focus of this paper. Intending to address the existence of misconceptions in calculus, the paper concludes with proposed strategies for the second action research cycle, the action-planning phase.

Keywords: Calculus, Misconceptions, Limits, Inverse Functions, Action Research, Reflective Practice

iafor

The International Academic Forum
www.iafor.org

Introduction

Tertiary mathematics is difficult to learn and has long been a hurdle for many students (Rabadi, 2015, p. 3). According to Rabadi (2015, p. 10), students encounter challenges in learning calculus which include misconceptions in their understanding of certain key concepts. These misconceptions may prevent students from succeeding in mathematics, particularly in first-year calculus modules (Ay, 2017, p. 21).

Given the misconceptions, a transformation in learning is required (Eschenbacher & Fleming, 2020, p. 660). Mezirow (2000, p. 93) describes transformative learning as “incorporating the examination of assumptions, to share ideas for insight, and to take action on individual and collective reflection.” Transformative learning begins, in accordance with Nerstrom (2014, p. 327) when people contemplate their views of what they consider to be true, accurate, or real. Critical reflection is the on-going process of purposefully or accidentally modifying and evaluating ideas to clarify the significance of experiences both individually and collectively.

The pedagogy of reflective practice incorporates critical reflection processes into action research. The extension of students' reflection on their behavior and learning, according to Leijen *et al.* (2012, p. 203), is one of the most crucial learning objectives in tertiary education. Reflective practice is defined by Moon (2000, p. 157) as a “cognitive process carried out in order to learn from experiences” through “individual inquiry and collaboration with others” (Dewey, 1933, p. 271). The teaching and learning process in a tertiary education framework can be understood from various angles by using reflective practice.

A calculus lecturer can utilize efficient approaches to help students recognize or correct their conceptual misconceptions by having a thorough understanding of the nature of these misconceptions and the factors that lead to them (McDowell, 2021, p. 3). According to Denbel (2014, p. 24), teaching these days prioritizes conceptual understanding above the mastery of abilities. The study by Jensen (2009, p. xiv) stresses that calculus students frequently accomplish tasks of a procedural character quite well, even though they have an insufficient grasp of a particular mathematical concept.

Thus, this study will be focusing on the diagnosed misconceptions in first-year calculus in a South African context.

Literature Background

With reference to the Oxford dictionary, Voon *et al.* (2017, p. 18) define a misconception as a “view or belief that is incorrect because of *faulty thinking* and *understanding*.” Leinhardt *et al.* (1990, p. 5) explain that misconceptions are “features of a student’s knowledge about a specific piece of mathematics knowledge that may or may not have been instructed.” Furthermore, they suggest that a misconception may result from an important right concept that developed from an overly simplistic result. Instead of randomly and unconsciously, misconceptions typically arise recursively and/or explicitly. In addition, Voon *et al.* (2017, p. 18) note that an error denotes the improper application of the methods, conceptions, or techniques, whereas a misconception denotes the incorrect interpretation of a concept or specific notion. It leads to misconceptions by repeatedly making identical mistakes. Likewise, unnoticed misconceptions would be detrimental to a student's future learning and are thus not beneficial to them (Weliwita *et al.*, 2020, p. 1).

Research on calculus learning has revealed several concepts that are difficult for students to understand, as shown by the definitions and explanations of misconceptions provided above. These include the following:

- Rate of change (Bezuidenhout, 1998, p. 389): A rate of change is a measurement of how one quantity alters in proportion to another.
- Limits (Areaya & Sidelil, 2012, p. 1; Bezuidenhout, 2001, p. 1; Jordaan, 2005, p. 1; Sebsibe & Feza, 2019, p. em0573): According to the definition, a limit is an output (or value) that a function approaches given certain input values.
- Tangents and functions (Bailey *et al.*, 2019, p. 18; Gunawan *et al.*, 2021, p. 99; Rabadi, 2015, p. 1): The curve's slope at a specific location is represented by a tangent. It is the line that contacts the curve at any given place and travels in the same direction as the curve at that location. The unique kind of relations is called functions. In mathematics, a function is represented as a rule that produces a distinct output y for each input x .
- Inverse functions (Delastri & Muksar, 2019, p. 1; Ikram *et al.*, 2020, p. 592; Nolasco, 2018, p. 15; Quaily & Agrawal, 2021, p. 123): An anti-function, also known as an inverse function, is a function that can transform into another function when reversed. A function that reverses the action of a function is called the inverse function, or f^{-1} .

The difficulties listed above have been specifically identified as ones that students face. Booth *et al.* (2017, p. 63) argue that calculus lecturers should encourage students to build conceptual understanding since students rather focus on mastering only the procedural techniques when solving calculus problems, as supported by this research.

There may be more misconceptions as a result of the fact that COVID-19 was a factor in many students' mediocre mathematics achievement. Ludwig (2021, p. 31) investigated how undergraduate mathematics and finance students did during COVID-19 and discovered that the course had a negative impact on the student's aptitude for learning mathematics, which led to their low performance. There is also a great deal of concern regarding the vast number of students enrolled in calculus and the rote, manipulative learning that occurs (Denbel, 2014, p. 24). As stated by Engelbrecht *et al.* (2005, p. 701), the experience in South Africa is that secondary school mathematics instruction tends to be quite procedural, and students entering tertiary institutions are well-prepared to handle procedural problems rather than conceptual understanding. According to Odafe (2012, p. 214), lecturers are frequently under pressure to help students understand concepts before applying them to real-world mathematical situations.

In order to define the concepts of derivative and integral calculus, the concept of a limit is crucial (Denbel, 2014, p. 24; Wu, 2020, p. 2832). Therefore, it would be difficult to understand notions like continuity, derivative, and definite integral without first conceptualizing the essential parts of limits (Juter, 2006, p. 19). As mentioned by Sulastri *et al.* (2021, p. 1) and Beynon and Zollman (2015, p. 48), in basic calculus and real analysis modules, the concept of a limit of a function is commonly formed without being connected to the formal definition of limits. Consequently, the learning and use of a limit of a function for learning in advanced calculus modules may not be deeply conceptually defined by many advanced mathematics students. Earlier studies done by Liang (2016, p. 37) indicate that students' difficulties with the limit of a function are caused by their misconceptions. Furthermore, students bring their everyday experiences along with their knowledge of limits into the calculus class, which, however essential, might result in misconceptions and hence create learning barriers.

Misconceptions concerning the concept of infinity have an impact on misconceptions that arise regarding the concept of a limit. The value of a function, the length of a sequence, or an approximate limit can all be confused with the concept of limits by students who are not familiar with the infinite process (Cottrill *et al.*, 1996, p. 4). Such misconceptions, according to Williams (1991, p. 419), are difficult to rectify and are inevitable when comprehending. Thus, not only does a lack of knowledge of limits impact that understanding, but it also makes it difficult to understand subsequent concepts like continuity, derivatives, and integrals (Sulastri *et al.*, 2021, p. 1).

As discussed by Sebsibe and Feza (2019, p. 5) and others, concepts of limits are frequently confounded by whether or not a limit is:

- **Unreachable:** A limit is a number or point the function gets closer to but never reaches (Güçler, 2013, pp. 445-447; Odafe, 2012, p. 218).
- **A boundary:** A limit is a number or point past which the function cannot go (Odafe, 2012, p. 218).
- **A dynamic process (motion) or static object (closeness):** Limits are dynamic processes (motion) or static objects (closeness) (Cottrill *et al.*, 1996, p. 5; Williams, 1991, p. 219). Thus, limits are inherently tied to motion concepts (Bezuidenhout, 2001, p. 491; Tall & Vinner, 1981, p. 160).
- **An approximation:** A limit is an approximation that can be made as accurately as you wish (Güçler, 2013, p. 446; Parameswaran, 2007, p. 194; Sebsibe & Feza, 2019, p. 6).
- **Substitution:** Students think that limits simply entail substituting the value at which the limit is to be found, into the expression (Thabane, 1998, p. 65).
- **A function value that is the same as a limit value:** The limit of a function is the value of the function at the limit point (Sebsibe & Feza, 2019, p. 6).

One of the concepts that are also fundamental to calculus learning is the inverse function. A function called the inverse function turns the original function on its head. An inverse function, denoted by the notation f^{-1} is a function that maps B to A, for instance, when f translates domain A to range B. In order to master the idea of an inverse function, students must first grasp the idea of a function. When addressing an inverse function question, conceptual knowledge is required (Delastri & Muksar, 2019, p. 1). Even though the processes for calculating reciprocal and inverse functions differ, both functions are applications of the concept of an inverse (Kontorovich, 2017, pp. 278-279).

Two apparently unconnected mathematical concepts – reciprocal and inverse functions are both represented by the same superscript (-1) symbol. This superscript (-1) symbol confuses many students as observed by Chin and Pierce (2019, p. 6). Students had seen x^{-1} before encountering $\sin^{-1} x$, therefore it looked like they were able to apply the significance of previously encountered negative exponents in the context of real numbers to trigonometric functions. They mindlessly applied what they had learned from prior context to the current context while concentrating on the physical characteristics of the superscript (-1) , so they conceptualized $\sin^{-1} x$ as if the statement was $[\sin x]^{-1}$. These participants seem to have concentrated on the well-known features without considering the significance of the context alterations and the physicalness of the composite symbols (Chin & Pierce, 2019, p. 6). If the students notice the changes in syntax and thereby conceptualize x^{-1} and $\sin^{-1} x$ as two composite symbols with various bases, then the physicalness of these two symbols might be regarded as different. Therefore, “ -1 ” as a superscript has a different meaning in each scenario.

Methodology

The research methodology used in this study was action research, which is integrated with reflective practice. Lincoln and Guba (1986, p. 75) state that it offers a framework for the researcher to consider how her own approach may be improved. According to Mathew *et al.* (2017, p. 130), action research is also a type of reflective practice. Action research requires a commitment to reflective thought, which may include “becoming aware of what you need to do to improve your practice in your workplace, doing it, and then describing and explaining what you have done, how you have done it, and why you have done it” (McNiff, 2016, p. 51).

Five iterative phases can be found in an action research cycle (Susman & Evered, 1978, p. 588) :

- *Diagnosis*: Identify or diagnose a problem.
- *Action planning*: Consider alternative courses of action for solving a problem.
- *Action taking*: Select a course of action.
- *Evaluating*: Studying the consequences of an action.
- *Specifying learning*: Identify general findings.

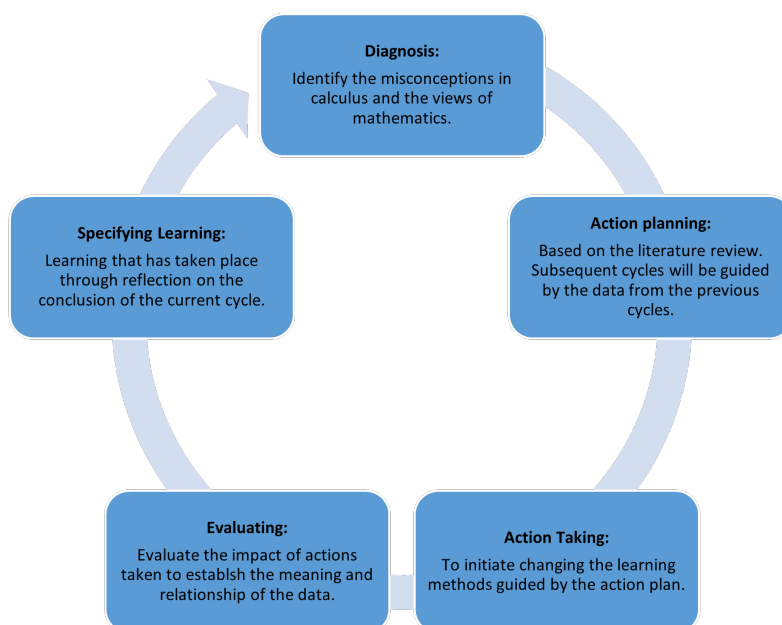


Figure 1: Action research phases

To diagnose misconceptions that exist in first-year calculus, this paper covers the first phase of the action research cycle. Prior to selecting appropriate tactics and theories to guide the action-taking phase, a diagnosis of the quandary was conducted to get some insight into the students' misconceptions of certain concepts in calculus. Reflective practice was the method utilized during the diagnosis phase.

Reflective practice is projected to be the way for lecturers and students to enhance learning in the constructivist means of inquiry known as critical reflection (Davis, 2003, p. 243). To gain a comprehensive understanding of the teaching and learning process in a tertiary education context, reflective practice can be used (Makura & Toni, 2015, p. 43). Ngololo and Kanandjebo (2021), Pavlovich (2007), Carey *et al.* (2017, p. 99), Lee (2010, p. 42), and

Carey *et al.* (2017, p. 99) all looked at reflective journals as a way to assist students to develop a deeper understanding of the crucial mathematical processes.

This study's data collection process involved multiple phases. Misconceptions regarding calculus were identified during the diagnosis phase. Literature reviews, reflections on the researcher's individual experiences, and previous assessments were used to identify misconceptions.

Results and Discussion

The inability of students to comprehend the concept of a limit is a major contributor to their struggles with other calculus concepts. There are explicit and implicit ways to explain the concept of a limit. An informal (implicit) definition of a limit, according to Stewart *et al.* (2021, p. 57), is:

Suppose $f(x)$ is defined when x is near the number a . (This means that f is defined on some open interval that contains a , except possibly at a itself.) Then we write $\lim_{x \rightarrow a} f(x) = L$ and say “the limit of $f(x)$, as x approaches a , equals L ” if we can make the values of $f(x)$ arbitrarily close to L (as close to L as we like) by restricting x to be sufficiently close to a (on either side of a) but not equal to a .

Stewart *et al.* (2021, p. 74) also outline the formal (explicit) definition of a limit as follows:

Let f be a function defined on some open interval that contains the number a , except possibly at a itself. Then we say that the limit of $f(x)$ as x approaches a is L , and we write $\lim_{x \rightarrow a} f(x) = L$ if for every number $\varepsilon > 0$ there is a number $\delta > 0$ such that if $0 < |x - a| < \delta$ then $|f(x) - L| < \varepsilon$.

By considering the two definitions of limits given above, the following misconceptions from past assessments were identified.

Misconception 1: Substitution of Infinity

The first misconception students saw, is that infinity is an exact number and substituted it into x like a value, as seen in Figure 2.

Figure 2 shows a boxed equation on the left and a handwritten student solution on the right. The boxed equation is:
$$\lim_{x \rightarrow -\infty} \frac{5x}{\sqrt{3x^2 - 2x}}$$
 The handwritten solution shows the limit as $x \rightarrow -\infty$, with the student substituting $-\infty$ for x in the denominator, leading to an incorrect result of ∞ .

Figure 2: An example of substituting infinity

The understanding that x approaches negative infinity is not grasped by this student. This perspective is consistent with the assumption that infinity is an actual object because it is thought of as an existing entity, as emphasized by Oehrtman (2009, p. 417).

Misconception 2: Substitution of Numbers

Substituting an exact number into a variable is the second misconception identified by the researcher.

Figure 3: An example of substituting a certain value

As illustrated in Figure 3, the variable p was substituted by the exact value 3. This student did not acknowledge the fact that p approaches 3 only from the right-hand side.

Misconception 3: Function Values Are the Same as Limit Values

Many students think that the function value at a specific point is the same as the limit value at that point. Thus, this is the third misconception identified from past assessments.

Figure 4: Examples illustrating the misconception that function values are the same as limit values

The function value of 3 at the point $x = 0$, is according to these students, the same as the value of the limit when x approaches 0, illustrated in Figure 4. According to Bezuidenhout (2001:495), this misconception may primarily be the result of using the method of substitution to discover limits algebraically without grasping the underlying conceptual understanding of the procedure. Such an answer might also be influenced by earlier classroom experiences in secondary school where students were only exposed to evaluating the limits of continuous functions. Because $\lim_{x \rightarrow a} f(x) = f(a)$ is true for continuous functions, they may have drawn the faulty conclusion that the results they received were the product of direct substitution. The only circumstance in which $\lim_{x \rightarrow a} f(x) = f(a)$, is when f is a continuous function (Bansilal & Mkhwanazi, 2022, p. 2093).

Misconception 4: Inverse and Reciprocal Trigonometric Functions

The fourth misconception identified by the researcher was the misunderstanding the students appear to have between inverse and reciprocal trigonometric functions together with the confusion about the use of the superscript (-1) .

Stewart *et al.* (2021, p. 401) define an inverse function as follows:

Let f be a one-to-one function with domain A and range B . Then its inverse function f^{-1} has domain B and range A and is defined by $f^{-1}(y) = x \Leftrightarrow f(x) = y$ for any y in B .

The notation of superscript (-1) to indicate inverse functions and reciprocal functions, and in this case, applied specifically to inverse and reciprocal trigonometric functions, seems to be challenging for many students, which will be illustrated in the examples that follow.

For clarification of the use of the superscript (-1) at inverse and reciprocal trigonometric functions, Table 1 gives the notation of inverse and reciprocal trigonometric functions alongside the use of the superscript (-1) of three of the six trigonometric functions.

INVERSE TRIGONOMETRIC FUNCTIONS	RECIPROCAL TRIGONOMETRIC FUNCTIONS
$\sin^{-1} x = \arcsin x$	$\frac{1}{\sin x} = (\sin x)^{-1} = \csc x$
$\cos^{-1} x = \arccos x$	$\frac{1}{\cos x} = (\cos x)^{-1} = \sec x$
$\tan^{-1} x = \arctan x$	$\frac{1}{\tan x} = (\tan x)^{-1} = \cot x$

Table 1: Notation of inverse and reciprocal trigonometric functions

Definition of Inverse Trigonometric Functions

Figure 5 illustrates the misconception this student, and many other students, appear to have about inverse and reciprocal trigonometric functions, specifically the use of the superscript (-1) when defining the function $\arctan x$.

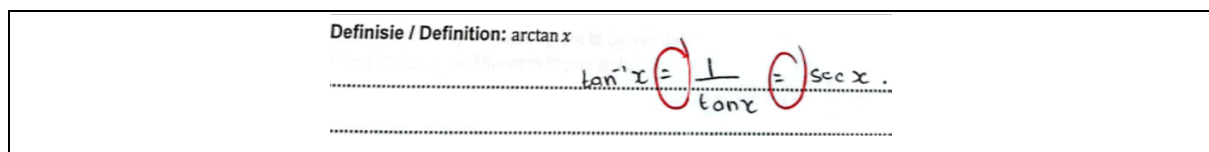


Figure 5: An example of an interpretation of superscript (-1)

Given the example seen in Figure 5, this student interpreted the superscript (-1) as the reciprocal of the trigonometric function. This confusion was also recognized by the research done by Chin and Pierce (2019, p. 6). Furthermore, this student says that $\frac{1}{\tan x} = \sec x$, which is correct, but this implies then that $\tan^{-1} x = \sec x$, which is incorrect.

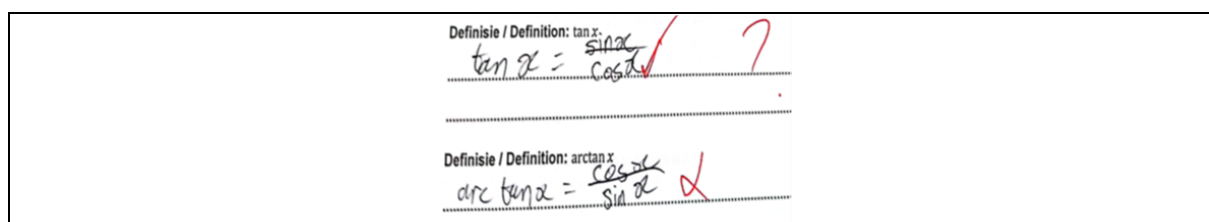


Figure 6: An example of an interpretation of the definition of $\tan x$ and $\arctan x$

Another example that points out the abovementioned misconception, is illustrated in Figure 6. This student defines the \tan -function correctly but then states the inverse \tan -function incorrectly. Hence, this student confused the inverse trigonometric function with the reciprocal trigonometric function even though the superscript (-1) was not applicable here.

Combination of Limits and Inverse and Reciprocal Trigonometric Functions

$$\lim_{t \rightarrow 3^-} \arctan\left(\frac{1}{t-3}\right)$$

Left interpretation: $\lim_{t \rightarrow 3^-} \tan^{-1}\left(\frac{1}{t-3}\right) = \lim_{t \rightarrow 3^-} \left[\tan\left(\frac{t-3}{1}\right)\right]^{-1} = 0$ (marked with a red X)

Right interpretation: $\lim_{t \rightarrow 3^-} \arctan\left(\frac{1}{t-3}\right) = \lim_{t \rightarrow 3^-} \frac{1}{\tan(t-3)} = \frac{1}{\tan(0)} = \frac{1}{0} = \infty$ (marked with a red X)

Figure 7: An example of two interpretations of inverse and reciprocal trigonometric functions at limit problems

In the last example (Figure 7) of the identified misconceptions, we have a combination of the misconception of a limit of a function and inverse and reciprocal trigonometric functions. The misconception about the limit of a function illustrated in both interpretations is the substitution of an exact number instead of t approaching 3 from the left-hand side.

Conclusion and Recommendations

From past assessments done by first-year calculus students at a certain South African university, the concept of a limit, and inverse and reciprocal trigonometric functions were identified as misconceptions. This paper adds to those voices who propose that if students do not have a conceptual understanding of the limit of a function as well as inverse and reciprocal trigonometric functions, students will have misconceptions about these very important notions in calculus. Thus, these misconceptions will influence their learning of concepts building from limits, like derivatives, integrals, and sequences (Ay, 2017, p. 21). Misconceptions regarding inverse and reciprocal trigonometric functions will also affect the calculations done with these types of functions.

For lecturers to teach for understanding is essential for first-year calculus students to succeed in first-year calculus in addition to any further studies in mathematics. To continuously be aware of and address misconceptions, lecturers make it possible for students to recognize their own misconceptions, address the misconceptions and try to eliminate those misconceptions for better understanding and to be more successful in calculus. The findings of this study show that the skills regarding limits are purely mechanical for those first-year students who are part of this study. The misconceptions found are typically comparable to those found by previous researchers. According to this study's results and emphasized by Jensen (2009, p. xiv), a lot of students' knowledge and comprehension are based mostly on discrete facts and procedures, and they have a poor conceptual comprehension of concepts like limits, inverse and reciprocal trigonometric functions, and infinity.

I conclude that students will develop further misconceptions if they have inadequate conceptual knowledge of these important concepts. In pursuit of an action plan to lessen or eliminate additional misconceptions, lecturers should be aware of their students' misconceptions and should carefully plan their teaching sequence.

The way forward will be the implementation of the second phase of the action research cycle, namely the action-planning phase (Susman & Evered, 1978, p. 588). During the action-planning phase, the researcher will create new techniques and strategies to address the

diagnosed misconceptions. Given that the research topic was inspired by the researcher's desire for clearing up misconceptions and her own teaching experiences in the classroom when teaching calculus, the researcher's reflections will be a valuable part of the action-planning phase. Therefore, the researcher will address the misconceptions by developing worksheets concerning the limits of a function and inverse and reciprocal trigonometric functions based on evidence through consulting the current scholarly literature and the researcher's reflections.

References

- Areaya, S., & Sidelil, A. (2012). Students' Difficulties and Misconceptions in Learning Concepts of Limit, Continuity and Derivative. *Ethiopian Journal of Education*, 32(2), 1.
- Ay, Y. (2017). A review of research on the misconceptions in mathematics education. *Education Research Highlights in Mathematics, Science and Technology*, 2017, 21-31.
- Bailey, N., Quinn, C., Reed, S., Wanner, S. C. A., McCulloch, A. W., Lovett, J. N., & Sherman, M. (2019). Calculus II Students' Understanding of the Univalence Requirement of Function. Proceedings of the 22nd annual conference on Research in Undergraduate Mathematics Education.
- Bansilal, S., & Mkhwanazi, T. W. (2022). Pre-service student teachers' conceptions of the notion of limit. *International journal of mathematical education in science and technology*, 53(8), 2083-2101.
- Beynon, K. A., & Zollman, A. (2015). Lacking a formal concept of limit: Advanced non-mathematics students' personal concept definitions. *Investigations in Mathematics Learning*, 8(1), 47-62.
- Bezuidenhout, J. (1998). First-year university students' understanding of rate of change. *International journal of mathematical education in science and technology*, 29(3), 389-399.
- Bezuidenhout, J. (2001). Limits and continuity: Some conceptions of first-year students. *International journal of mathematical education in science and technology*, 32(4), 487-500.
- Chin, K. E., & Pierce, R. (2019). University students' conceptions of mathematical symbols and expressions. *Eurasia Journal of Mathematics, Science and Technology Education*, 15(9), em1748.
- Cottrill, J., Dubinsky, E., Nichols, D., Schwingendorf, K., Thomas, K., & Vidakovic, D. (1996). Understanding the limit concept: Beginning with a coordinated process scheme. *Journal of mathematical behavior*, 15(2), 167-192.
- Delastri, L., & Muksar, M. (2019). Students' conceptual understanding on inverse function concept. *Journal of Physics: Conference Series*.
- Denbel, D. G. (2014). Students' misconceptions of the limit concept in a first calculus course. *Journal of Education and Practice*, 5(34), 24-40.
- Dewey, J. (1933). *How we think*. Buffalo, NY: Prometheus Books.
- Eschenbacher, S., & Fleming, T. (2020). Transformative dimensions of lifelong learning: Mezirow, Rorty and COVID-19. *International Review of Education*, 66(5), 657-672.

- Güçler, B. (2013). Examining the discourse on the limit concept in a beginning-level calculus classroom. *Educational studies in mathematics*, 82, 439-453.
- Gunawan, R. G., Maulana, Y., & Putri, R. (2021). Identification of Students' Misconceptions in Functions Topic. *Indonesian Journal of Science and Mathematics Education*, 4(1), 99-107.
- Ikram, M., PARTA, I. N., & SUSANTO, H. (2020). Exploring the Potential Role of Reversible Reasoning: Cognitive Research on Inverse Function Problems in Mathematics. *Journal for the Education of Gifted Young Scientists*, 8(1), 591-611.
- Jensen, T. A. (2009). *A study of the relationship between introductory calculus students' understanding of function and their understanding of limit* (Publication Number 3386647) [Ph.D., Montana State University]. ProQuest Dissertations & Theses Global; Publicly Available Content Database. United States -- Montana.
- Jordaan, T. (2005). *Misconceptions of the limit concept in a mathematics course for engineering students* University of South Africa].
- Juter, K. (2006). Limits of functions: Students solving tasks. *Australian Senior Mathematics Journal*, 20(1), 15-31.
- Kontorovich, I. (2017). Students' confusions with reciprocal and inverse functions. *International journal of mathematical education in science and technology*, 48(2), 278-284.
- Leijen, Ä., Valtna, K., Leijen, D. A., & Pedaste, M. (2012). How to determine the quality of students' reflections? *Studies in Higher Education*, 37(2), 203-217.
- Leinhardt, G., Zaslavsky, O., & Stein, M. K. (1990). Functions, Graphs, and Graphing: Tasks, Learning, and Teaching. *Review of Educational Research*, 60(1), 1-64.
- Liang, S. (2016). Teaching the Concept of Limit by Using Conceptual Conflict Strategy and Desmos Graphing Calculator. *International Journal of Research in Education and Science*, 2(1), 35-48.
- Lincoln, Y. S., & Guba, E. G. (1986). But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New directions for program evaluation*, 1986(30), 73-84.
- Mathew, P., Mathew, P., & Peechattu, P. (2017). Reflective practices: A means to teacher development. *Asia Pacific Journal of Contemporary Education and Communication Technology*, 3(1), 126-131.
- McDowell, Y. L. (2021). *Calculus Misconceptions of Undergraduate Students* (Publication Number 28545954) [Ph.D., Columbia University]. ProQuest Dissertations & Theses Global. United States -- New York.
- McNiff, J. (2016). *You and your action research project*. Routledge.

- Mezirow, J. (2000). *Learning as Transformation: Critical Perspectives on a Theory in Progress. The Jossey-Bass Higher and Adult Education Series*. ERIC.
- Moon, J. A. (2000). *Reflection in Learning and Professional Development: Theory and Practice*. Psychology Press.
- Nerstrom, N. (2014). An emerging model for transformative learning.
- Nolasco, J. (2018). The struggle with inverse functions doing and undoing process.
- Odafe, V. U. (2012). Pushing the limit: A class project. *Primus*, 22(3), 214-227.
- Oehrtman, M. (2009). Collapsing dimensions, physical limitation, and other student metaphors for limit concepts. *Journal for research in mathematics education*, 40(4), 396-426.
- Parameswaran, R. (2007). On understanding the notion of limits and infinitesimal quantities. *International Journal of Science and Mathematics Education*, 5, 193-216.
- Quaily, J. N. A., & Agrawal, B. (2021). An assessment of inverse functions in context of doing and undoing process.
- Rabadi, N. (2015). *Overcoming difficulties and misconceptions in calculus* Teachers College, Columbia University].
- Sebsibe, A. S., & Feza, N. N. (2019). Assessment of students' conceptual knowledge in limit of functions. *International Electronic Journal of Mathematics Education*, 15(2), em0574.
- Stewart, J., Clegg, D. K., & Watson, S. (2021). *Single variable calculus*. Cengage Learning.
- Sulastri, R., Suryadi, D., Prabawanto, S., Cahya, E., Siagian, M., & Tamur, M. (2021). Prospective mathematics teachers' concept image on the limit of a function. *Journal of Physics: Conference Series*.
- Susman, G. I., & Evered, R. D. (1978). An Assessment of the Scientific Merits of Action Research. *Administrative Science Quarterly*, 23(4).
- Tall, D., & Vinner, S. (1981). Concept image and concept definition in mathematics with particular reference to limits and continuity. *Educational studies in mathematics*, 12(2), 151-169.
- Thabane, J. L. (1998). *Students' Understanding of the Limit Concept in a First Year Calculus Course* University of the Witwatersrand].
- Voon, L. L., Julaihi, N. H., & Tang, H. E. (2017). Misconceptions and errors in learning integral calculus/Voon Li Li, Nor Hazizah Julaihi and Tang Howe Eng. *Asian Journal of University Education (AJUE)*, 13(1), 17-39.

Weliwita, J., Sanchez, J., & Almasalmeh, M. (2020). Mathematical misconceptions of students in Engineering education: statistical analysis and suggestions to pedagogical approaches. 2020 Advances in Science and Engineering Technology International Conferences (ASET).

Williams, S. R. (1991). Models of limit held by college calculus students. *Journal for research in mathematics education*, 22(3), 219-236.

Wu, W. (2020). A Definite Explanation of the Concept of Limit in Teaching. *Creative Education*, 11(12), 2832-2836.

Contact email: elsabe.weyer@nwu.ac.za

The Implementation of an Asynchronous E-learning Course in Higher Education – Lessons Learned

Brido Schuler, FHNW–University of Applied Sciences and Arts Northwestern Switzerland,
Switzerland

Michael Pülz, FHNW–University of Applied Sciences and Arts Northwestern Switzerland,
Switzerland

Fabia Berger, FHNW–University of Applied Sciences and Arts Northwestern Switzerland,
Switzerland

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The pandemic boosted the use and impact of electronic learning (e-learning) in many life areas including education (Monira et al., 2022). Based on that externally forced experience, the Business Information Technology Bachelor degree program (BIT) at the University of Applied Sciences and Arts, Northwestern Switzerland (FHNW) radically changed the learning-teaching set-up from traditional face-to-face (F2F) instruction to asynchronous e-learning in the mandatory course "Corporate Finance (CF)." Against initial expectations, the success of the students participating in the asynchronous e-learning course, measured by the mark achieved, was notably higher than compared to traditional F2F instruction. This outcome is even more surprising in light of the current research results. Varkey et al. (2022) addressed the problem with the current literature in their research on asynchronous learning with the lack of guidance in the creation of a high quality and high-fidelity asynchronous courses. The goal of this conference paper is to give insight into the learning design, setting, methods, instruments, concepts, etc. in the newly implemented asynchronous e-learning course CF and highlight lessons learned. The lessons learned might contribute to best practices for other asynchronous e-learning courses and can help to improve such learning settings.

Keywords: Asynchronous Learning, Blended Learning, Bachelor Degree, Distance Learning, E-learning, Face-to-Face Instruction (F2F), Higher Education, Synchronous Learning

iafor

The International Academic Forum
www.iafor.org

1. Introduction

E-learning went mainstream with the COVID-19 pandemic. Initially, mainly through lecturers' intuition, trial and error, and driven by rapidly changing social distancing requirements to combat the virus, teaching and learning moved from traditional F2F to predominantly synchronous distance e-learning between February 2020 and June 2021. It quickly became clear that the use of an electronic medium such as the Internet between the teacher and the students would bring about a number of new challenges. There was a concern that students might be more easily distracted from e-learning at home. Another concern was the limited social interaction of those involved. This could lead to students feeling of socially isolated (Lin & Gao, 2020, p. 174). Identifying and responding appropriately to these factors can be important in maintaining students learning success. The success of the students was measured in a unidimensional way by the grade obtained in the course.

Students' demand for distance learning did not go away after COVID-19. On the contrary, the demand for formats of study that are independent of time and place has increased. The increased demand for studying independently of time and place may be due to the saving of travel time from home to university. This leaves more time for other activities such as work, leisure activities or spending time with family. The additional factor of cost pressure from the University with campuses in different locations led to implementing the asynchronous e-learning course CF. The course was held for the first time in the autumn semester of 2022 at the University of Applied Sciences Northwestern Switzerland (FHNW). It is part of the bachelor's degree program in Business Information Technology.

Lessons learned from the implementation of this asynchronous e-learning course are presented in this paper. This will be achieved in two ways. Firstly, through a literature review, which will then be enriched with insights into the learning design, setting(s), methods, tools, concepts, etc. in the newly implemented asynchronous e-learning course CF.

Secondly, some of the relevant aspects and terms related to the topics of e-learning, blended learning, and synchronous and asynchronous learning are defined and discussed. The literature review serves to show that some factors are more prominent than others. These factors will be identified, discussed further, and compared against results from a study carried out among students participating in this asynchronous e-learning program. The student's level of success is analyzed and lessons learned from the newly implemented asynchronous e-learning course are derived.

1.1. Definitions of Terms

We begin by discussing and classifying the key terms used in this article, namely e-learning, blended learning, and synchronous and asynchronous.

1.1.1. Definition of E-learning

There are different types and definitions of e-learning in literature. Arkorful & Abaidoo (2014, p. 29 based on Algahtani, 2011) conclude that it is difficult to find a common definition for e-learning. In some definitions, e-learning means providing content entirely online, while in other definitions e-learning is already implemented when web-supplementary and web-dependent services are used to provide educational and support processes. A synonym often used in literature instead of e-learning is online learning.

In higher education, the term online learning often means that the courses are delivered entirely online, typically through the use of learning management systems (LMS), such as Moodle (Nortvig et al., 2018, p.47 based on Ryan et al., 2016 and Pellas & Kazanidis, 2015). The most prominent feature of online learning compared to F2F learning is the absence of a physical classroom, which is replaced by the use of web-based technologies. This provides opportunities for learning outside of class, independent of time, place and pace (Nortvig et al., 2018, p. 47 based on Bernard et al., 2014; Chigeza & Halbert, 2014; Northey, 2015, Israel, 2015, Potter, 2015).

1.1.2. Definition of Blended Learning

The terms blended learning and hybrid learning are often used interchangeably (Nortvig et al. 2018, p.48 based on Ryan et al. (2016). Blended learning can be seen as “the combination of instruction from the two historically separate models of teaching and learning: traditional F2F learning systems and distributed learning systems” (Nortvig et al., 2018, p. 48 based on Bernard et al., 2014). Therefore, blended and/or hybrid learning can be categorized between the two opposing notions F2F and online learning, depending on the degree of online usage in teaching and learning.

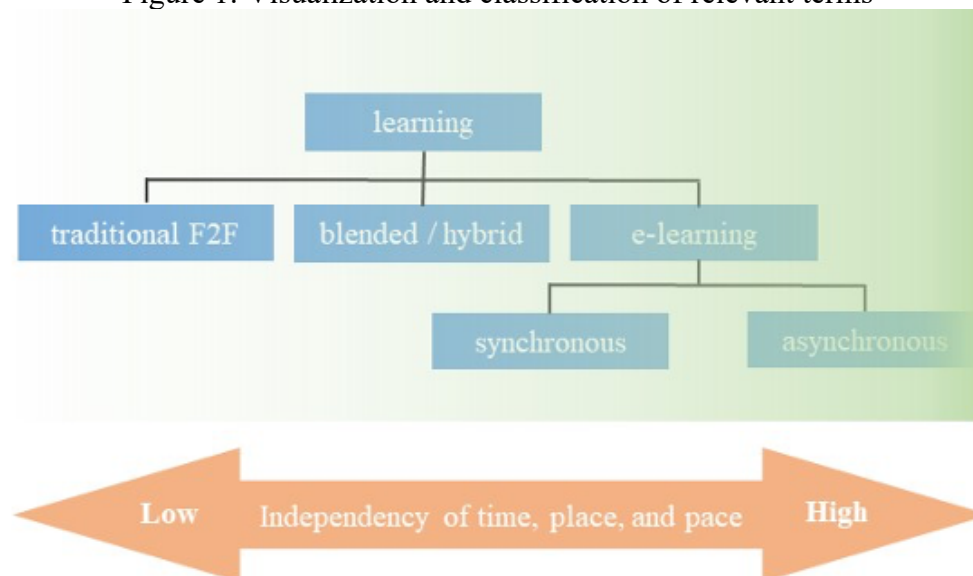
1.1.3. Definition of Synchronous and Asynchronous

The researchers explain that asynchronous learning is online or distance learning that does not take place in real time, and the instructor provides email and online discussion boards to enable interaction (Lin & Goa, 2020, p. 170, based on Ruiz et al., 2006).

1.1.4. Definition of Asynchronous E-learning Used in This Paper

From the author’s point of view it is important for the meaning of asynchronous e-learning that a high degree of independence of time, place and pace is provided to the learner for the majority of the course duration. This can be achieved by making a majority of the learning-material available online, using a LMS, such as Moodle. The course may have synchronous elements such as synchronous assessment and/or synchronous sessions (online and offline). Finally, the course design may even include some limited traditional F2F sequences, i.e. where participants meet physically in a classroom.

Figure 1: Visualization and classification of relevant terms



Note: The superimposed square with different shades of green is intended to visualize the classification of asynchronous e-learning: the stronger the color, the stronger the weighting of the corresponding term in asynchronous e-learning.

1.2. Literature Review

Distance learning, enabled by e-learning technologies such as the Internet in conjunction with LMS is common in education (Brady & Pradhan, 2020, p. 233; Monira et al., 2022). Learning content can be delivered synchronously (in separate physical spaces,) asynchronously (at separate times,) or hybrid (a combination of synchronous and asynchronous learning).

Varkey et al (2022) summarize that several comparisons have been made in literature between different learning modalities, including hybrid, F2F, synchronous online, and asynchronous online courses. The authors criticize, rightly in our view that a much part of this literature has focused on the ways in which these different modalities differ in the students learning experiences, rather than on potential ways to improve students' learning in these environments (Varkey, 2022). Nevertheless, the different modalities may provide an indication of which modalities lead to high levels of student's success and which do not.

According to Wittich et al. (2017, p.7), asynchronous e-learning is commonly used in internal medicine programs. The authors conclude, that e-learning has a positive effect on knowledge acquisition and is approximately as effective as textbooks or lecturers.

Based on their review of studies, Nortvig et al. (2018, p. 48) conclude that, comparing F2F teaching with online and / or blended learning reveals that no inherent feature of any of the three teaching formats leads to better or worse learning outcomes for students. It is not the format that leads to better or poorer learning outcomes for students, but rather the circumstances and context (Nortvig et al., 2018, p. 48). According to Nortvig et al. (2018, p. 50), factors that have a significant impact on e-learning are:

- Spaces, learning community and student identity
- Course design
- Educator roles and relations

Nortvig et al. summarize the most prominent concepts and their importance for the above mentioned factors. For the factor *spaces, learning community and student identity*, they highlight (Nortvig et al., 2018): appropriate teaching and learning spaces (online and offline); engaging and meaningful learning communities; and a strong and salient sense of learner's identity. For *course design*, the most important elements relate to the interactions between online and offline activities, campus-based and practice-based, as well as students, teachers and content (Nortvig et al., 2018). The factors which have emerged as most important to *educator roles and relations* include establishing a strong teacher presence in the online environment and building an online community that fosters positive relationships (Nortvig et al., 2018).

Varkey et al. (2022) used educational psychology literature to provide evidence-based recommendations for the construction of an educational medium in an asynchronous learning environment. They identify three main theories that show promise in the asynchronous classroom:

- Sequential learning
- Metacognition in the asynchronous classroom
- Multimedia principles

Sequential learning refers to the use of spaced learning episodes in time with breaks in between and the use of other learning experiences placed in-between these learning episodes (Varkey et al., 2022).

Asynchronous learning is an advantageous setting, since students can define and use their own retention intervals, time between learning and assessment. Sequential learning can be best used in a classroom that has a sufficient longitudinal reserve, as the very nature of sequential learning requires sufficient time (Varkey et al. 2022). Other researcher have concluded that self-paced online courses (SPOC) can contribute to learner's effectiveness (Southard et al. 2015).

Metacognition in an asynchronous classroom focuses on a person's ability to recognize the learning that is taking place, to create an evaluation of the learning process, and to make changes to the interaction with the materials so that they can increase their overall learning. This is often measured through the writing of reflection papers (Varkey et al. 2022). Through the application of Mayer's 12 (multimedia) principles (Varkey et al. 2022 adapted from Mayer and Moreno, 1998; see figure 2), presentation content is streamlined, and therefore made more effective for teaching students.

Figure 2: Meyer's 12 principles
(Varkey et al. 2022 adapted from Mayer and Moreno, 1998; Meyer, 1997)

The principle	What it means
Coherence Principle	Learning is improved when additional words, sounds and pictures (noise) are removed
Signaling Principle	Learning is improved when there are cues highlighted in the essential material
Redundancy Principle	Learning is improved when graphics and narration are utilized rather than utilizing graphics, narration and on-screen text
Spatial Contiguity Principle	Learning is improved when related words and pictures are presented near to each other
Temporal Contiguity Principle	Learning is improved when related words and pictures are presented at the same time rather than one after the other
Segmenting Principle	Learning is improved when the material is presented in user-paced segments rather than as a singular and continuous unit
Pretraining Principle	Learning is improved when students know the names and characteristics of the main teaching points or concepts
Modality Principle	Learning is improved with graphics and narration as compared to animation and on-screen text
Multimedia Principle	Learning is improved with both words and pictures rather than just words alone
Personalization Principle	Learning is improved when the teaching is written conversationally rather than formally
Voice Principle	Learning is improved when the narration is spoken with a human voice rather than with a mechanistic voice
Image Principle	Learning is not necessarily improved when the speaker's image is added to the screen

In addition, Varkey et al. (2022) highlight the importance of clear and concise feedback from teacher to student. High quality feedback to students enables learning and changes behavior.

According to Lin & Gao (2020, p. 174), two themes emerged regarding the benefits of asynchronous distance learning: self-controlled learning and self-directed learning. Students learned at home, anytime, anywhere and arranged their learning according to their own schedules. In addition, asynchronous learning allowed students to watch course videos repeatedly (Lin & Gao, 2020, p. 174). Self-directed learning is another advantage of asynchronous learning. Lin & Gao (2020, p. 174) reported that students were more focused on learning when they were studying on their own. By repeatedly watching the course videos, students developed a deeper learning. Students were able to stop the video when they had problem with the lecture and searched for resources to dissolve their confusion. The access to rich learning materials and resources motivated students' learning (Lin & Gao, 2020, p. 174), but conversely, it could also lead to students being overwhelmed (course load).

The challenges explored by Lin & Gao (2022) are that students experienced social isolation, as they had less opportunities for class communication and discussion. Additionally, they were unaware of their peers' learning progress, which lead to students feeling distant from others, thus undermining their passion for learning. Previous studies have already mentioned that the vast majority of the statements in an asynchronous learning environment are content related, which might result in the students feeling isolated (Hrastinski, 2008, p. 51).

Not all students fully understand the learning content through self-study. Not getting immediate feedback from the teacher in case of questions and not having the opportunity to interact with peers in real time classroom communication (Francescucci & Rohani, 2019, p. 61) is a challenge. Slow Internet speed, poor quality of the course videos and unfamiliarity with the LMS software are other challenges. Finally, students complained about fatigue due to long time spent concentrating on using electronic devices for learning (Lin & Gao, 2022, p. 175).

Lazarevic & Bentz (2021, p. 9) conclude that ease of access to learning materials is one of the four determinants of students' lower perception of stress in online learning environments (Lazarevic & Bentz 2021, p. 2).

Wasdahl (2022) summarized the advantages and disadvantages of different distance learning settings, more specifically asynchronous, hybrid and asynchronous distance learning. He reported significantly more advantages than disadvantages for asynchronous distance learning. Among the advantages, he included greater accessibility to diverse students (inclusivity), increased time for consideration, reflection and exploration, cost effectiveness (no travel or venue costs) and the ability to scale to potentially thousands of learners at a time. On the disadvantages side, he also mentioned that students can feel socially isolated, that course material can be misunderstood and that students need more self-discipline and motivation to complete their courses.

2. Implementation of the Asynchronous E-learning Course CF

The Business Information Technology Bachelor degree program (BIT) at the University of Applied Sciences and Arts, Northwestern Switzerland (FHNW) has changed the learning and teaching set-up from traditional F2F teaching to asynchronous e-learning in the compulsory finance course CF.

Until February 2020 the CF course was taught in a traditional F2F learning environment. Various restrictions due to the fight against the COVID-19 virus led to the introduction and use of different settings from February 2020 to June 2021. During this period, a mixture of traditional F2F and synchronous e-learning was used in the CF course. The courses that took place in autumn 2021 (September 2021 to December 2021) and spring 2022 (February to June 2022) were again in the traditional F2F setting. At this point, the strategy of returning to a traditional F2F setting seemed more promising than increasing the use of asynchronous e-learning.

The course setting was then changed to the asynchronous e-learning setting and held for the first time starting in September 2022. The change was initiated and driven by several factors, such as higher student demand for asynchronous e-learning courses and cost pressure from the university (student groups from two different locations can be taught together), to name two reasons.

The course CF deals with basics of the mentioned field. There was no change in the LMS used, the course structure or the content between the asynchronous e-learning course and the F2F course. Moodle was used as LMS in F2F and asynchronous e-learning. The same learning textbooks, the same presentation slides, the same questions, exercises and solution manual for the questions and exercises were provided. Finally, quizzes were provided for each topic.

Bonus points could be gained by solving a written case study as a group work. To solve the case study, several topics covered during the course had to be applied. This possibility was given in the traditional F2F format as well as in the asynchronous e-learning setting. Figure 3 compares the original with the asynchronous online setting.

Figure 3: Comparison of asynchronous e-learning with F2F in the CF course

Criteria	Asynchronous e-learning	F2F
Time period	September 2022 to December 2022	February 2022 to June 2022
Content	12 topics	The same 12 topics as in F2F
LMS	Moodle	Moodle
Learning material	Explanatory videos Discussion forum On-demand tutorial Two textbooks Presentation slides for each of the 12 topics	- Discussion in classroom Discussion in classroom The same two textbooks as in F2F The same presentation slides for each of the 12 topics
Bonus points	Possibility of 21 bonus points Limited to 10% (= 9 points) of max. points achievable in the final examination Rewarding the correct solution of the case study with a group Weekly quizz questions; rewarding the successful solving	Possibility of 9 bonus points Limited to 10% (= 9 points) of max. points achievable in final the examination Rewarding the correct solution of the case study with a group Weekly quizz questions; not rewarding the successful solving
Final exam date	January 31st 2023	June 23rd 2022
Form	Paper and pencil	Paper and pencil
Duration	90 minutes	90 minutes

In summary, the following elements have been added to the asynchronous e-learning course:

- Explanatory videos
- Discussion forums
- On-demand tutorials
- Reward for successful completion of weekly quiz questions

An explanatory video has been produced and made available for each topic. The videos are realized as voice-over slides, using standard Microsoft Power Point software. The explanation videos are between 8 to 15 minutes long. The lecturer explains the main content of each topic in a concise way.

If students had questions, they could write them in the discussion forum. The forum was assessable to all students enrolled in the course as well as to the lecturer. There was a time limit for posting questions. Students could post questions up to twelve hours before a topic was scheduled for asynchronous work. Other students or the teacher could then answer the question(s) or add other aspects to the discussion. If the level of activity was high, measured by the complexity and number of questions on the discussion forum, the lecturer invited to a synchronous online session to clarify the enquiries. This possibility is known to the students as on-demand tutorial.

In the asynchronous e-learning format, as in the F2F format, quizzes were also made available. The students had the possibility to solve a quiz every week. The quiz had to be solved at a given date and time within a given time slot. If students answered seven out of ten multiple choice questions correctly, they were rewarded with a bonus point. In the F2F course format, the students did not receive bonus points for correctly completing the quizzes.

3. Analysis

Due to changes in the curriculum, the number of students taking the CF course in autumn 2022 (asynchronous e-learning) more than tripled compared to the number of students taking

the course in spring 2022 (F2F). The average grade increased notably from 4.2 to 4.6 or by 0.4 (explanation of the Swiss grading system below the table in figure 4).

Figure 4: Figures comparing asynchronous e-learning with F2F in the CF course

Criteria	Asynchronous e-learning	F2F
Number of students (=N)	46	14
Passed	40	12
Succession rate in %	87.00	85.70
Max. exam points possible	90	90
Average points achieved in the final exam	62.2	58.0
Average bonus points achieved	8.8	7.3
Average grade	4.6	4.2
Standard deviation	0.848	0.818

Note(s): The grading scale ranges from 1 (very poor) to 6 (excellent). A minimum grade of 4.0 is required to pass the exam. Tenth marks have been mathematically rounded to half marks. Tenth of grades have been calculated from the points obtained in the exam as follows: (points achieved including bonus points / maximum possible points) * 5 + 1.

The number of bonus points available to students has been increased from 9 (F2F) to 21 (asynchronous e-learning). However, the number of bonus points credited to the final exam is limited to nine. The increased possibility of earning bonus points may have contributed to the higher bonus points achieved per student in the asynchronous e-learning setting, which was 1.5 points (equivalent to 0.08 grade points). After eliminating this effect, the grade increase is reduced by 0.08 to 0.32 when comparing asynchronous e-learning to F2F.

The standard deviation increased from 0.818 to 0.848. The findings of Lin & Gao (2020, p. 174) can help to interpret the increase in the standard deviation. Lin & Gao summarize that self-directed learning is an advantage of asynchronous e-learning because students are more focused on learning when they are studying on their own, watching the explanatory videos provided several times if necessary. The authors of this paper deem it possible that self-directed learning with little or no connection to peers and the instructor, compared to group learning (F2F), will lead to more heterogeneous results, not only in terms of content, but also in terms of grades. This is reflected in the higher standard deviation.

The concise explanatory videos are between 8 to 15 minutes long. The limited duration of the videos should not overstretch the students' concentration span, so the videos might increase motivation. In addition, several principles from Meyer's Twelve Principles were adapted in the production of the videos. For example, multimedia, personalization, voice and image.

The students' own quiz results could be used as a toll to check their own learning progress, both in the F2F setting and in asynchronous e-learning. The results of the quizzes in the asynchronous e-learning environment were used by the teacher to give students overall feedback on the quiz results. The provision of these results gave students an insight into the learning progress of their peers. This feedback had the potential to motivate students (Varkey et al., 2022; Lin & Gao, 2020) and might have helped students in their metacognition process.

In addition, each student received an individual quiz summary that showed which questions they answered correctly or incorrectly. Getting seven out of ten questions in the quiz right in the asynchronous e-learning format resulted in a bonus point. Students could use the quiz results summary to monitor their own learning progress. According to Varkey et al. (2022) the metacognition in the asynchronous classroom contributes to the learning success in an asynchronous e-learning environment.

The possibility to use discussion forum and / or the on-demand tutorials was rarely used by the students. This might be explained by the content of the course, which could be learned by self-study, the clear and logical structure of the course, the quality of the learning material provided and the student's confidence in their self-learning abilities in an asynchronous e-learning environment.

As a prerequisite for the successful course transformation from traditional F2F to asynchronous e-learning, Brady & Pradhan (2020, p. 235) mentioned that student familiarity with the LMS supports success. Another factor that might contribute to the learning success in asynchronous e-learning is the perceived stress level of the students (Lazarevic & Bentz, 2021, p.9). Lazarevic & Benz found that students taking a course in a traditional F2F classroom environment felt slightly more stressed than their counterparts taking the course online. Four factors contribute to students' perceived stress a) finding time to study, b) access to learning materials, c) social stress and d) expectations from family and friends (Lazarevic & Bentz, 2021, p.9).

Strong teacher presence combined with high quality course content are important elements in asynchronous e-learning (Nortvig et al., 2018, p. 52, based on Moore, 2014 and Swan & Shi, 2014). Students participating in e-learning courses need to feel connected to the course content, to the other students and to the instructor (Nortvig et al., 2018, p. 52, based on Southard, Meddaugh & France-Harris, 2015; Martin-Rodriguez, Fernandez-Molina, Montero-Alonso & Gonzales-Gomez, 2015).

Students can take the course in their second or third year at the earliest. Students study in a class environment. This means that students attend courses with the same classmates, giving them time to get to know each other. In the first year of study, the F2F teaching and learning environment is predominant. In the period from February 2020 to June 2021, this effect may have been diminished due to limited F2F teaching. Furthermore, the students know the lecturer, as they worked together in two foundational courses before (during their first year of the Bachelor program). Both elements help to build a student-to-student and teacher-to-student relationship before the CF course even started. A good relationship between students and between students and lecturer can contribute to students' learning success (Nortvig et al., 2018).

4. Conclusion: Lessons Learned and Limitations

Based on both, the literature reviewed and the personal experience described from teaching the course, asynchronous e-learning has the potential to increase student learning success (Varkey et al. 2022; Nortvig et al. 2018; Lin & Gao, 2020; Wittich, 2017). Some of the factors that sustain learning success are in the nature of the asynchronous e-learning environment such as student independence in terms of time, place and to some extent to content, which supports students' sequential learning (Varkey et al., 2022).

In order to unlock the positive elements of asynchronous e-learning that contribute to students' learning success, some barriers need to be considered and overcome. Firstly, the relationship between lecturer and students is essential not only in a F2F learning and teaching setting but also in an asynchronous e-learning setting (Nortvig et al., 2018, p.52). Building up a fruitful and respectful relationship takes time and personal interaction. Learning in a group as a class can support the relationship building between students, while limiting the class size to a reasonable number supports the relationship building between students and lecturer.

Secondly, feedback from the lecturer to students can support students' metacognition. Metacognition is considered to have great potential to contribute to students' learning success (Varkey et al., 2022; Hattie & Timperley, 2007, p. 104), while giving feedback to the class as a whole can form the basis for overcoming students' feeling of isolation. According to Lin & Gao (2022), students who did not know their peers in the learning process experienced social isolation. Preventing students feeling socially isolated is seen as a major challenge in an asynchronous e-learning setting (Lin & Gao 2022; Wasdahl, 2022).

Thirdly and finally, quite obviously, students need easy access to the learning materials. This is one of the four factors that reduce stress (Lazarevic & Bentz, 2021, p. 9). The impact of reduced stress on learning success is widely discussed in the literature (Lazarevic & Bentz, 2021, p. 9). Students need appropriate hardware, a stable and fast network connection, an LMS that is easy to use and with which they are ideally already familiar (Brady & Pradhan (2020, p. 235). A clear structure and easy navigation through the online materials (e.g. finding the course syllabus online) helps. Based on the authors' experience, students appreciate the provision of short explanatory videos, as they can watch the video several times, stop it, and adjust the speed, which may maintain a deeper learning (Lin & Gao, 2020, p. 174). Keeping Meyer's 12 principles in mind during the production of the explanatory videos can improve students' learning. In addition, the fact of a reduced concentration span when learning from an electronic medium compared to an F2F situation should be taken into account when producing the explanatory videos.

The findings of this paper are limited by several factors. The grade achieved in a course is not the only indicator to measure students' learning success. Other measures such as student satisfaction may have different results.

The subjects of the studies are students in a bachelor program in business information technology. Due to the students' special interest in information technology, they are more IT affine than students from other disciplines. The subjects are members of (smaller) classes, consisting of 46 and 14 students. For larger classes, the lessons learned may not be useful as it is harder or not possible to build a fruitful and respectful relationship between students and teacher.

Learning and teaching is very complex and differs from person to person. What works for one person may not work for another. Or as Hattie (2015, p. 80) notes in a meta-analysis of influences on student learning: "Almost all of the 65 interventions that are commonly claimed to improve student learning have a positive impact on student learning."

References

- Algahtani, A.F. (2011). Evaluating the Effectiveness of the E-learning Experience in Some Universities in Saudi Arabia from Male Students' Perceptions, Durham theses, Durham University. <https://etheses.dur.ac.uk/3125/>
- Arkorful, V., & Abaidoo, N. (2014). The role of e-learning, the advantages and disadvantages of its adoption in higher education. *International Journal of Education and Research*, 2(12), 397–410.
- Brady, A. K. & Pradhan, D. (2020). Learning without Borders: Asynchronous and Distance Learning in the Age of COVID-19 and Beyond. *ATS Scholar*, Vol. 1, Issue 3, 233 – 242. <https://doi.org/10.34197/ats-scholar.2020-0046PS>
- Bernard, M. B., Borokhovski, E., Schmid, R. F., Tamim, R. M. and Abrami, Ph. C. (2014). A meta-analysis of blended learning and technology use in higher education: from the general to the applied. *Journal of Computing in Higher Education*, 26(1), pp. 87-122.
- Chigeza, P. Halbert, K. (2014). Navigating E-Learning and Blended Learning for Pre-service Teachers: Redesigning for Engagement, Access and Efficiency. *Australian Journal of Teacher Education*, 39(11), pp. 133–146. <https://doi.org/10.14221/ajte.204v39n11.8>
- Francescucci, A., & Rohani, L. (2019). Exclusively synchronous online (VIRI) learning: The impact on student performance and engagement outcomes. *Journal of marketing Education*, 41(1), 60-69. <https://doi.org/10.1177/0273475318818864>
- Hattie, J. (2015). The Applicability of Visible Learning to Higher Education, *Scholarship of Teaching and Learning in Psychology*, Vol. 1, No. 1, pp. 79 – 91.
- Hattie, J. & Timperley, H. (2007). The power of feedback, *Review of Educational Research*, Vol. 77 No. 1, pp. 81-112.
- Hrastinski, S. (2008). Asynchronous and synchronous e-learning. *Educause Quarterly*, 31(4), 51-55.
- Israel, M. J. (2015). Effectiveness of Integrating MOOCs in Traditional Classrooms for Undergraduate Students. *International Review of Research in Open and Distributed Learning*, 16(5), pp. 102-118.
- Lazarevic, B. & Bentz D. (2021). Student Perception of Stress in Online and Face-to-Face Learning: The Exploration of Stress Determinants, *American Journal of Distance Education*, 35:1, 2-15, DOI: 10.1080/08923647.2020.1748491
- Lin, X. & Gao, L. (2020). Students' sense of community and perspectives of taking synchronous and asynchronous online courses. *Asian Journal of Distance Education*, 15(1), 169-179. <https://doi.org/10.5281/zenodo/3881614>

- Martín-Rodríguez, Ó., Fernández-Molina, J. C., Montero-Alonso, M. Á., and González-Gómez, F. (2015). The main components of satisfaction with e-learning. *Technology, Pedagogy and Education*, 24(2), pp. 267–277.
<https://doi.org/10.1080/1475939X.2014.888370>
- Mayer, R.E. (1997). Using multimedia for e-learning, *Journal of Computer Assisted Learning*, 33, pp. 403-423.
- Mayer, R.E. & Moreno, R. (1998). A cognitive theory of multimedia learning: implications for design principles, *Journal of Educational Psychology*, Vol. 91 No. 2, pp. 358-368.
- Monira, I. Aludhahi, Abdulfattah, S. Alqahtani, Baian A. Baattahiah, Huda I. Al-Mohammed (2022). Exploring the relationship between students' learning satisfaction and self-efficacy during the emergency transition to remote learning amid the coronavirus pandemic: A cross-sectional study. *Education and Information Technologies* (2022), 1323-1340. <https://doi.org/10.1007/s10639-021-10644-7>
- Moore, R. (2014). Importance of developing community in distance education courses. *TechTrends* 58(2), pp. 20-25.
- Northey, G., Bucic, T., Chylinski, M. and Govind, R. (2015). Increasing Student Engagement Using Asynchronous Learning. *Journal of Marketing Education*, 37(3), pp. 171-180.
- Nortvig, A. M., Petersen, A. K., and Balle, S. H. (2018). A Literature Review of the Factors Influencing E-Learning and Blended Learning in Relation to Learning Outcome, Student Satisfaction and Engagement. *The Electronic Journal of e-Learning*, 16(1), pp. 46-55.
- Pellas, N. and Kazandis, I. (2015). On the value of Second Life for students' engagement in blended and online courses: A comparative study from the Higher Education in Greece. *Education and Information Technologies*, 20(3), pp. 445-466.
- Potter, J. (2015). Applying a hybrid model: Can it enhance student learning outcomes? *Journal of Instructional Pedagogies*, 17(11).
- Ryan, S., Kaufman, J., Greenhouse, J., Joel; She, R. and Shi, J. (2016). The Effectiveness of Blended Online Learning Courses at the Community College Level. *Community College Journal of Research and Practice*, 40(4), pp. 285-298.
- Southard, S., Meddaugh, J., and France-Harris, A. (2015). Can SPOC (self-paced online course) live long and prosper? A comparison study of a new species of online course delivery. *Online Journal of Distance Learning Administration*, 18(2), 8.
- Swan, K., and Shih, L. (2014). On the nature and development of social presence in online course discussions.

- Varkey, T.C., Varkey, J.A., Ding, J.B., Varkey, P.K., Zeitler, C., Nguyen, A.M., Merhavy, Z.I. and Thomas, C.R. (2022). Asynchronous learning: a general review of best practices for the 21st century, *Journal of Research in Innovative Teaching & Learning*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/JRIT-06-2022-0036>
- Wasdahl, A. (2020). Synchronous vs. Asynchronous Learning: Strategies for Remote Environments. <https://ssidp.ucla.edu/wp-content/uploads/sites/54/2020/08/Synchronous-vs-Asynchronous-Learning-Strategies-for-Remote-Environments.pdf>
- Wittich, C.M., Agrawal, A., Cook, D.A., Halvorsen, A.J., Mandrekar, J.N., Chaudhry, S., Dupras, D.M., Oxentenko, A.S., Beckman, T.J. (2017). E-learning in graduate medical education: survey of residency program directors. *BMC Medical Education*, 2017, 17:114.

Contact email: brido.schuler@fhnw.ch

The Role of Reflection in Changing Student's Conceptions About the Teaching Profession: Navigate Towards Meaning Physical Education

Ana Rita Águeda, University of Porto, Portugal

Paula Silva, University of Porto, Portugal

Paula Queirós, University of Porto, Portugal

The Paris Conference on Education 2023

Official Conference Proceedings

Abstract

In initial Teacher Education Programs, students face a different reality than expected due to the opportunities to engage in deeper reflection and critical thinking. Therefore, this study explored the reflective dimension's role in changing students' initial conceptions about the teaching profession during the first semester of a teacher education program. One hundred and twenty-two students were involved in this study. At the end of the first semester, they were asked to write a reflection with the following question: "How do I feel that I am learning to be a teacher?" The document analysis was used for data collection, and data analysis was guided by Braun and Clarke's (2006) guidelines. Each coding phase ensured that the evolution of themes was transparent and traceable. The results indicate that future Physical Education teachers are unaware of the demands and complexity of the teaching profession, underlining that they are still learning how to become a teacher. Moreover, this study has shown reflection's positive impact and central role on teachers' ability to improve and question their practice. Reflection is now seen as a fundamental characteristic of becoming a teacher. Since reflection has a significant role in changing students' conceptions, the need for initial training to value continuous critical reflection is highlighted. Therefore, when reflection is considered, teachers can become career-long learners, letting them produce and preserve personal knowledge through the reflective process to promote meaningful Physical Education.

Keywords: Initial Teacher Education, Reflection, Physical Education, Teaching Profession

iafor

The International Academic Forum

www.iafor.org

Introduction

Innumerable changes have been made from a sociocultural and ethnographic perspective, adding complexity to our current society. Therefore, it is expected a higher preparation for future teachers, including the development of autonomy and the ability to reflect to overcome the constraints that could emerge from teaching practice. Teaching has never been as complex as it is currently, requiring greater preparation to promote quality teaching (Shulman, 2002). As a teaching profession, being a teacher involves a continuous process of discovery, learning, and reflection. However, the initial stages of the teaching profession are not only decisive in obtaining new knowledge but also have a strong impact on the conception of future practice.

In addition, less attention has been given to the relevance of initial teacher education programs in developing and promoting reflective and critical thinking. Current research indicates an evident dedication to investigating the teaching profession, but unfortunately, the initial teacher education programs still require further studies, especially when future teachers are considered. During this study, we aim to understand how complex the teaching profession can be, which requires a deeper interpretation in the early stages, where reflective thoughts and critical thinking are stimulated and promoted toward a meaningful teaching practice.

Reflection Conceptualized

The term 'reflection' has now become part of the language of teacher education, yet its importance has not always been recognized. It should be noted that although reflection and reflective practices have gained special and deserving attention in the teacher education curriculum, the concept as a process has been conceptualized in different ways with different implications (Mulryan-Kyne, 2021). These differences can trigger misperception that, consequently, has repercussions on teacher education since verifying its use in an uncritical and unreflected way is possible. Even more worrying becomes the scenario when the concept is not clearly defined. The term is ambiguous, and its use does not always have the same connotation (Zeichner & Liston, 1996). Consequently, transmitting it still becomes more complex (Jay & Johnson, 2002).

Despite having verified the existence of different interpretations for the concept of reflection, Loughran (2002) states that an element that a majority has in common is the notion of a problem (an intriguing, curious, or disconcerting situation). What the problem is, how it is framed in the specific context, and (hopefully) reformulated is a crucial aspect of understanding the nature of reflection and the value of reflective practice.

In brief, reflection must stop being seen as a set of techniques that can be packaged and taught to teachers as if they were robots. Thus, reflection stimulates critical thinking and the teacher's identity. As so, accepting everything that is seen, done, or heard without questioning seems absurd, given all the research that has been done in this field. By adopting a critical reflective process, the perception of reality is exposed to changes and may result in the transformation of the individual itself (Freire, 2001).

Reflective Dimensions and Levels of Reflectivity

The most common platform for demonstrating trainee teacher reflection within initial teacher education frameworks is before, during, and after teaching (Griffiths, 2000).

Schön (1987) distinguishes ‘reflection-on-action’ and ‘reflection-in-action,’ which involve rational thinking that leads to reasoned judgment about correct, appropriate, and deliberated actions or responses. As Schön (1987) mentioned, ‘reflection-in-action’ is related to thinking during the teaching process. Therefore, this dimension of reflection allows continual interpretation, investigation, and critical conversation with oneself about the problems that may emerge from practice (Sellars, 2017).

When it comes to ‘reflection-on-action,’ this involves taking the opportunity to draw on the professional knowledge base more explicitly. Moreover, it can be used in two ways: 1) to develop the teacher’s understanding; 2) to test and develop the knowledge base (Thompson & Pascal, 2012). Nevertheless, it seems crucial to mention ‘reflection-for-action,’ an aspect of reflective practice that Schön did not discuss. It refers to planning, thinking ahead about what is coming next, and using the experience to make the best use of available time resources (Thompson & Pascal, 2012).

Van Manen (1977) identifies three of them. At the first level (technical reflection), the main concern is with efficient means to attain a given objective. The rationality of the ‘best choice’ is defined based on the principles of technological progress. At the second level (practical reflection), it is assumed that every educational choice is preoccupied with analyzing and clarifying individual and cultural experiences, assumptions, and presuppositions to orient practical actions. The third (politico-ethical), and highest level, reflection is now focused on the nature of social conditions necessary for raising the question of worthwhileness in the first place. At this final stage, reflection requires a constant critique of domination and repressive forms of authority. On the other hand, it calls for moral and ethical criteria by considering social and political contexts (Hatton & Smith, 1995).

Reflection in Initial Teacher Education

There is a significant and growing literature on reflection, reflective teacher, and reflective practice, particularly in teacher education. Reflection and reflective practice are increasingly being discussed and promoted as a crucial part of initial teacher education programs (Minott, 2019; Zeichner, 1983). This highlight that has been given towards reflection stems from a belief that not only encourages and facilitates the linkage between theory-practice but also promotes critical thinking (Calderhead, 1989). Therefore, reflection is key to the teacher’s professional practice (Day et al., 2022).

Its impact is notable and essential, given that it contradicts technical rationality. If followed rigidly, it reduces practitioners to technicians whose only role is to implement research findings and theoretical models without reflecting on them (Thompson & Pascal, 2012). Therefore, it is essential to promote opportunities to reflect that is systematic and conscious, where teachers can develop their capacities and have a deeper understanding of their teaching processes (Lizana & García, 2022).

Research in teacher education programs shows that reflection should not be perceived as separate from ongoing coursework. More specifically, it is not simply a periodic pause for thought or a course requirement that teachers can forget as they go to work in schools (Thompson & Thompson, 2023). To conclude this perspective, reflection in initial teacher education programs is not a replacement for theory; however, it needs to draw on this as part of the reflective process. Reflection provides an opportunity to apply theory to professional practice (Sellars, 2017).

Traditional Physical Education approaches have been criticized for triggering gaps in theory practice and not correctly preparing pre-service teachers for their teaching process. As so, this perspective encourages future teachers to follow the rules in their teaching instead of making their own decisions to adapt the management of the class, the instruction, and the contents according to the needs of the students (Forzani, 2014; Grossman et al., 2009). However, there has been a more ambitious outcome for initial teacher education.

Moreover, in initial teacher education, cycles of deliberate practice and reflection provide Physical Education teachers at the beginning of their careers with an opportunity to systematically engage in the different dimensions of reflection. Since they usually have little experience, developing adaptive competence is fundamental. It becomes possible, given the contribution of reflection, since it allows adaptations based on the needs of students and the context that reflects teaching situations (Xie et al., 2020).

Furthermore, it has acknowledged the importance of working towards a critical and more democratic Physical Education, where reflection is a fundamental basis of pedagogical practice (Brasó i Rius & Torredadella Flix, 2018). For this reason, Physical Education institutions must stimulate students' reflective capacity and promote its importance, encouraging permanent monitoring and evaluation of practice.

Objectives

In initial teacher education programs, students often face a different reality than expected due to the opportunities to engage in deeper reflection and critical thinking.

Therefore, the main goal of this study was to understand the role of reflection in initial physical education teaching programs, explicitly considering the context of the master's degree of Physical Education in Elementary and Secondary Teaching Education from the conceptions of future teachers. As a specific goal, we intended to explore the reflective dimension's role in changing students' initial conceptions about the teaching profession during the first semester of a curricular unit.

Methodology

Context

This study occurred in the Faculty of Sports of the University of Oporto (FADEUP) during the 2021/2022 academic year, specifically at the end of the 1st semester of the master's degree in Physical Education in Elementary and Secondary Teaching Education. At the end of the second year, Physical Education teachers can apply for schools once they finish their practicum training and defend the internship report.

This master's degree is often characterized as a context of good practices, where reflection and critical thinking are often developed and stimulated in future Physical Education teachers. For this reason, future teachers gain their own voice in the teaching process.

At the Teaching Professionalism curricular unit, future teachers' reflective dimension was stimulated through individual and group reflection and the contribution of class discussion, supportive learning environments, and reflective written documents. Moreover, at the end of the first semester, future teachers were asked to write a final reflection about how they are

learning to become teachers, mentioning changes (or not) in their position and understandings regarding the teaching profession.

Participants

At the very end of the first semester, one hundred and twenty-two (122) future teachers answered, through individual reflection, the following question: “How do I feel I am learning to be a teacher?” Additionally, the contribution of all semesters in their professional development was also incorporated in the final reflection.

Data Collection

The data of the present study emerged from the 122 participant's final reflections. Given the nature of data and the qualitative nature of this project, it is considered that there is a dynamic relationship between the natural world and the subject. More specifically, an inseparable link between the objective world (context) and the subject's subjectivity that cannot be translated into numbers and deals with phenomena. For this same reason, the analysis will be guided by Braun and Clarke's (2006) guidelines for the use of thematic analysis.

Document analysis is reported as a non-reactive source, allowing to obtain information after long periods where documents (reflections) can be considered a natural source of contextualized information since they appear in each context and provide information about it (Kripka et al., 2015). In this way, the data collected through the analysis of future teachers' individual reflections will contribute to understanding the role and importance of reflection in initial teacher education programs.

Data Analysis and Credibility

Due to the nature of the data, it is considered that there is a dynamic relationship between the natural world and the subject. In other words, there is an inseparable link between the subject's context and subjectivity that cannot be translated into numbers and deals with phenomena. For this same reason, the analysis will be conducted using thematic analysis by Braun and Clarke's (2006) guidelines. Each phase of the described coding and theme development process ensured that the evolution of themes was clear and traceable, which helped ensure the rigor of the research.

Initially, the data was familiarized through repeated reading and the use of initial notes in search of meanings and patterns. The documents (final reflections) were read line by line, and the initial codes were written in a column attached to the respective document. Patterns were sought throughout the data set and subsequently grouped into themes (Braun & Clarke, 2006). A more inductive and data-oriented approach was privileged, recognizing the role of researchers in co-creating themes (Braun & Clarke, 2006).

Finally, the themes were reviewed after a detailed identification of different possibilities, and the internal and external homogeneity was verified (Braun & Clarke, 2006; Joffe, 2012). There was also an attribution of names to the themes, identifying the respective essence so that the excerpts were coherent and internally consistent in each theme (Braun & Clarke, 2006).

Considering the qualitative nature of this study is relevant to reinforce that the aim is to comprehend and understand the phenomenon in specific contexts (Patton, 2002). Therefore, our goal was not to seek universal generalizations and unidirectional patterns but to privilege the involvement and personal role in the research. Following the thoughts of Golafshani (2003), it is crucial to demonstrate that studies are credible and trustworthy.

To reduce the possibility of incorrect interpretations, data triangulation was privileged, which allowed to clarify and reach a consensus on the meanings obtained through observation or interpretation (Patton, 2002). Apart from this, a continuous evaluation by the researchers (peer debriefing) was also guaranteed by periodic meetings to discuss points of view. Also, encouraging constant critical analysis, questioning formulated ideas, and reviewing research procedures were considered (Strauss & Corbin, 1998). Finally, there was a permanent combination between the data and the ideas and interpretations of the intervening researchers. As a result, it allowed an in-depth understanding of the phenomenon set out to investigate.

Findings and Discussion

Through the interpretative analysis, it was possible to highlight two fundamental topics: 1) reflection as a path to rediscover the teaching profession; 2) reflection as a mean to change beliefs and initial conceptions about the teaching profession. These topics will be presented and discussed below.

Reflection as a Path to Rediscover the Teaching Profession

These four months were not only relevant but also essential to change future teachers' perspectives on the demands of the teaching profession. At the beginning of the academic year, future teachers demonstrated to have a general and wide perspective of what it meant to 'be a teacher', however throughout the classes and through reflective habits, they seemed to understand the profession as highly complex, which was not taken into perspective. Through future teachers' reflections, the meaning of teaching education is way more complex, which leads to the difficulty of simplifying the term that has been widely recognized (Kiss, 2012). Moreover, Altet (2001) refers to the teaching profession as a relational practice with multiple interactions limited by unique, complex, and predictable situations.

"Being a good teacher is not just about these perceptions, so throughout the semester, I was able to learn and idealize that the profession is much more complex than what I was particularly willing to find." –NS

"In order to define a good teacher, I am now able to recognize that I cannot mention all the aspects due to the complexity of the teaching profession." –RS

As seen before, teaching is a complex activity influenced by various factors (pedagogical content knowledge, beliefs, capabilities, students). Therefore, focusing solely on one factor may not be helpful in deeply understanding the complexity of teaching (Uzuntiryaki-Kondakci et al., 2017). Due to this complexity, future teachers also pointed out an initial reality shock that was not easy to overcome. Mahmood (2013) mentioned that beginning teaching is challenging and complex.

Moreover, moving from the role of the student to the teacher can be disconcerting. Indeed, research indicates that most student teachers experience a reality shock when they encounter

the complexity of a classroom during their practical training. Sometimes, this is sufficiently severe to terminate their teaching career aspirations before graduation (Rots et al., 2010).

“Since the first day of the semester, there has been a constant reality shock, but the idea of what it means to be a teacher has been taking shape.” –AF

“In short, the reality shock is a crucial moment where we leave the role of being a student and start to act like a teacher. It is scary but thrilling at the same time.” –SG

During this reality shock, future teachers assumed double status (students and teachers) and reinforced the need to start thinking and act adopting the teacher's lens. In this case, they ensured the teaching-learning process was not reduced and influenced by past experiences as students.

“Firstly, I changed from a student to teacher view. With this transition came the notion of responsibility that is present in teaching and the need to reflect and think about all “whys.” –MA

“I think I acquired another vision of what it means to be a teacher. I feel that I have fallen into a reality that I did not consider before because my perception was more of a student rather than a teacher.”

Additionally, the role transition triggered a greater awareness of the link between theory and practice in the teaching profession. Despite the first year of this master's program has a strong theoretical component, through which they learn the specific skills of each subject, they also mentioned the need to contextualize, adapt and reflect according to the surrounding environment. Therefore, Physical Education future teachers highlight the need not to act and make decisions without critical thinking and not to follow "recipes."

“Exactly what we are doing right now, we are learning how to be professors by trying to increase our theoretical knowledge, but also associating it, later, with practice.” –GA

How conceptions of future teachers and their teaching practices are intertwined is an urgent theme in the research on teacher education. New experiences and contexts can trigger new thinking, which means that experimenting with teaching practices can be a starting point for teachers to reconceptualize their thinking about teaching. In this sense, developing skills in a particular context can be relevant at that moment and lead to a change of conceptions later on (van den Bos & Brouwer, 2014).

During the classes on Teaching Professionalism, future Physical Education teachers were asked questions to trigger reflection and stimulate critical thinking about their pedagogical practice. As so, it was the reflection that allowed to rethink initial conceptions about the teaching profession, which led to the concept of reflective practice. Thorsen and DeVore (2013) describe it as complex, not only because teachers need to reflect on aspects of teaching and the content knowledge but also because teaching methods used daily, such as planning and executing adequate and relevant lessons and understanding cultural identity and that of their students.

The initial questions allowed future teachers to (re)interpret the role of reflection over time, giving it due value and recognition.

"The impact that reflective habits have on the teacher's ability to improve and perfect their practice constantly was a concept that was not present in my ideology of "being a teacher." –PA

"I consider the process of reflection relevant and fundamental to evolve as a professional, which initially was not even something questionable for me and which started to make perfect sense." –BF

"In this way, I also understood that reflective capacity is not just a characteristic of a good teacher, but a necessary condition for the full exercise of the profession." –TL

Future Physical Education teachers mentioned the reflective dimension as essential to the teaching profession. Generally, the existence of a reductive conception is evident at the early stages of the teaching profession. Over time, the understanding of future teachers followed the perspective of Perrenoud (2001), who attests that the teaching profession is complex so that the teaching professional can adapt to the complexity of each situation and systematically seek new solutions. It is essential to point out that, due to the complexity of the teaching profession, future teachers mentioned that "they still have not learned to be teachers" and stressed the need for continuous training in teacher education. In his way, it is essential to train future teachers capable of learning from the past and proper in the present and future.

Reflection as a Mean to Change Beliefs and Initial Conceptions About Teaching Profession

Through the reflections of future Physical Education teachers, it was possible to perceive that at the beginning of the curricular unit, their conception of learning to be a teacher ended in initial training. Also, they were secure that at the end of the year of the professional practicum would be fully prepared for all adversities, challenges, and issues that would arise in the most diverse professional contexts. However, through the privileged reflexive habits during the curricular unit, changes were made in their understanding since lifelong education was recurrently mentioned in their final reflections.

"It is curious to find that the initial formation is, as the name indicates, initial. My training will never be finished and will be subject to constant tests throughout my career." –GB

"I am aware that being a teacher is formed over time, that I still have a long way to go, and that, despite the training and preparation that this course offers, I will never be fully prepared for all the scenarios I will encounter in practice." –PT

Although learning had not been seen as a lifelong process before 1980, nowadays is essential to succeed (Laal et al., 2014). The final reflections of future teachers trigger an appreciation of lifelong education, allowing them to be the principal actors of their teaching process through the transformation of their belief system, self-knowledge, self-image, and becoming open to change and professional development (Lima et al., 2015).

In this way, it is recognized that lifelong education can have a strong and positive impact on improving pedagogical practices and, most important, adding quality to Physical Education teaching programs (Junior & Tassoni, 2013).

Reflection allowed future teachers to understand and clarify that the teaching process is plural and unfinished simply because it begins and never ends. Thus, future teachers will learn “step by step” and reinforce the need to renew theoretical knowledge.

“A teacher never reaches a maximum point of knowledge and expertise, thus finding himself in a process of constant reconstruction.”

“As for specific knowledge, I think that no professional can say that he owns the absolute truth. As in any area transversal to Education, it is important for educators to keep up to date as there are always new theories, new knowledge, new approaches, and teaching methods over the years...”

Reflection was also relevant to change future teachers' initial beliefs about the role of Physical Education teachers. Initially, and as seen above, the main purpose was focused on teaching and, more specifically, the transmission of technical abilities.

“I did not have any perception or knowledge to understand that the word teacher is much more than giving classes and making assessments.” –PA

“(...) because I had in mind that I would only have to teach, pass on the contents and then leave without having to worry about anything else.” –FS

This initial way of thinking about teaching in Physical Education leads us to an education focused on technique, seeking physical excellence and not intellectual. Related to technical rationality, this perspective consists of instrumental problem-solving made rigorous by applying scientific theory and technique (Schön, 2001). For this same reason, it is evident that future teachers initially believe that to achieve excellence, some standards and recipes can be followed rigorously and applicable to all pedagogical institutions. This way of thinking, as described below, shows that this conception changed over time. Through individual and group reflection, future teachers could prioritize reflective teaching.

“I thought that there were recipes and standardized learning situations. I finally understood that it is necessary to doubt, criticize, evaluate, and, above all, reflect.” –MB

“Right now, I have a completely different view of what it means to be a good teacher. Instead of certainties, I have more doubts... because being a good teacher is very relative, and there is no magic formula that applies to all contexts” –JC

Following this perspective, it was also possible to understand a turning point in the way future teachers perceive their teaching towards the future. Therefore, they prioritized student-centered approaches and decentralized the teacher from the protagonist and the main person responsible for transmitting knowledge. This student prioritization allows them to reflect on issues raised by colleagues or the teacher and, consequently, to actively participate in creating their own knowledge (Bosco, 2020). In short, the teacher acts as a facilitator of the teaching process and adjusts it to the needs of the students.

“Your role, as an educator, is to guide your students to reflect on their role in the world and how they can act on it.” –AP

“(…) education is an anthropological project, and the student is the center of your action as teachers.” –LT

During this curricular unit, reflection also allowed future teachers to change their initial beliefs about the clarity of the teaching profession. After a few months, it was possible to understand the difficulty in clarifying what “being a teacher” means due to the complexity of this profession.

“Despite this, I believe that there is no universal definition, converging on several aspects, characteristics, and competencies associated with the teaching profession.” –BR

“The difficulty I felt in creating a definition for what it means to be a competent teacher was due to the fact that any attempt to respond to this statement would be a step that reduces the nature of the profession.” –SM

Not less importantly, at the beginning of the curricular unit, future teachers demonstrate not to be open to ear other’s opinions and reflections in groups. In some cases, they hold the idea of knowing everything. Therefore, some opinions and advice were not initially taken into perspective.

“As many of us, I thought I was absolutely right. I was not interested in the opinion of others.” –DC

This way of thinking did not last over time. Their experiences through reflection allowed considerable changes. Therefore, at the end of four months, there was an appreciation of collaborative work, group reflection, sharing, and exchange of experiences that became fundamental in favor of more significant learning and professional development opportunities. Therefore, there is an obvious need for a community in which it is possible to share teaching experience, especially with novice teachers (Attard & Armour, 2005).

“In addition, I am able to value even more the conversation with more experienced colleagues, as there is an exchange of knowledge.” –TL

“In addition, these dialogues will help me to enter the circle of professionals and create a healthy work environment conducive to good practices.” –AR

To summarize, the final reflections of future Physical Education teachers reinforce the importance of interacting with other members of the school community by sharing information and creating bonds and relationships that have a positive impact on learning. In the process of becoming teachers, the need for initial teacher education to value continuous critical reflection, both individually and collaboratively, to be an integral part of daily professional practice is emphasized.

Conclusion

Since reflection has a significant role in changing students' conceptions, the need for initial training to value continuous critical reflection is highlighted. When reflection is considered, teachers can become career-long learners, letting them produce and preserve personal knowledge through the reflective process to promote meaningful Physical Education. Moreover, in becoming teachers, critical reflection, both individual and collaborative, must be seen as an integral part of daily professional practice.

Initial teacher education programs should provide opportunities to reflect and develop critical thinking to prepare future teachers more effectively for what it is to be a physical education teacher (Day et al., 2022). As future research, it would be interesting to comprehend the behavior of these future teachers during the practicum training and understand if the changed perspectives and beliefs maintain in practice.

These results reinforce the importance of reflection in the curriculum of initial teacher education is crucial and will allow future teachers to interpret, question and understand the pedagogical practice so that it is given due meaning.

References

- Altet, M. (2001). As competências do professor profissional: entre conhecimentos, esquemas de ação e adaptação, saber analisar. *Formando professores profissionais: Quais estratégias*, 23-35.
- Attard, K., & Armour, K. M. (2005). Learning to become a learning professional: Reflections on one year of teaching. *European Journal of Teacher Education*, 28(2), 195-207.
- Boscov, C. (2020). O impacto do ensino centrado no aluno no processo de aprendizado. *RAGC*, 8(36).
- Brasó i Rius, J., & Torredadella Flix, X. (2018). Reflexiones para (re) formular una educación física crítica. *Revista Internacional de Medicina y Ciencias de la Actividad Física y del Deporte*.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Calderhead, J. (1989). Reflective teaching and teacher education. *Teaching and teacher education*, 5(1), 43-51.
- Day, S. P., Webster, C., & Killen, A. (2022). Exploring initial teacher education student teachers' beliefs about reflective practice using a modified reflective practice questionnaire. *Reflective Practice*, 1-15.
- Forzani, F. M. (2014). Understanding “core practices” and “practice-based” teacher education: Learning from the past. *Journal of teacher education*, 65(4), 357-368.
- Freire, A. M. (2001). Concepções orientadoras do processo de aprendizagem do ensino nos estágios pedagógicos. *Colóquio: modelos e práticas de formação inicial de professores, Faculdade de Psicologia e de Ciências da Educação, Universidade de Lisboa. Lisboa, Portugal*, 1-25.
- Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The qualitative report*, 8(4), 597-607.
- Griffiths, V. (2000). The reflective dimension in teacher education. *International Journal of Educational Research*, 33(5), 539-555.
- Grossman, P., Hammerness, K., & McDonald, M. (2009). Redefining teaching, re-imagining teacher education. *Teachers and Teaching: theory and practice*, 15(2), 273-289.
- Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and teacher education*, 11(1), 33-49.
- Jay, J. K., & Johnson, K. L. (2002). Capturing complexity: A typology of reflective practice for teacher education. *Teaching and teacher education*, 18(1), 73-85.

- Joffe, H. (2012). Thematic analysis. *Qualitative research methods in mental health and psychotherapy: A guide for students and practitioners, 1*, 210-223.
- Junior, N. B., & Tassoni, E. C. M. (2013). A educação física, o docente e a escola: concepções e práticas pedagógicas. *Revista Brasileira de Educação Física e Esporte*, 27, 467-483.
- Kiss, T. (2012). The complexity of teacher learning: Reflection as a complex dynamic system. *Journal of Interdisciplinary Research in Education*, 2(1), 17-35.
- Kripka, R., Scheller, M., & Bonotto, D. L. (2015). Pesquisa Documental: considerações sobre conceitos e características na Pesquisa Qualitativa. *CIAIQ2015*, 2.
- Laal, M., Laal, A., & Aliramaei, A. (2014). Continuing education; lifelong learning. *Procedia-social and behavioral sciences*, 116, 4052-4056.
- Lima, F. D. C., de Oliveira, A. C. L., Araújo, T. S., & Miranda, G. J. (2015). O choque com a realidade: dormi contador e acordei professor. *REICE. Revista Iberoamericana sobre Calidad, Eficacia y Cambio en Educación*, 13(1), 49-67.
- Lizana, A., & García, A. B. (2022). El estudio de la práctica reflexiva y la labor tutorial en el proceso de formación docente. *Revista electrónica interuniversitaria de formación del profesorado*, 25(2), 93-112.
- Loughran, J. J. (2002). Effective reflective practice: In search of meaning in learning about teaching. *Journal of teacher education*, 53(1), 33-43.
- Mahmood, S. (2013). “Reality shock”: New early childhood education teachers. *Journal of Early Childhood Teacher Education*, 34(2), 154-170.
- Minott, M. (2019). Reflective teaching, inclusive teaching and the teacher’s tasks in the inclusive classroom: A literary investigation. *British Journal of Special Education*, 46(2), 226-238.
- Mulryan-Kyne, C. (2021). Supporting reflection and reflective practice in an initial teacher education programme: An exploratory study. *European Journal of Teacher Education*, 44(4), 502-519.
- Patton, M. Q. (2002). Qualitative research and evaluation methods. Thousand Oaks. Cal.: Sage Publications, 4.
- Perrenoud, P. (2001). Dez novas competências para uma nova profissão. *Pátio: Revista Pedagógica*, 5(17), 8-12.
- Rots, I., Aelterman, A., Devos, G., & Vlerick, P. (2010). Teacher education and the choice to enter the teaching profession: A prospective study. *Teaching and teacher education*, 26(8), 1619-1629.
- Schön, D. (2001). From technical rationality to reflection-in-action. *Supporting Lifelong Learning: Volume I: Perspectives on Learning*, 40.

- Schön, D. A. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. Jossey-Bass.
- Sellars, M. (2017). Reflective practice for teachers. *Reflective Practice for Teachers*, 1-312.
- Shulman, L. S. (2002). Truth and consequences? Inquiry and policy in research on teacher education. *Journal of teacher education*, 53(3), 248-253.
- Strauss, A., & Corbin, J. (1998). Basics of qualitative research techniques.
- Thompson, N., & Pascal, J. (2012). Developing critically reflective practice. *Reflective Practice*, 13(2), 311-325.
- Thompson, S., & Thompson, N. (2023). *The critically reflective practitioner*. Bloomsbury Publishing.
- Thorsen, C. A., & DeVore, S. (2013). Analyzing reflection on/for action: A new approach. *Reflective Practice*, 14(1), 88-103.
- Uzuntiryaki-Kondakci, E., Demirdöğen, B., Akın, F. N., Tarkin, A., & Aydın-Günbatar, S. (2017). Exploring the complexity of teaching: the interaction between teacher self-regulation and pedagogical content knowledge. *Chemistry Education Research and Practice*, 18(1), 250-270.
- Van den Bos, P., & Brouwer, J. (2014). Learning to teach in higher education: how to link theory and practice. *Teaching in Higher Education*, 19(7), 772-786.
- Van Manen, M. (1977). Linking ways of knowing with ways of being practical. *Curriculum inquiry*, 6(3), 205-228.
- Xie, X., Ward, P., Oh, D., Li, Y., Atkinson, O., Cho, K., & Kim, M. (2020). Preservice physical education teacher's development of adaptive competence. *Journal of teaching in physical education*, 40(4), 538-546.
- Zeichner, K. M. (1983). Alternative paradigms of teacher education. *Journal of teacher education*, 34(3), 3-9.

Contact email: up201504701@edu.fade.up.pt

***We Have Unrealistic Beliefs Until We Deconstruct Our Thinking:
The Relationship Between Reflection and Epistemological Beliefs in
Teacher Education Programs***

Margarida Barros, University of Porto, Portugal
Isabel Mesquita, University of Porto, Portugal
Paula Queirós, University of Porto, Portugal

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Preservice teachers (PTs) can develop a deeper understanding of their epistemological beliefs (EB) when enrolled in a curriculum that provides opportunities for reflection. Therefore, this study investigated the relationship between PTs' reflection practices and their EB during the first year of a Teacher Education Program in Physical Education in Basic and Secondary Education. Eleven PTs were intentionally chosen for this study. The data collection took place between 2021 and 2022 using three focus group moments, participant observation, and document analysis. Data analysis was carried out through the procedure presented by Charmaz (2006) based on theoretical and deep coding, where emerging themes were identified. The study has shown that individual and group reflection moments guided PTs in acknowledging their EB. Additionally, these reflective practices led PTs to understand learning as changeable, evolutionary, and achieved through interacting their ideas with others and contexts, suggesting a synergy between reflection and EB sophistication. Since EB assume—a relevant position in PTs' techniques and teaching methods, exploring, and developing them can benefit learning environments. Understanding reflection as a tool to develop more sophisticated EB can contribute to teacher educators' knowledge, curricular reconfiguration, and teacher training policies.

Keywords: EpistemoLogical Beliefs, Reflection Practices, Teacher Education, Physical Education

iafor

The International Academic Forum
www.iafor.org

Introduction

Epistemological beliefs (EB) are individuals' beliefs about the nature of knowledge and the processes of knowing (Perry, 1970). Several conceptions about EB have been theorized over the years, such as development models (King & Kitchener, 1994; Kuhn et al., 2000), EB system (Schommer-Aikins, 2004), and personal epistemology (Hofer & Pintrich, 1997, 2002). Due to domain specificity, development nature, and the research context, the personal epistemology model (Hofer & Pintrich, 1997, 2002) stands as the theoretical lens for this work. Two general areas represent the core structure of individuals' epistemological theories, and they are generally categorized in a spectrum from simple to sophisticated. The areas are the nature of knowledge and the nature of knowing. Within the nature of knowledge, there are two dimensions: certainty of knowledge and simplicity of knowledge, and under the area of nature of knowing, there are two other dimensions: source of knowledge and justification for knowing (Hofer & Pintrich, 1997).

Many studies on epistemological beliefs have aimed to categorize these beliefs in students and teachers and identify factors that may be related to these beliefs (Güven et al., 2014). However, in the last few years, there has been a growing interest in what and how EB can be improved (Brownlee et al., 2011; Brownlee et al., 2001) since EB has a significant impact on how teachers think about teaching and learning.

EB acts as a filter for new understanding, and research shows that sophisticated EB has been more successful in education (Neber & Schommer-Aikins, 2002). In this context, little attention has been given to the relevance that initial teacher education (ITE) can have in developing a reflective and critical attitude that enhances the necessary reconfigurations of EB. Despite the lack of relevant research on this topic, ITE often includes opportunities for reflection, as they are seen as an important way to help preservice teachers develop their EBs and become more reflective practitioners. Understanding preservice teachers' (PSTs) EB and acknowledging contexts to develop them should be considered in ITE in reflection processes that allow individuals to examine their own thinking and behavior.

By helping individuals become more aware of their own beliefs and consider alternative perspectives, reflectivity practices are one factor affecting EB development. A permanent record of experiences and ideas helps the PSTs learn and their professional development by allowing their development of critical thinking, a conscious look at learning, and improved communication between peers and teacher educators (Griffith & Frieden, 2000; Towndrow & Tan, 2008).

These processes allow individuals to examine their own thinking and behavior. Therefore, through them, PSTs might grow aware of their views about knowledge and learning and consequently improve their EB (Güven et al., 2014).

The predicted success of research on EB will not be achieved if it is limited to correlations between the phenomenon and other constructs. The evidence highlights the difficulty and inconsistencies of research on this topic. However, it is also known that to undertake this impasse, more ambitious and sophisticated work in a natural context ITE is needed (Ashton, 2014). This premise and reflection can promote a climate of renewal in teaching where PSTs get involved and critically evaluate their ideas and knowledge so that they develop simultaneously as teachers and agents of change (Feucht et al., 2017).

The relationship between EB and reflection might bring insight into epistemic development during ITE (Guven et al., 2014). Therefore, this work aims to explore and understand the relationship between PSTs' reflection practices and their EB during the first year of a Teacher Education Program in Physical Education.

Context of the Study

Teacher education programs should provide PSTs with opportunities to reflect on their teaching practices and understand how they relate to their beliefs about knowledge. This strategy is present all along the ITE program analyzed in this study. PSTs are encouraged to reflect on their own learning processes and teaching practices, prioritizing deep comprehension rather than superficial matters.

This ITE invites reflection through the writing of individual reflections and reflective diaries on pedagogical practices, group reflection, and class discussions that involve perspectives from colleagues and teacher educators. These practices are developed in a cooperative learning environment that encourages PSTs to organize their thinking and constantly confront their ideas with new knowledge, which leads to reconstructing their ideas and professional practices.

Methodology

Participants

The participants were 11 preservice PSTs (6 males and 5 females) in their first year of the ITE program explored in this work. The intentional choice of participants was privileged for a deeper understanding of the analyzed cases and considering the research questions (Patton, 2002). For this reason, preservice teachers were selected for convenience and criteria from previous research on epistemic beliefs, such as gender (Adamakis, 2018; Kulinna et al., 2010) and sports experience (Yildizer, 2020).

All the participants are enrolling in this ITE program as full-time students (school year 2021/2022), and all completed the first year.

Data Collection

Focus group interviews were carried out at 3 different times and in groups of 3 or 4 participants, totaling 9 focus group interviews lasting approximately 90 minutes. These moments were defined considering critical moments of the ITE program: the beginning, middle, and end of the school year. Semi-structured scripts allowed the discussion to stimulate relevant thoughts and questions to access EB. During the focus group interview sessions, the interviewer created an environment to share experiences and opinions that generated reflection and discussion on the thoughts and practices of the participants (Jones et al., 2012).

Documental analysis of the reflections made during the first year of the PETE program was carried out. This method constitutes a source through which the researcher can extract evidence that substantiates the participants' statements and monitors the evolution of their thoughts. In addition, it is a data source that reflects the participants' thoughts in a context without interference from the formal moment of collection. The individual reflections of each

participant were analyzed: i) at the end of the first semester in the curricular unit of Pedagogical Professionality with the theme "learning to be teachers," discussing changes (or not) in understandings and positions regarding the teaching profession and ii) in the pre-and post-practice periods of micro-teaching in a school context in the curricular units of Sports Specific Didactics – handball and basketball, in the analyzes carried out about the classmates' classes and in the self-assessment of their classes.

Data Analysis

The data analysis process involved the verbatim transcription of focus groups and multiple readings of the transcripts and documents following the six-phase process of thematic analysis (Braun & Clarke, 2006). By following the systematic process of familiarizing with the data, generating initial codes, searching for themes, reviewing, and refining the themes, and producing the final report, the thematic analysis unfolded.

The analysis process employed a deductive approach, allowing themes to emerge from the data. An interpretive stance meant the possibility of developing ideas about what the documents could describe and considering the relationships between these experiences, giving them meaning alongside the existing literature (Braun & Clarke, 2006). Themes were subsequently analyzed through the lens of Hofer & Pintrich's (1997) theoretical framework and provided insights into participants' EB concerning the dimension of the source of knowledge.

Trustworthiness was guaranteed through data triangulation, participants check, and peer debriefing (Creswell, 2013).

Findings and Discussion

The study has shown that individual and group reflection moments guided PSTs in acknowledging their EB. Additionally, those reflective practices led PSTs to understand learning as changeable, evolutionary, and achieved through interacting their ideas with others and other contexts, suggesting a synergy between reflection and EB sophistication.

Awareness of EB Through Reflection

“Reflection helps us to understand our actions, whether we are doing well or doing it badly, and this helps us to evolve.” - RT (2nd focus group)

“Reflection is always important because it is up to us to know what we have done and be aware of what we can correct, improve, and adapt and find strategies to solve the problems we encountered in class.” - GF (2nd focus group)

“The questions presented, and all the reflective moments provided by the teacher, which took place throughout the semester, served to develop critical thinking and the ability to introspect. This development influenced me as a student.” – RG (2nd focus group)

As Bento (2003, p.177) states, "The teacher must always also control and evaluate his own pedagogical results," and in the case of MEEFEBS, reflective practice has led to this "personal inspection" that maintains the future teacher attentive to his practice and aware of

his convictions. It was noted that reflection played a relevant role in raising awareness of the actions and thoughts of the PSTs. Additionally, it was possible to understand that in addition to awareness, the PSTs could have a critical look at their actions and thoughts and understand that these are changeable and subject to improvement. Our data corroborate the existing literature and reinforce the role of individual reflection in the awareness about EB, as Guo et al. (2022) had already concluded that reflective writing instruction can facilitate the exploration and formation of professional roles and values.

ITE's curriculum plan and pedagogical practices also guided the PSTs toward deconstructing their preconceptions, making them aware of the process of reconfiguring their beliefs together with the new understanding of the profession.

"I built an idealization for the future in this profession, and with the beginning of the training process in this master's degree, I was deconstructing some ideas and corroborating others." – JR (written reflection)

"Being a teacher manifests itself in our heads through an adulterated prism – the one we have as students. In this way, we produce unrealistic beliefs that are often maintained until our thinking is deconstructed, at which point we are able to put the profession in perspective and base it with the appropriate knowledge coming from training." – MC (written reflection)

In this field, the literature values a context of ITE guided by reflective practice since self-reflection is seen as a critical component in the creation of relevant teaching practices (Schmeichel, 2012), where PSTs become more attentive to the meaning and impact of beliefs on their practices (Farrell & Ives, 2014).

Once again, reflection gains a prominent role in the personal and professional awareness of the future teacher. It became clear that this first year of ITE was essential for PSTs to access and accept reflection as an undeniable tool. Reflection helped future teachers be aware of their epistemological beliefs and how these might intervene in their professional training process. Soleimani (2020) has already noted that developing thinking and reflection skills during ITE is important to understanding the connections between the teachers' belief systems.

Development of EB Through Reflection

It was understood that individual reflection was perceived as a necessary condition for the whole exercise of the profession. The PSTs emphasized the need to privilege reflection as a means for the evolution of what the PSTs think to be knowledge and how this knowledge is learned. The confrontation of ideas with new understandings and practice creates the necessary reflective environment for developing these understandings.

"So, without reflection, we cannot be better, obviously. Reflection is so important for my own process of evolution, which will then be transferred to the student's learning."
- IB (3rd focus group)

"I think everyone rethinks their actions, whether teaching classes or in other circumstances, but what happened was that we thought, rethought, and resolved, that

is, found justifications and results and solutions for what happened, and this did not happen before, we thought and moved forward." – SC (2nd focus group)

"The impact that reflective habits have on the teacher's ability to improve and perfect their practice constantly was a concept that was not present in my ideology of "being a teacher." - AM (written reflection)

This appreciation of reflection highlights a counterargument to decision-making devoid of intentionality and rationality. The concept of a reflective teacher emerges. Corroborating this appreciation of the reflective teacher in the teaching profession, Larrivee (2000) argues that when teachers become reflective and critical, they tend to go beyond the basic knowledge of discrete skills and rise to a different level in which they integrate skills considering the context. Also, Feucht et al. (2017) found that reflection on the nature of one's own personal epistemologies can serve as a mechanism for change. This is in line with the results presented, where it was possible to understand that the reflection potentiated the development of EB and might, consequently, their practices.

The individual reflection was visible with the reported benefits. However, there was also an appreciation of collaborative work, joint reflection, sharing, and experiences that became fundamental in favor of more significant opportunities for learning and development. In addition, it was noticeable that there is an appreciation of the knowledge developed by individual critical thinking together with the opinions of colleagues and experts in the area (teacher educators), revealing sophisticated EB in relation to how knowledge is learned.

"The exchange of experiences between professionals can, many times, accelerate this process of reflection-action... the practices of other teachers can be added to our backpack so that when we find ourselves in a situation of doubt, we have more options for solving that problem." – PA (3rd focus group)

"In addition, I am able to value even more the conversation with my more experienced colleagues, and it is useful for me as well as for them, as there is an exchange of knowledge..." – SG (3rd focus group)

"The moments of reflection in which we really manage to learn something are when we are talking with our colleagues when we are discussing things with each other, about what we feel, what we have done, and I think that this is much more beneficial for my development." – JS (3rd focus group)

The results presented support the perspective of Attard and Armor (2005), stating the need for a community where it would be possible to share the teaching experience, mainly from the teachers' perspective at the beginning of their careers. According to Wenger (1998), learning is mediated through social participation; that is, interactions that trigger the involvement that each human being adopts in the process of being an active agent in the community are privileged.

Conclusion

The PSTs enrolling in this ITE program evidenced both individual and peer reflection processes. EB assumes a relevant position in PSTs' ideas, professional identity, and teaching practice; exploring and developing them can benefit learning environments. Understanding

reflection as a tool to develop more sophisticated EB can contribute to teacher educators' knowledge, curricular reconfiguration, and teacher training policies.

Specifically, peer reflection was also highlighted in the EB development process. Sharing ideas and reflecting on the opinions of others led to an awareness of one's understanding and the ability to be self-critical. This stance triggered the development of epistemic thoughts more congruent with the prevailing education paradigm.

This work supports a compelling argument in the teaching field and sheds light on the critical issue of EB in teacher education. If we consistently find that reflection processes can effectively enrich EB, it becomes crucial to understand the perspectives of PSTs about this connection and reevaluate ITE designs.

Acknowledgements

This work was supported by the Portuguese Foundation for Science and Technology (FCT), grant number 2021.04842.BD. The authors have no conflict of interest to declare.

References

- Adamakis, M. (2018). Physical Education students' beliefs in four important curricular outcomes: Results from three Greek Faculties. *Journal of Physical Education and Sport*, 18, 1001-1007. <https://doi.org/10.7752/jpes.2018.s2148>
- Ashton, P. T. (2014). Historical Overview and Theoretical Perspectives of Research on Teachers' Beliefs. In *International Handbook of Research on Teachers' Beliefs*. Routledge. <https://doi.org/10.4324/9780203108437.ch3>
- Brownlee, J., Petriwskyj, A., Thorpe, K., Stacey, P., & Gibson, M. (2011). Changing personal epistemologies in early childhood pre-service teachers using an integrated teaching program. *Higher Education Research & Development*, 30(4), 477-490. <https://doi.org/10.1080/07294360.2010.518952>
- Brownlee, J., Purdie, N., & Boulton-Lewis, G. (2001). Changing Epistemological Beliefs in Pre-service Teacher Education Students. *Teaching in Higher Education*, 6(2), 247-268. <https://doi.org/10.1080/13562510120045221>
- Creswell, J. (2013). *Qualitative Inquiry & Research Design: Choosing Among Five Approaches*. SAGE Publications, 11.
- Farrell, T., & Ives, J. (2014). Exploring teacher beliefs and classroom practices through reflective practice: A case study. *Language Teaching Research*, 19. <https://doi.org/10.1177/1362168814541722>
- Feucht, F. C., Lunn Brownlee, J., & Schraw, G. (2017). Moving Beyond Reflection: Reflexivity and Epistemic Cognition in Teaching and Teacher Education [Article]. *Educational Psychologist*, 52(4), 234-241. <https://doi.org/10.1080/00461520.2017.1350180>
- Gill, M. G., Ashton, P. T., & Algina, J. (2004). Changing preservice teachers' epistemological beliefs about teaching and learning in mathematics: An intervention study [Article]. *Contemporary Educational Psychology*, 29(2), 164. <https://doi.org/10.1016/j.cedpsych.2004.01.003>
- Griffith, B., & Frieden, G. (2000). Facilitating Reflective Thinking in Counselor Education. *Counselor Education and Supervision*, 40, 82-93. <https://doi.org/10.1002/j.1556-6978.2000.tb01240.x>
- Guo, X., Xuemin, H., Deng, W., Ji, X., Xiang, S., & Hu, W. (2022). The relationship between epistemological beliefs, reflective thinking, and science identity: a structural equation modeling analysis. *International Journal of STEM Education*, 9. <https://doi.org/10.1186/s40594-022-00355-x>
- Güven, G., Sülün, Y., & Çam, A. (2014). The examination of elementary preservice teachers' reflective diaries and epistemological beliefs in science laboratory [Article]. *Teaching in Higher Education*, 19(8), 895-907. <https://doi.org/10.1080/13562517.2014.934350>

- Hofer, B., & Pintrich, P. (1997). The Development of Epistemological Theories: Beliefs About Knowledge and Knowing and Their Relation to Learning. *Review of Educational Research*, 67. <https://doi.org/10.3102/00346543067001088>
- Hofer, B., & Pintrich, P. (2002). *Personal epistemology. The psychology of beliefs about knowledge and knowing.* . Erlbaum.
- Jones, R., Morgan, K., & Harris, K. (2012). Developing coaching pedagogy: Seeking a better integration of theory and practice. *Sport, Education and Society* Vol. 17, 313-329. <https://doi.org/10.1080/13573322.2011.608936>
- King, P., & Kitchener, K. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults.* Jossey-Bass Publishers.
- Kuhn, D., Cheney, R., & Weinstock, M. (2000). The Development of Epistemological Understanding. *Cognitive Development*, 15, 309-328. [https://doi.org/10.1016/S0885-2014\(00\)00030-7](https://doi.org/10.1016/S0885-2014(00)00030-7)
- Kulinna, P. H., Brusseau, T., Ferry, M., & Cothran, D. (2010). Preservice Teachers' Belief Systems Toward Curricular Outcomes for Physical Education. *Research Quarterly for Exercise and Sport*, 81(2), 189-198. <https://doi.org/10.1080/02701367.2010.10599666>
- Larrivee, B. (2000). Transforming Teaching Practice: Becoming the critically reflective teacher. *Reflective Practice*, 1(3), 293-307. <https://doi.org/10.1080/713693162>
- Markic, S., & Eilks, I. (2012). A Comparison of Student Teachers' Beliefs from Four Different Science Teaching Domains Using a Mixed Methods Design [Article]. *International Journal of Science Education*, 34(4), 589-608. <https://doi.org/10.1080/09500693.2011.608092>
- Neber, H., & Schommer-Aikins, M. (2002). Self-regulated Science Learning with Highly Gifted Students: The role of cognitive, motivational, epistemological, and environmental variables. *High Ability Studies*, 13(1), 59-74. <https://doi.org/10.1080/13598130220132316>
- Patton, M. Q. (2002). *Qualitative Research and Evaluation Methods* (3rd ed.). Sage Publications.
- Perry, W. (1970). *Forms of Intellectual and Ethical Development in the College Years.* Holt, Rinehart & Winston.
- Schmeichel, M. (2012). Good Teaching? An Examination of Culturally Relevant Pedagogy as an Equity Practice. *Journal of Curriculum Studies - J CURRICULUM STUD*, 44, 211-231. <https://doi.org/10.1080/00220272.2011.591434>
- Schommer-Aikins, M. (2004). Explaining the Epistemological Belief System: Introducing the Embedded Systemic Model and Coordinated Research Approach. *Educational Psychologist - EDUC PSYCHOL*, 39, 19-29. https://doi.org/10.1207/s15326985ep3901_3

- Soleimani, N. (2020). ELT teachers' epistemological beliefs and dominant teaching style: a mixed method research. *Asian-Pacific Journal of Second and Foreign Language Education*, 5(1), 12. <https://doi.org/10.1186/s40862-020-00094-y>
- Towndrow, P., & Tan, A.-L. (2008). Promoting Inquiry Through Science Reflective Journal Writing. *Eurasia Journal of Mathematics, Science and Technology Education*, 4. <https://doi.org/10.12973/ejmste/75350>
- Yildizer, G. (2020). Epistemological Belief Differences between Prospective Physical Education Teachers and Coaches With and Without Coaching Experience. *Journal of Teaching, Research, and Media in Kinesiology*(6), 1-6.

Contact email: up201101651@edu.fade.up.pt

Elementary School Counselors' Experiences Engaging in Advocacy Action for Transgender Youth

Melissa Anne Brennan, Our Lady of the Lake University, United States

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Transgender youth, marginalized at much high rates than their cisgender peers, are present in elementary schools and in need of support. School counselors have an ethical responsibility to advocate for marginalized students, including transgender youth, yet very little is known of this phenomenon at the elementary school level. The study described within aims to understand the experiences of elementary school counselors engaging in advocacy action for transgender youth. In-depth individual interviews were conducted with seven participants to explore their experiences related to the phenomenon of engaging in advocacy action for transgender youth in elementary school. Hermeneutic analysis was utilized to analyze and interpret participants' described experiences. As a result, the five emergent themes of: (a) collaborative advocacy and balancing interests, (b) uncertainty and navigating the unknown, (c) resolving conflict and overcoming obstacles, (d) considering the advocacy context, and (e) beyond the job: "more than a nine-to-five" collectively answer the question: 'What are elementary school counselors' experiences engaging in advocacy action for transgender youth in elementary school?'. These themes interact to describe and illuminate the studied phenomenon, informing the future advocacy efforts of elementary school counselors (and counselor educators) for transgender youth.

Keywords: School Counselor, Elementary School, Transgender Youth, Advocacy Action

iafor

The International Academic Forum
www.iafor.org

Introduction

This paper reports on the qualitative study titled ‘Elementary School Counselors Engaging in Advocacy Action for Transgender Youth,’ which explores the experiences of elementary school counselors advocating for transgender youth in their schools. The findings provide valuable insights from participants’ experiences to inform future advocacy efforts for and with transgender youth in elementary school. For the purposes of this paper the term transgender broadly refers to individuals who are gender-nonconforming and whose gender identity differs from their sex assigned at birth (Bockting, 2014; Fassinger & Arsenau, 2007).

Background of the Problem

Transgender youth experience harassment and discrimination at much higher rates than their cisgender peers (Kosciw et al., 2020). In fact, transgender youth experience the highest rates of discrimination and harassment among all groups within the LGBTQ+ community (Kosciw et al., 2020). These youth are much more likely to develop mental health concerns such as depression, anxiety, substance abuse, and suicidality (Abreu et al., 2017; Kosciw et al., 2020; Kurt, 2017; National Alliance of Mental Illness [NAMI], n.d.; Simons & Cuadrado, 2019; Weir & Piquette, 2018).

Students begin to identify as transgender during their elementary school years, therefore support is needed at this early age (Bockting, 2014; Edwards-Leeper, 2017; Meyer et al., 2019). Despite this need for support, gender identity is often considered a taboo topic in elementary school and is generally avoided in discussion (GLSEN & Harris Interactive, 2012; Goodhand & Brown, 2016; Hermann-Wilmarth & Ryan, 2019a, 2019b). Some adult stakeholders oppose gender identity conversations, arguing that this type of discussion is inappropriate in early childhood education and not developmentally relevant until adolescence. Gender identity development research has found evidence to the contrary, establishing that children become aware of their gender identity in early childhood. In fact, some children show signs of gender dysphoria as early as age two (Coleman et al., 2012; Kappus, 2015). Societal gender norms are often reinforced through heteronormative practices in elementary school that categorize students as boys and girls. It is important to consider how such practices impact the development of young gender diverse students (GLSEN, 2012; Goodhand & Brown, 2016; Hermann-Wilmarth & Ryan, 2019a, 2019b).

Elementary school counselors are ethically responsible for advocating for this marginalized population, yet very little is known about their experiences engaging in such advocacy action (ACA, 2014; ASCA, 2016a, 2016b, 2019). Existing literature has outlined a strong case for school counselor advocacy action for transgender youth, but a better understanding of the advocacy experience that follows is still necessary. The described study aims to provide a better understanding of this phenomenon and inform future advocacy efforts.

Methods

The qualitative study utilized a hermeneutic phenomenological methodology. The primary question answered through the study was, ‘what are elementary school counselors’ experiences engaging in advocacy action for transgender youth in elementary school?’

Seven participants contributed descriptions of their relevant experiences to inform the study. Participants were located in six different states throughout the United States (Colorado,

Maryland, Oregon (2), Vermont, Texas, and Wisconsin). All seven participants identified themselves as cisgender females, six out of seven identified themselves as White, and six out of the seven identified themselves as straight or heterosexual (one identified as bi-sexual). Four participants were between the ages of 30-40 years old, two participants were between the ages of 40-50 years old, and one participant was between the ages of 50-60 years old. Regarding years of experience as a school counselor, two participants had 0-5 years of experience, two participants had 6-10 years of experience, one participant had between 16-20 years of experience, and two participants had between 20-25 years of experience. All seven participants served as elementary school counselors in a public-school setting.

In depth semi-structured interviews were conducted and recorded as the primary data collection method. Each interview recording was manually transcribed and reflected upon to develop an interpretive summary. Initial categories of meaning were then identified and further analyzed for significant patterns or unique experiences among participants. Five themes emerged from the data and serve as a foundation of understanding of the studied phenomenon.

Results

The results of the study are organized and presented according to the five emergent themes.

Themes	N	%
Collaborative Advocacy and Balancing Interests	7	100%
Uncertainty and Navigating the Unknown	5	71%
Resolving Conflict and Overcoming Obstacles	7	100%
Considering the Advocacy Context	7	100%
Beyond the Job: "More Than a 'Nine-to-Five'"	7	100%

Table 1: Emergent Themes and Frequency

Collaborative Advocacy and Balancing Interests

Collaborative advocacy efforts such as collaboration and consultation with parents, staff, and administrators saturated the descriptions of school counselors' advocacy actions for transgender youth. Participants regularly worked with families of gender diverse students to provide guidance and support (or resources and referrals when appropriate). One participant described working with a family the evening before their child planned to come out as transgender at school by wearing a dress for the first time. In addition to parent consultation, participants also discussed collaborative work with their campus staff and administration. Participants facilitated and/or delivered staff trainings, collaborated with various staff members to increase the presence of gender inclusive books and curriculum on campus, and worked with teachers to create an inclusive classroom environment for transgender students. This included consultation on bathroom usage, student pronouns, and confidentiality of records that refer to transgender students by their birth assigned name (when different from their chosen name).

Existing literature exploring school counselor advocacy recommends a collaborative approach to advocacy efforts in schools, suggesting that school counselors serve as campus experts on gender identity issues, providing education and consultation on the topic to school stakeholders such as teachers and administrators (ASCA, 2016b; James et al., 2016; Kurt, 2017; Roe, 2017). According to previous related research, teachers are not prepared with the

knowledge and skills necessary to address sexual and gender identity issues in schools, therefore training organized or provided by an informed school counselor is critical (Goodrich et al., 2013; Gower et al., 2019; Hermann-Wilmarth & Ryan, 2019a). It is also recommended that school counselors collaborate with staff to emphasize the importance of pronouns and encourage the use of students' identified names and pronouns at school (ALGBTIC, 2010; ASCA, 2016b; Fassinger & Arsenau, 2007; GLAAD, 2016; Gonzalez & McNulty, 2010; Goodrich et al., 2013; Henry & Grubbs, 2016; Kurt, 2017; Weir & Piquette, 2018).

Much of the collaborative advocacy work participants described would be categorized as indirect and 'advocacy for' rather than 'advocacy with' transgender youth according to the ACA Advocacy Competencies (Toporek & Daniels, 2018). Although school counselor advocacy 'for' transgender youth makes up an important portion of advocacy action for transgender youth, consideration should also be given to the value of advocacy 'with' transgender youth. Involving marginalized youth in the process of advocacy on their behalf can have empowering effects and teach youth valuable skills to advocate for themselves in the future. Advocacy 'with' transgender youth also takes into consideration the perspective of the population being impacted, avoiding white saviorism, or an approach to advocacy efforts that implies the marginalized population needs to be 'saved' and cannot help themselves (Sondel et al., 2019).

Challenges of balancing the interests and wishes of adults with student interests and needs was also a common thread throughout the participants' descriptions of their experiences. Although school counselors prioritize the rights and best interests of their student clients, it is also expected that school counselors respect the rights and wishes of their students' guardians. The ASCA Ethical Standards for School Counselors (2016a) state that school counselors must "recognize their primary ethical obligation for confidentiality is to the students but balance that obligation with an understanding of parents'/guardians' legal and inherent rights to be the guiding voice in their children's lives" (A.2.f). Participants' descriptions included navigation of this balancing act between protecting the privacy of students related to their gender identity without violating the legal rights of their guardians. This result was not surprising due to the nature of the school counselor role in elementary school. Ethical dilemmas related to balancing student privacy and guardian rights are common when working with clients of this young age (regardless of the counseling focus).

Uncertainty and Navigating the Unknown

A sense of uncertainty or difficulty navigating the unknown was described at some point throughout each participants' experiences. Six of the participants described a lack of information and support established for elementary school counselors regarding advocacy for transgender students. The emergence of the theme 'uncertainty and navigating the unknown' illuminates the previously unexplored aspects of the phenomenon being studied. Although guidelines for supporting transgender students may be established for school counselors at the secondary level, very few guidelines exist at the elementary level (GLSEN & Harris Interactive, 2012; Goodhand & Brown, 2016; Hermann-Wilmarth & Ryan, 2019a, 2019b). While some degree of uncertainty currently exists for all school counselors advocating for transgender youth, this experience is most relevant to elementary school counselors who often engage in advocacy action without a previous model to guide them. Not only is less relevant information or guidance available for elementary school counselors, information and procedures previously utilized at secondary levels are not usually transferable to the

elementary school setting and age group. Several participants described experiencing this lack of information or guidance as a barrier impeding their ability to effectively advocate for their transgender students. Although the prevalence of trainings on counseling LGBTQ+ youth has improved, participants still described the lack of trainings applicable to elementary aged students specifically. Participants who sought training to bridge their gap in knowledge found that most available trainings were focused on children and teens approximately 12-years and up.

Resolving Conflict and Overcoming Obstacles

Encountering conflict throughout advocacy action experiences was a common thread among participants. These experiences included conflicts among staff, administrators, and the school community. This finding was not surprising in light of the conflicting views of society regarding gender identity, especially in young children. Existing literature consistently finds that advocacy for transgender youth is met with considerable resistance at the elementary school level (GLSEN & Harris Interactive, 2012; Goodhand & Brown, 2016; Hermann-Wilmarth & Ryan, 2019a, 2019b). What was unexpected was the response of the school counselors when faced with such resistance. The resilience demonstrated by the school counselors in their continued advocacy efforts, despite facing resistance within their school community, was overwhelming. Participants created various ways to work around the roadblocks they faced and continue to advocate for marginalized students according to the ethical codes of the profession.

While opposition to advocacy efforts for transgender youth is commonly encountered by school counselors and frequently discussed in existing professional literature, participants encountered more support than resistance to their advocacy efforts overall. This finding diverged from existing counselor advocacy literature and may be an area worth exploring in future research. Support and encouragement of advocacy efforts for transgender youth was received from parents, teachers, administrators, and the student body. The most significant aspect of this finding was the overwhelming support of transgender students by their peers. All participants unanimously described supportive student bodies that accepted their transgender peers with little to no resistance. This finding conflicts with the results of GLSEN's bi-annual surveys of school climate (Kosciw et al., 2016, 2018, 2020), as discrimination and harassment of LGBTQ+ youth by their peers is consistently reported in secondary schools. Since this data does not include elementary aged students and schools this new development in findings based on age group may be an area to consider in future research.

Considering the Advocacy Context

All seven participants described aspects of their experiences that were influenced by their context. Differences in participants' experiences were observed in relation to the context of the advocacy action taking place. Although the contexts of advocacy action varied for all participants, the fact that all participants described the influence of their specific contexts was a commonality. Influential contextual factors included the socio-political climate, rural location, and the cultural makeup of the families within their school community. One participant described the challenges created by a small-town atmosphere that makes confidentiality and privacy difficult when providing referrals for outside counseling. Another participant described the influences of the socio-political climate within their community (and the country at large). The United States presidential election of 2020 and the political

tension that has recently grown among citizens was discussed. One participant's descriptions of her experiences were heavily saturated with discussion of racial dynamics, specifically regarding the intersectionality of gender and racial identity and its relevance within her school community. She described how her students of marginalized racial groups more often struggled with diverse gender expressions.

The elementary school setting, the context of the current study, greatly impacted participants' advocacy experiences for transgender youth in similar ways. Participants experienced an increased level of uncertainty due to the less established advocacy practices at the elementary school level, were met with greater resistance from adults due to the young age of their students, and observed overwhelming support of transgender students by their elementary school peers. Most of these shared experiences confirm previous findings related to school counselor advocacy action in elementary school. Literature consistently describes elementary school settings as less accepting of gender diversity compared to secondary schools (GLSEN & Harris Interactive, 2012; Goodhand & Brown, 2016; Hermann-Wilmarth & Ryan, 2019a, 2019b; Meyer et al., 2019). Elementary schools are especially likely to engage in heteronormative practices that further marginalize gender diverse students, such as binary gender grouping that divides students by 'boys' and 'girls.' School counselors should be mindful of heteronormative practices that may isolate gender diverse students and encourage discontinuation of these practices among staff members on their campus (Gansen, 2017; Hermann-Wilmarth & Ryan, 2019a).

The counselor's context, or positionality, is also a relevant contextual factor in participants' advocacy experiences for transgender youth. Each of the seven participants described varying aspects of their own personal context or positionality that impacted their advocacy experiences with transgender youth. Some participants described facets of their own upbringing that were influential on their counselor advocate identity. Others described their own personal positionality or personal connection to individuals who are a part of the LGBTQ+ community and cited this personal context as influential on their advocacy efforts. Although all school counselors are expected to competently advocate for marginalized populations such as transgender youth (ASCA 2016a, 2016b), existing literature suggests that counselors' personal values and belief system can interfere with this responsibility (GLSEN, 2019a, 2019b). It is imperative that school counselors develop a strong understanding of gender identity issues and development, including the marginalization that transgender students are likely to face at school (Byrd & Hays, 2012; Edwards-Leeper, 2017; Gonzalez & McNulty, 2010; Goodrich et al., 2013; Henry & Grubbs, 2016). Byrd and Hays (2012) suggest that engagement in self-directed learning and exploration of professional literature related to gender identity and development can help to dispel any false beliefs or misconceptions causing biases towards the transgender population.

Beyond the Job Description: "More Than a 'Nine-to-Five'"

The participants' accounts of their advocacy experiences were peppered with evidence of their compassion for marginalized students and their dedication to the professional responsibility to advocate for them. Participants described their concerns for their transgender students' well-being and cited these concerns as a strong influential factor in their advocacy actions. One participant explained that they insist on starting and continuing conversations surrounding transgender youth to increase awareness and positive change for these students. Another participant described their concerns for the mental and physical well-being of their

transgender students. They recalled the story of a transgender teen who was brutally murdered and cited this story as influencing their engagement in advocacy action.

Participants' concerns for their transgender students did not come as a surprise due to the overwhelming amount of existing data confirming their reason to be concerned for this marginalized group of students (GLSEN & Harris Interactive, 2012; Greytak et al., 2009; Kosciw et al., 2016; Kosciw et al., 2018; Kosciw et al., 2020; NAMI, n.d.; SAMSHA, 2015). Transgender youth experience marginalization at higher rates than any other sub-group under the LGBTQ+ umbrella (Kosciw et al., 2020; Weir & Piquette, 2018). Transgender students are also at higher risk for developing a mental health condition, substance abuse problem, or suicidal ideation compared to their cisgender peers (NAMI, n.d.).

In addition to expressing great concern for transgender students facing marginalization, participants also described their concern for transgender students who do not have access to a school counselor that will advocate for them. School counselors who do not possess levels of advocacy competency or awareness that meet the counseling profession's ethical and professional standards could further marginalize already marginalized student groups such as transgender youth. This can be especially problematic for transgender youth at the elementary school level where there is often only one counselor assigned to a campus. Participants described the importance of counselor advocacy competency and awareness and the narratives of all participants included evidence of their own well-developed counselor advocate identities. They described their experiences advocating for advocacy action among school counselors to promote the well-being of marginalized students, including transgender youth.

The ethical and professional codes of school counseling's governing bodies clearly emphasize school counselors' responsibility to advocate for marginalized groups of students (ACA, 2014; ASCA, 2016a, 2016b; CACREP, 2016). These participants took this ethical responsibility to advocate a step further by advocating for school counselor advocacy action among school counselors to promote the well-being of transgender youth. These individuals' dedication to their students, especially marginalized groups of students such as transgender youth, goes far beyond their job description. As one participant explained, "It's a lot more than a 'nine-to-five.'"

Implications

The findings from the described study inform future advocacy efforts by school counselors and school counselor educators alike. They provide insight that will assist school counselors, school counselors in training, and school counselor educators to better prepare for future advocacy efforts for transgender youth in elementary school.

Much of the advocacy efforts participants described were engaged in collaboratively with other school stakeholders such as teachers. This work is especially important at the elementary school level where students are generally assigned to one classroom teacher all day for the entire school year. Elementary counselors should plan to work with teachers to ensure they are adequately trained on gender identity rights and concerns, proper pronoun use, and harmful heteronormative practices to avoid in the classroom. School counselors are able to make a significant positive impact on the daily lives of transgender students by providing teachers with education and consultation on gender inclusive practices. Elementary school counselors should keep this important aspect of advocacy action for transgender youth

in mind each year, while school counselor educators should ensure that counselors in training are prepared to effectively engage in this type of advocacy action upon completion of their counselor preparation program.

Although the findings suggest that advocacy action at the school community level is extremely important, elementary school counselors should also consider engaging in systemic advocacy action that reaches beyond the context of their own school. This type of advocacy action was not prominent throughout the participants' experiences, yet findings suggest that broader systemic advocacy action is needed to establish clear and consistent guidelines for elementary school counselors navigating transgender student rights. Additional training and preparation for systemic level advocacy action may be necessary throughout counselor preparation programs and should be considered for inclusion by counselor educators.

The study's findings stand out from previous literature due to the elementary school context of the advocacy actions for transgender youth being considered. Although school counselors at all levels may face challenges when advocating for transgender students, the challenges that elementary school counselors encounter (and overcome) are unique to their specific context. Elementary school counselors can expect to experience greater uncertainty due to the less established guidelines regarding implementation of gender inclusive practices. Secondary school practices may need to be adapted considerably before implementation at the elementary school level is possible. Additional training and consultation for parents and staff may be necessary, as it is a common misconception that students do not develop gender identity until adolescence, therefore many individuals are unprepared to address the needs of transgender students in elementary school. School counselors can address concerns regarding the acknowledgement of gender identity in elementary school by providing clear and concise information that maintains privacy and respect for the transgender individual(s) concerned (Rodela & Tobin, 2017; Slesaransky-Poe et al., 2013). Responses to opposition should be based on the professional standards and ethical codes of the counseling profession (Goodrich et al., 2013). Ample resources are publicly available to assist school counselors and guide these challenging conversations (ALGBTIC, 2010, 2013; GLAAD, 2016; GLSEN, 2012, 2019a, 2019b, GLSEN & Harris Interactive, 2012; GLSEN & National Center for Transgender Equality, 2015; HRC, 2013). While advocate organizations publicly provide these resources for all counselors, counselor educators might consider including them within counselor education curriculum to ensure counselors in training are adequately prepared to utilize these resources in practice upon completion of their program.

School counselor resilience was also a unique finding that emerged from the described study. Although barriers to advocacy action for transgender youth were expected, the resilient response to those barriers by elementary school counselor participants was not anticipated. Participants found unique ways to overcome or work around barriers they encountered when advocating for transgender youth. This finding provides insight for school counselors and school counselor educators, as it demonstrates how to overcome barriers to advocacy and protect the wellbeing of marginalized students. Counselor educators might consider preparing school counselors in training to anticipate conflict or barriers to advocacy and develop skills to address these concerns in a professional manner. Previous research related to school counselor training and advocacy competency development has found that there is a need for improved training in this area (Byrd & Hays, 2012; Couture, 2017; Simons, 2018; Simons & Cuadrado, 2019; Simons et al., 2017).

Limitations

Transferability of the findings to private school settings may not be possible due to the described study's focus on the public-school setting. Future consideration of the student perspective, as opposed to the school counselor perspective, could also provide valuable insight for future advocacy efforts for transgender youth. Intersectionality and the impact of other cultural identities have not yet been fully examined in relation to transgender youth (Abreu & Kenny, 2018; Edwards-Leeper, 2017). More information is needed regarding the experiences of transgender youth with consideration to their race or ethnicity, socio-economic status, religious identity, and body type (Abreu & Kenny, 2018). The study's findings are also limited to the context of the United States, therefore transferability to the contexts of other countries may not be possible.

Conclusion

According to the ethical standards and guiding principles of the counseling profession, counselors must take action (beyond awareness) to create change and benefit marginalized groups of students (ACA, 2014; ASCA, 2016a; Ratts et al., 2016). The results of the described study provide valuable insight for elementary school counselors and counselor educators preparing to take action and engage in advocacy efforts for transgender students. Through consideration of the presented findings, members of the counseling and counselor education profession are better equipped to effectively engage in advocacy action for transgender youth in elementary school and positively impact this group of marginalized students.

Acknowledgements

Sincerest thanks to each of the study's participants that shared their time and experiences in order to make this research possible. This selfless act of kindness is so deeply appreciated. You are an absolute gift to the counseling profession and an amazing inspiration to your fellow counselors (author included). Thank you for choosing to devote your heart and soul to your role each day; you are making a difference in countless young lives. I know firsthand that this is not easy work, but your personal sacrifices are the reason for so many positive changes in our society. Thank you for all that you do and all that you are. To all transgender and gender diverse youth, as well as the adults who passionately stand beside them: You are loved and appreciated. Thank you for being you.

References

- Abreu, R. L. & Kenny, M. C. (2018). Cyberbullying and LGBTQ youth: A systematic literature review and recommendations for prevention and intervention. *Journal of Child & Adolescent Trauma, 11*, 81-97. <https://doi.org/10.1007/s40653-017-0175-7>
- Abreu, R. L., McEachern, A.G., & Kenny, M.C. (2017). Myths and misconceptions about LGBTQ youth: School counselors' role in advocacy. *Journal of School Counseling, 15*(8), 1–30. <https://doi.org/10.1080/00131881.2013.844947>
- American Counseling Association [ACA]. (2014). *ACA Code of Ethics*. <https://www.counseling.org>
- American School Counselor Association [ASCA]. (2016a). *ASCA Ethical Standards for School Counselors*. <https://www.schoolcounselor.org>
- American School Counselor Association [ASCA]. (2016b). *The school counselor and LGBTQ youth*. <https://www.schoolcounselor.org>
- American School Counselor Association [ASCA]. (2019). *ASCA School Counselor Professional Standards and Competencies*. <https://www.schoolcounselor.org>
- Association of Lesbian, Gay, Bisexual, and Transgender Issues in Counseling [ALGBTIC]. (2010). American counseling association competencies for counseling with transgender clients. *Journal of LGBT Issues in Counseling, 4*(3), 135-159. <https://doi.org/10.1080/15538605.2010.524839>
- Bockting, W. (2014). Transgender identity development. In D. L. Tolman & V. L. Diamond (Eds.), *APA Handbook of Sexuality and Psychology, Vol. 1: Person-Based Approaches* (pp. 739-758). American Psychological Association.
- Byrd, R. & Hays, D.G. (2012). School counselor competency and lesbian, gay, bisexual, transgender, and questioning (LGBTQ) youth. *Journal of School Counseling, 10*(3), 1–28. <http://jsc.montana.edu/articles/v10n3.pdf>
- Coleman, E., Bockting, W., Botzer, M., Cohen-Kettenis, P., DeCuypere, G., Feldman, J., Fraser, L., Green, J., Knudson, G., Meyer, W., Monstrey, S., Adler, R., Brown, G., Devor, A., Ehrbar, R., Ettner, R., Eyler, E., Garafalo, R., Karasic, D. . . Zucker, K. (2012). Standards of care for the health of transsexual, transgender and gender non-conforming people, Version 7. *International Journal of Transgenderism, 13*, 165–232. <http://dx.doi.org/10.1080/15532739.2011.700873>
- Council for Accreditation of Counseling and Related Educational Programs [CACREP]. (2016). *2016 Standards*. <https://www.cacrep.org/for-programs/2016-cacrep-standards/>
- Couture, V. (2017). Counseling transgender college students: Perceptions of college mental health clinicians' preparedness. *College Student Journal, 51*(4), 463–472. <http://www.projectinnovation.biz/csj.html>

- Edwards-Leeper, L. (2017). Affirmative care of TGNC children and adolescents. In A. A. Singh and L. M. Dickey (Eds.), *Affirmative counseling and psychological practice with transgender and gender nonconforming clients*, (pp. 119-141). American Psychological Association. <http://dx.doi.org/10.1037/14957-006>
- Fassinger, R. E., & Arsenau, J. R. (2007). "I'd rather get wet than be under that umbrella": Differentiating the experiences and identities of lesbian, gay, bisexual, and transgender people. In K. J. Bieschke, R. M. Perez, & K. A. Debord (Eds.) *Handbook of counseling and psychotherapy with lesbian, gay, bisexual and transgender clients* (2nd ed., pp. 19-50). American Psychological Association. <https://doi.org/10.1037/11482-001>
- Gansen, H. M. (2017). Reducing (and disrupting) heteronormativity: Gendered sexual socialization in preschool classrooms. *Sociology of Education*, 90(3), 255-272. <https://doi.org/10.1177/0038040717720981>
- Gay, Lesbian, & Straight Education Network [GLSEN]. (2012). *Ready, set, respect! GLSEN's elementary school toolkit*. <https://www.glsen.org/activity/ready-set-respect-elementary-toolkit>
- Gay, Lesbian, & Straight Education Network [GLSEN]. (2019a). *LGBTQ-visibility and integration in elementary school*. <https://www.glsen.org/activity/lgbtq-visibility-and-integration-elementary-schools>
- Gay, Lesbian, & Straight Education Network [GLSEN]. (2019b). *Safe space kit*. <https://www.glsen.org/activity/glsen-safe-space-kit-solidarity-lgbtq-youth>
- Gay, Lesbian, & Straight Education Network [GLSEN] & Harris Interactive (2012). *Playgrounds and prejudice: Elementary school climate in the United States, a survey of students and teachers*. <https://www.glsen.org/research/playgrounds-and-prejudice-lgbtq-issues-elementary-schools>
- Gay and Lesbian Alliance Against Defamation [GLAAD]. (2016). *GLAAD media reference guide* (10th ed.) <https://www.glaad.org/sites/default/files/GLAAD-Media-Reference-Guide-Tenth-Edition.pdf>
- Goodhand, M., & Brown, K. M. (2016). Heteronormativity in elementary schools: The hidden and evaded curricula of gender diversity. *International Journal of School and Cognitive Psychology*, 3(3), 115. <https://www.longdom.org/openaccess/heteronormativity-in-elementary-schools-the-hidden-and-evadedcurricula-of-gender-diversity-2469-9837-1000188.pdf>
- Goodrich, K. M., Harper, A. J., Luke, M., & Singh, A. A. (2013). Best practices for professional school counselors working with LGBTQ youth. *Journal of LGBT Issues in Counseling*, 7(4), 307-322. <https://doi.org/10.1080/15538605.2013.839331>
- Gonzalez, M., & McNulty, J. (2010). Achieving competency with transgender youth: School counselors as collaborative advocates. *Journal of LGBT Issues in Counseling*, 4(3-4), 176-186. <https://doi.org/10.1080/15538605.2010.524841>

- Gower, A. L., Valdez, C., Watson, R. J., Eisenberg, M. E., Mehus, C. J., Saewyc, E. M., Corliss, H. L., Sullivan, R., & Porta, C. M. (2019). First- and second-hand experiences of enacted stigma among LGBTQ youth. *The Journal of School Nursing: The Official Publication of the National Association of School Nurses*, 1059840519863094. Advance online publication. <https://doi.org/10.1177/1059840519863094>
- Greytak, E. A., Kosciw, J. G., & Diaz, E. M. (2009). *Harsh realities: The experiences of transgender youth in our nation's schools*. <https://www.glsen.org/research/harsh-realities-experiences-trans-youth-schools>
- Henry, H. L. & Grubbs, L. (2016). Best practices for school counselors working with transgender students. *Ideas and Research You Can Use: VISTAS 2017*, 45, 1-20. https://www.counseling.org/docs/default-source/vistas/article_4557cd2bf16116603abcacff0000bee5e7.pdf?sfvrsn=c9db4b2c_6
- Hermann-Wilmarth, J. M. & Ryan, C. L. (2019a). LGBTQ topics in elementary education, research, and practice. *Theory Into Practice*, 58, 1-5. <https://doi.org/10.1080/00405841.2018.1536913>
- Hermann-Wilmarth, J. M., & Ryan, C. L. (2019b). Reading and teaching the rainbow: Making elementary school classrooms LGBTQ-inclusive. *American Educator*, 43(1), 17-21. https://www.aft.org/ae/spring2019/hermann-wilmarth_ryan
- James, S. E., Herman, J. L., Rankin, S., Keisling, M., Mottet, L., & Anafi, M. (2016). *The Report of the 2015 U.S. Transgender Survey*. National Center for Transgender Equality. <https://www.transequality.org/sites/default/files/docs/USTS-Full-Report-FINAL.PDF>
- Kappus B. (2015). In sync with LGBT families. *ASCD Express*, 10, 1-3. <http://www.ascd.org/ascd-express/vol10/1024-kappus.aspx>
- Kosciw, J. G., Clark, C. M., Truong, N. L., & Zongrone, A. D. (2020). The 2019 National School Climate Survey: The experiences of lesbian, gay, bisexual, transgender, and queer youth in our nation's schools. GLSEN. <https://www.glsen.org/research/2019-national-school-climate-survey>
- Kosciw, J. G., Greytak, E. A., Giga, N. M., Villenas, C. & Danischewski, D. J. (2016). *The 2015 National School Climate Survey: The experiences of lesbian, gay, bisexual and transgender youth in our nation's schools*. GLSEN. <https://www.glsen.org/research/2015-national-school-climate-survey>
- Kosciw, J.G., Greytak, E.A., Zongrone, A.D., Clark, C.M., Truong, N.L. (2018). *The 2017 National School Climate Survey: The experiences of lesbian, gay, bisexual and transgender youth in our nation's schools*. GLSEN. <https://www.glsen.org/research/2017-national-school-climate-survey>
- Kurt, L. J. (2017). Creating school climates that foster inclusive community attitudes toward gender nonconforming students. *Journal of School Counseling*, 15(1), 1-25. <https://files.eric.ed.gov/fulltext/EJ1144758.pdf>

- Meyer, E. J., Quantz, M., Taylor, C. & Peter, T. (2019). Elementary teachers' experiences with LGBTQ-inclusive education: Addressing fears with knowledge to improve confidence and practices. *Theory Into Practice*, 58(1), 6-17. <https://doi.org/10.1080/00405841.2018.1536922>
- National Alliance for Mental Health [NAMI]. (n.d.). *LGBTQI*. <https://www.nami.org/Your-Journey/Identity-and-Cultural-Dimensions/LGBTQI>
- Ratts, M.J., Singh, A.A., Nassar-McMillan, S., Butler, S.K. and McCullough, J.R. (2016). Multicultural and social justice counseling competencies: Guidelines for the counseling profession. *Journal of Multicultural Counseling and Development*, 44(1), 28-48. <https://doi.org/10.1002/jmcd.12035>
- Rodela, K. C. & Tobin, J. M. (2017). On Anna's terms: Supporting a student's gender transition during elementary school. *Journal of Cases in Educational Leadership*, 20(4), 42-57. <https://doi.org/10.1177/2F1555458917711210>
- Roe, S. (2017). "Family support would have been like amazing": LGBTQ youth experiences with parental and family support. *The Family Journal: Counseling and Therapy for Couples and Families*, 25(1), 55-62. <https://doi.org/10.1177/1066480716679651>
- Slesaransky-Poe, G., Ruzzi, L., Demedio, C. & Stanley, J. L. (2013). Is this the right elementary school for my gender non-conforming child? *Journal of LGBT Youth*, 10(29), 29-44. <https://doi.org/10.1080/19361653.2012.718521>
- Simons, J. D. (2018). Middle and high school counselor advocates for lesbian, gay, and bisexual students. *Journal of LGBT Issues in Counseling*, 12(3), 158–175. <https://doi.org/10.1080/15538605.2018.1488231>
- Simons, J., & Cuadrado, M. (2019). Narratives of school counselors regarding advocacy for LGBTQ students. *Professional School Counseling*, 22(1), 1-9. <https://doi.org/10.1177/2156759X19861529>
- Simons, J. D., Hutchinson, B., & Bahr, M. W. (2017). School counselor advocacy for lesbian, gay, and bisexual students: Intentions and practice. *Professional School Counseling*, 20(1a), 29-37. <https://doi.org/10.5330/1096-2409-20.1a.29>
- Sondel, B., Kretchmar, K., & Hadley Dunn, A. (2019). "Who do these people want teaching their children?" White saviorism, colorblind racism, and anti-blackness in "no excuses" charter schools. *Urban Education*, 1-30. <https://doi.org/10.1177/0042085919842618>
- Toporek, R. L. & Daniels, J. (2018). *American Counseling Association advocacy competencies: Updated*. <https://www.counseling.org/knowledge-center/competencies>
- U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. (2015). *Ending conversion therapy: Supporting and affirming LGBTQ youth* (HHS Publication No. SMA 15–4928). Author. <https://store.samhsa.gov/product/Ending-Conversion-Therapy-Supporting-and-Affirming-LGBTQ-Youth/SMA15-4928>

Weir, C., & Piquette, N. (2018). Counselling transgender individuals: Issues and considerations. *Canadian Psychology/Psychologie Canadienne*, 59(3), 252–261.
<https://doi.org/10.1037/cap0000129>

Contact email: mabrennan@ollusa.edu

Analytic Recommendation of Learning Graphs Based on User's Learning History

Massra Sabeima, University of Paris 8, France

Myriam lamolle, University of Paris 8, France

Mohamedade Farouk Nanne, University of Nouakchott, Mauritania

The Paris Conference on Education 2023

Official Conference Proceedings

Abstract

Learning online (e-learning) has gained popularity in a world where emerging technologies are transforming the world in particular self-training due to what it provides of low-cost learning and relieving the learner of all logistical concerns that traditional learning methods impose. Although e-learning systems have managed to establish many advantages, in terms of time management, and economic level, and also provide much more learning freedom when it comes to when and where a person wants to learn. Some improvements in the learning sessions themselves are needed. Mentioning adaptability between user profiles, the variable personal user preferences during his/her learning sessions, and the learning path. In this work, and to address that issue we propose a system that recommends learning graphs to users based on their profiles, preferences, and progress, based on an analytic review of experiences from multiple users' learning sessions. Having three ontologies: User Profile Ontology to model the learner, Training Ontology, and MultiMedia Resources Ontology modeling respectively the domain and resources. We analyze the users' session history stored in those ontologies to produce recommendations based on matching profiles, taking advantage of the web semantic multiple uses.

Keywords: E-learning, Ontology, Learning Analytics

iafor

The International Academic Forum

www.iafor.org

Introduction

Recommending appropriate learning content in an e-learning system is one of the biggest issues systems are facing nowadays, then it is not easy to deduce what content is suitable to a specific user or group of users.

To enhance the user experience in e-learning systems many have focused on recommending to learners items based on other users' ratings, or recommendations and/or by corresponding users' general profiles and the training objective.

All these approaches are effective to a specific limit, and the recommendation is still in mitigation; when relying upon user's rating some cautions should be taken into consideration, seeing that the users are generally not experts in the training domain, and are rating based on very vast criteria, then the integrity of their ratings is not verified.

As far as it concerns the approach of corresponding user's profile with content to establish recommendations; seeing that the learners are likely to be beginners seeking to learn some skills then the systems making recommendations lack valuable information to start the process of an effective recommendation. The user profile is built by extracting his/her interactions with the system and/or by implicit information the user provided, but these are not yet complete because the learner is still new to the system and has not yet started learning. So having a general profile that contains basic information about the user is not enough. This problem is widely known as the cold start, where it is hard to find criteria when the learner is a neophyte.

Looking back to the definition of a recommender system provided by Ricci, Rokach, and Shapira (2015), recommender systems are software tools and approaches that make recommendations for items that are likely to be relevant to a particular user.

Therefore the level of interest of a user alongside the basic characteristics of the user, seeing that the recommender system is particularly aimed at users that lack the necessary personal experience to assess the appropriate items for their needs.

The recommender system can effectively modify its recommendations to match each user's individual requirements and preferences by considering the user's level of interest and knowing their core attributes Benhamdi, Babouri, and Chiky (2017), Zaiane, O. R. (2002), Zhang, Lu, and Zhang (2021), Tan, Guo, and Li (2008), Sikka, Dhankhar, and Rana (2012).

This paper is organized as follows: an introductory section that provides a summary of the research topic establishes the context and emphasizes the significance of the study.

Following the introduction, the paper contains a methodology section. We detail the approaches used in our study in this area, outlining the precise techniques, tools, and procedures used to collect data, run experiments, or analyze information.

Following that, the article includes a results section that displays and explains the results of our experiments or studies. We present the conclusions, data, and statistical analyses obtained during the research process in this part.

Finally, the paper concludes with a section dedicated to the conclusion and future research work. We review the main findings, draw inferences based on the findings, and explain their consequences in this section. In addition, we discuss prospective future study directions, indicating areas that need further investigation.

Methods

Knowledge sources for recommender systems come from three points of origin Burke, R., Felfernig, A., & Göker, M. H. (2011). Firstly, from an individual provenance represented by users' personal judgment regarding a resource, user preferences, and elementary information and interaction with the system.

Secondly, it can source from social provenances such as ratings, reviews, and analysis and last from the content itself, the structuration and concept representation, and thirdly from the relation between the main actions and the expected results.

In our approach, we proceeded as follows:

(i) We structured concepts using three ontologies:

- The User Profile Ontology (UPO) contains the personal information and preferences of every user. It primarily describes learners, trainers, experts, etc. (see Figure 1). It also includes their initial or acquired skills and personalized learning path already completed or in progress (i.e., the pedagogical resources already used, assessments conducted, skills acquired or being acquired through a path).

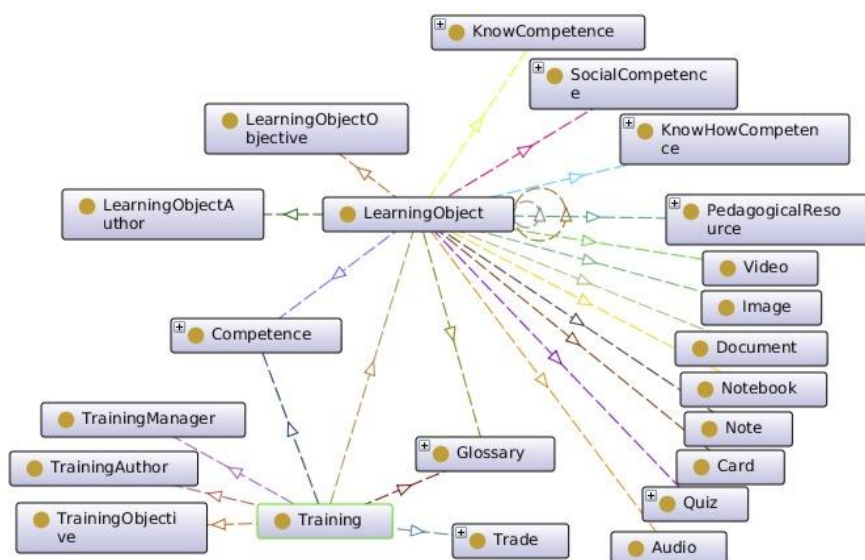


Figure 1: partial view of ontology UPO

- The second ontology is the Training Ontology (TO) which describes the skills required for a trade, as well as the objects and pedagogical resources used in various Learning Objects inside the *Training* class (see Figure 2). These learning objects are associated with available training programs, enabling the construction of a learning path so that users regardless of their level, can acquire the necessary skills.

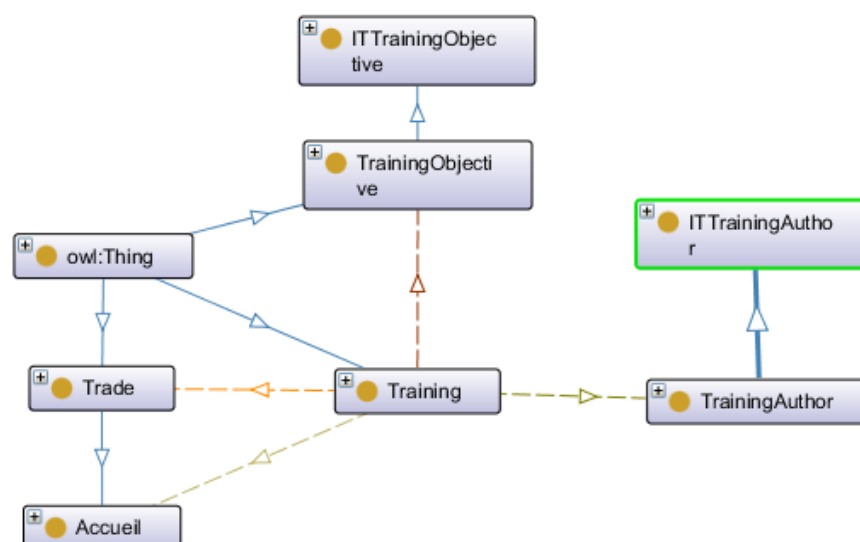


Figure 2: Partial view of Training Ontology (TO)

- The third ontology is MultiMedia Resources Ontology (MMRO) for modeling multimedia resources in different formats mainly in the class *MultimediaResource* (see Figure 3).

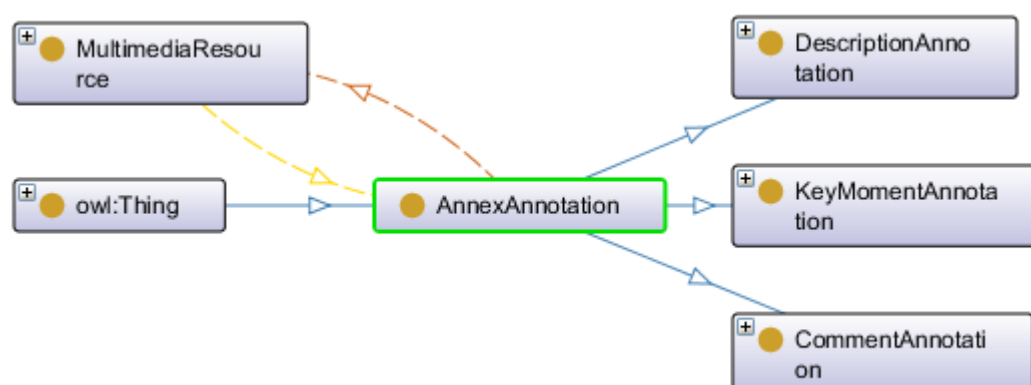


Figure 3: Partial view of MMRO ontology

(ii) Afterwards, we implemented a user interface (UI) enabling users to input their fundamental preferences regarding learning sessions, and specific training. The latter is composed of a sequence of learning objects containing various forms of resources forming the learners' learning graph. This learning graph is constituted of several levels. Each level has its own set of learning objects (LO) and pedagogical resources (PR) linked to one LO in the set of LO. The users' progression between levels of the learning graph requires successful completion of the evaluation. When the user fails the evaluation he/she is offered to go back and rewatch the same LO of the current level with the same or different PR. Users must select at least one pedagogical resource associated with one learning objective of the current level to validate the learning object and progress to the next level.

(iii) The learning paths are structured as follows: The expert defines the format, language, content, and the different attributes of the pedagogical resources and the learning objects. Each learning object has at least one pedagogical resource, and each learning object has at

least a prerequisite learning object. The graph is structured based on the level and the prerequisite learning objects.

(iv) Each time a user chooses a training a new instance of a personalized learning path is created, this learning path will contain the traces of user interactions with the system. Furthermore, whenever a user selects a pedagogical resource linked to a learning object for visualization the interaction of the user with the system is captured and stored inside the UPO. This path, containing the details of their learning history, will then be extracted for subsequent analysis in order to see which path represents the highest success rate taking into account the profile pattern of the users that took this path.

Before the end of the learning session, an evaluation is conducted to measure the level of proficiency.

Results

Users Traces

In this section, we present the results of the experiment we conducted. After multiple users connected and constructed their profiles during registration and while choosing a specific training, we collected their learning session history (see Figure 4) from the UPO. This includes all learning objects referenced as **LOs**, pedagogical resources referenced as **PRs**, and associated attributes and properties during the learning session.

These results are analyzed by specifying the activity name parameter (i.e., determining which entity from the graphs will serve as the measurement item). In this case, we defined the learning objects as the quantifiable factor since they form the core of the original learning graph, and all other entities are linked to them.

	idUser	training	learningObject	pedagogicalResource	time
1	"625902183"	"DEV"	"LO1"	"PR52"	"01/06/2023, 11:15:50 11:15:50"
2	"625902183"	"DEV"	"LO1"	"PR7"	"01/06/2023, 11:16:46 11:16:46"
3	"625902183"	"DEV"	"LO2"	"PR10"	"01/06/2023, 11:18:33 11:18:33"
4	"625902183"	"DEV"	"LO2"	"PR12"	"01/06/2023, 11:17:38 11:17:38"
5	"625902183"	"DEV"	"LO2"	"PR50"	"01/06/2023, 11:18:19 11:18:19"
6	"625902183"	"DEV"	"LO3"	"PR17"	"01/06/2023, 11:19:15 11:19:15"
7	"120905340"	"DEV"	"LO1"	"PR6"	"08/06/2023, 15:41:53 15:41:53"
8	"120905340"	"DEV"	"LO2"	"PR9"	"08/06/2023, 15:42:47 15:42:47"
9	"120905340"	"DEV"	"LO3"	"PR14"	"08/06/2023, 15:43:32 15:43:32"
10	"120905340"	"DEV"	"LO4"	"PR21"	"08/06/2023, 15:45:39 15:45:39"
11	"120905340"	"DEV"	"LO5"	"PR24"	"08/06/2023, 15:45:50 15:45:50"
12	"935326815"	"DEV"	"LO1"	"PR4"	"09/06/2023, 16:22:40 16:22:40"
13	"935326815"	"DEV"	"LO2"	"PR10"	"09/06/2023, 16:22:49 16:22:49"
14	"935326815"	"DEV"	"LO4"	"PR21"	"09/06/2023, 16:22:54 16:22:54"

Figure 4: Fragmented view of detailed users interactions with the system

In this partial view of the results set, we find the training **DEV** in this case, the time user selected a pedagogical resource **PRs** the learning object connected to that resource, and the identifier of the user in question.

Analyzed Users Data

In this section, we find the multiple paths passed by different users and the activities they have taken (the resources they watched). These users had the full freedom to choose any resources in any language or format from the filtered list of resources based on their preferences. Users take an evaluation at the end of the learning graph to pass to the next level. The profile and the personalized learning path of those who passed it the first time and those who had the full score are stored to be referenced.

The identified learning graph or graphs will then be recommended to new users with shared interests, preferences, and characteristics for the same training. The path is suggested but not imposed on users; essentially it serves as a road map for users.

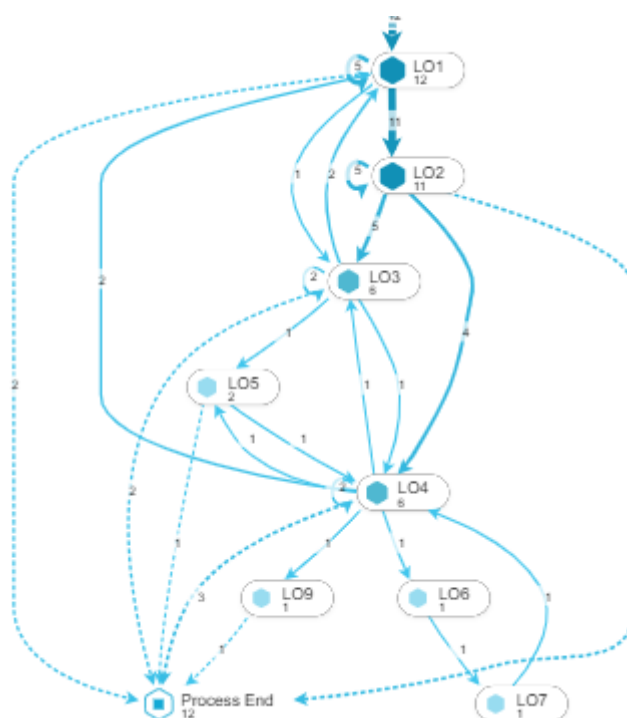


Figure 5: Fragmented view of multiple learning paths from a graph

The results of our analysis presented in this work provide a summary of the data collected and evaluated. The purpose of this analysis is to discover crucial results that will lead to determining what path a specific user took in our case, and what are the most visited learning objects and pedagogical resources. We can determine the profile of the users that passed the evaluation at the end of the learning session for further recommendation to users.

Conclusions and Future Work

We focused on the issue of personalized learning recommendations in this work by developing a system that considers users' profiles and preferences. The goal is to deliver meaningful and relevant recommendations to learners based on their individual traits and learning path.

By considering users' past learning experiences and patterns by examining their session history contained in the three presented ontologies (UPO, TO and MMRO). This analytic examination enables us to detect commonalities and patterns among various learners, allowing us to efficiently compare and match user profiles with training objectives and available resources.

In the future, we hope to improve the suggestion parameters by identifying the characteristics of the users' profiles in a way that depicts their cognitive level, as it is one of the primary criteria of a user's profile. We may further personalize the recommendation system and deliver more tailored ideas to each user by considering aspects such as cognitive ability, learning styles, and preferences. This technique will enable us to improve the system's accuracy and efficacy in matching the individual demands and preferences of users, thereby improving their overall experiences.

Second, we intend to create a complete profile method that captures the cognitive traits of users. Attention, reasoning ability, and information processing methods will all be taken into account by this mechanism. Users will be given evaluations or questionnaires aimed to collect information about their qualities and technical abilities regarding the training in question. This data will subsequently be utilized to build detailed profiles that reflect the cognitive strengths and limitations of the users.

Third, we will incorporate these cognitive profiles into the current recommendation system. The system will be able to create highly relevant and tailored recommendations by combining user preferences, interests, and cognitive qualities. For example, if a user prefers visual learning and has superior spatial reasoning skills, the system may prioritize offering interactive visual learning resources or simulations.

In addition, we want to continuously enhance and increase the system's ability to adapt to changing cognitive profiles of users. Users' cognitive status may change over time as they interact with the system. As a result, we want to use adaptive algorithms to update and alter the suggestion parameters in response to continuous user interactions and input. This adaptability ensures that the system remains sensitive to the changing cognitive needs and preferences of the users.

Fourth, we improve our networked ontologies and enrich them with external ontologies from certain standards or norms in the field of education.

References

- Benhamdi, S., Babouri, A., & Chiky, R. (2017). Personalized recommender system for e-Learning environment. *Education and Information Technologies*, 22, 1455-1477.
- Burke, R., Felfernig, A., & Göker, M. H. (2011). *Recommender systems: An overview*. *Ai Magazine*, 32(3), 13-18.
- Ricci, F., Rokach, L., & Shapira, B. (2015). *Recommender systems: introduction and challenges*. *Recommender systems handbook*, 1-34.
- Sikka, R., Dhankhar, A., & Rana, C. (2012). A survey paper on e-learning recommender system. *International Journal of Computer Applications*, 47(9), 27-30.
- Tan, H., Guo, J., & Li, Y. (2008, December). E-learning recommendation system. In *2008 International conference on computer science and software engineering* (Vol. 5, pp. 430-433). IEEE.
- Zhang, Q., Lu, J., & Zhang, G. (2021). Recommender Systems in E-learning. *Journal of Smart Environments and Green Computing*, 1(2), 76-89.
- Zaiane, O. R. (2002, December). Building a recommender agent for e-learning systems. In *International Conference on Computers in Education, 2002. Proceedings*. (pp. 55-59). IEEE.

Contact email: m.sabeima@iut.univ-paris8.fr

Assessment of STEM Competences – Systematic Overview of Model Solution and Practices

Nadezhda Kaloyanova, Prof. Dr Assen Zlatarov University, Bulgaria

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

A wide contextual understanding of STEM competence poses a strong challenge to the process of measuring and evaluating students' achievement in STEM. The problem with the assessment of STEM competences arises both from the authors' ambiguous understanding of the structure and content of STEM competence and from the variety of STEM practices in which goals are set to achieve different levels and aspects of STEM competences. The aim of this study is the main approaches for assessing STEM competences to be systematise. The research methodology is based on a systematic theoretical analysis and synthesis of three main sources of information on the research topic: official institutional sites that describe policies and tools for introducing STEM learning; publications in specialised scientific literature; practical models for introducing STEM into educational practice. The main criteria for analyzing the levels and characteristics of the integrated STEM competences and the methods and tools for their assessment. The used research methods are quantitative and qualitative content analysis, analysis of the main factors, comparative analysis. The study is a prerequisite for establishing the achievements and deficits in the assessment of STEM competences with a view to deriving a conceptual framework of an adaptive metric system for measuring and evaluating STEM competences.

Keywords: STEM Competences, Assessment, STEM Practices

iafor

The International Academic Forum
www.iafor.org

Introduction

The problem of assessing the achievements of students in STEM is of key importance, since systematically assessment and monitoring of STEM guarantees the quality of STEM education. At the same time, it is considered to be one of the most critical problems due to the limitation of measurement tools and evaluation methodologies (Saxton et al., 2014).

There are two reasons for the actuality of this problem. The first reason is the complex nature of STEM competencies, which are defined as a generalized construct with many diverse components, differentiated into two main groups: knowledge, attitudes and values related to STEM-disciplines and the skills to apply acquired knowledge in accordance with ethical attitudes and values, so as to act in an appropriate, effective way in a given context (Ng, Soo Boon, 2019).

The second reason is related to the specificity of each STEM practice, which focuses on developing certain skills within different variants of STEM competence.

In this regard, for STEM education, the key issue is the types of assessment, the assessment criteria and the methods and tools with which to realize the different types of assessment, so as to cover all levels of the formed STEM competences.

With the increasingly introduction of the so-called “integrated STEM education,” the opinion is imposed that formative assessment is leading for STEM, because formative assessment is a key tenant of quality STEM/technology education, as it acknowledges student progress (Peterson & Hipple, 2020). The points of view towards the criteria, methods and type of formative assessment in STEM are also not unambiguous and fit less and less into the traditional understanding of this type of assessment.

For example, Jimenez Iglesias, M. at all., described that assessment as a key element of STEM school must includes two main criteria:

- Continuous assessment – assessment typology where students are examined continuously
- Personalised assessment – assessment typology framed to demonstrate whether pupils have met specific educational goals, according to their personal development. (Jimenez Iglesias, M. at all., 2018)

Kreamer & Zimmermann introduced the concept of competency-based assessments or CBA, which entered into the STEM approach as assessments that expand students’ knowledge, provide flexibility and applicability of knowledge, as well as an opportunity for the student to demonstrate learning according to his own progress, so that the maximum level of his achievement can be highlighted (Kreamer & Zimmermann, 2015).

The tendency to apply the so-called authentic assessment is confirmed, but it also proves quite difficult for teachers (McNair, Bhargava, Adams, Edgerton, & Kypros, 2003). Authentic assessment is a model of formative assessment that takes into account the social dynamics of the classroom, allows students to self-assess by determining their progress, identifying their mistakes and taking action to improve. Assessments in this type of assessment should be specific and targeted, not to cause comparison between students, but to motivate them (Peterson & Hipple, 2020; Reynolds et. al., 2020, Jimenez Iglesias, et al., 2018).

Because of the very wide range of criteria it has to cover, the formative assessment enables the flexible use of various atypical methods and tools for measuring and evaluating student achievement, such as notebooks (engineering, science), rubrics, portfolios, performance monitoring, etc. (Peterson & Hipple, 2020). Traditional methods such as standardized tests, questionnaires and practical tasks also retain their influence in formative assessment of STEM competences (Xiaoyi Gao et al., 2020. Kuen-Yi et al., 2015).

Although many opportunities it provides, the formative assessment in STEM is not enough to prove the effectiveness of STEM education. On the one hand, this type of assessment can “miss out” important key competencies that almost every STEM practice needs to develop.

Haesen et al. remark that in the analysis of studies in the field of STEM “... could not identify studies which treated the assessment of STEAM competences within learners, such as co-operation, critical thinking and creativity” (Haesen et al., 2018).

On the other hand, the main goals of STEM education is, by increasing the interest and motivation of students, to achieve higher levels of their achievements in the fields of mathematics, sciences, technology and engineering, as well as to be the basis for future career development in these fields (Kelley et al., 2016), i.e. to take into account the level of achieved academic competences through STEM teaching and learning.

In this aspect exactly, Arcin et al. emphasise one of the leading problems in STEM education research, namely the lack of common interdisciplinary frameworks for assessment. According to them, this is why many studies use large-scale assessments or test scores as indicators of STEM achievement. However, these assessment tools were not designed to measure students' STEM-related achievement (Arcin et al., 2020).

As a confirmation of this thesis, some of the countries have accepted as the leading criterion for the successful implementation of STEM education the average results achieved by students in evaluation with internationally recognised instruments. Just as often, the same countries report that students achieve unsatisfactory results, and in conditions of similar STEM education, there is a significant difference in average of achievements between students' groups in different regions or countries.

For example, in a report presenting a comparative analysis of the achievements in STEM education of 7 schools from five European countries (Belgium, UK, Italy, Portugal and Spain) it is noted that the performance of students in the PISA (OECD's Programme for International Student Assessment) and TIMSS (Trends in International Mathematics and Science Studies) tests is not good. In addition, there is considerable variation between student achievement across countries. Over 20% of students from Italy and Portugal show very low results (Haesen et al., 2018).

This trend is not unique to Europe. Similarly, data from the performance of students from the Gulf Cooperation Council (GCC) States on the PISA and TIMSS in the period 2011 - 2019 shows that “all six countries rank under the center point score of 500, closer to low international benchmark of 400.” There is also a significant difference in the performance of students from different countries, such as students from the UAE and Bahrain appear to be the top performers among the GCC countries and KSA and Kuwait the lowest” (Kayan-Fadlelmula et al., 2022).

As a response to the identified challenges to the assessment of STEM competencies, Kaloyanova and Papancheva developed “A taxonomic framework for development of adaptive metric system for assessment of STEM-competencies” (Kaloyanova & Papancheva, 2023). The Framework includes 6 main categories of competences each with 2 subcategories:

1. Academic STEM competences
 - 1.1. Structured (integrated) knowledge – integrative cognitive constructs involving knowledge from the fields of mathematics, physics, chemistry, biology, engineering and technology.
 - 1.2. Ampliative skills – skills in the field of mathematics, physics, chemistry, biology, engineering, and technology that are amplified through the use of integrative cognitive constructs
2. Key STEM competences
 - 2.1. Relational competences – complex of constructive, digital and technological skills, expanding the ampliative ones.
 - 2.2. Extended abstract competences – analysis, synthesis and ratiocination. Building systems of key skills for research, planning and decision-making in learning situations. Inclusion of knowledge and skills in modes of divergent thinking (algorithmic, critical, strategic).
3. Transversal competences
 - 3.1. Problem Solving – solving authentic problems with multiple methods and techniques, incl. in a new, non-standard context.
 - 3.2. Innovation and creativity – Higher divergent / lateral thinking. Approbation of solutions, search for alternatives, construction of hypotheses, insight, and creativity.
4. Metacognitive competences
 - 4.1. Independent learning – applying strategies for emotional-social learning, argumentation and debating, curiosity and independence, learning to change.
 - 4.2. Self-Regulation – reflection of experience, regulation and self-regulation of learning, independent finding of solutions and answers to dilemma questions and problems.
5. Personal competences
 - 5.1. Motivation – demonstration of motivation, interests and sustainable attitudes towards learning and development in the field of STEM.
 - 5.2. Interaction – manifestations of teamwork, leadership, tolerance, communication, dealing with conflicts in real situations, learning through interaction with others.
6. STEM culture
 - 6.1. Cultural awareness – use of netiquette, tools for Internet security and safety in the context of global and uncontrolled communication.
 - 6.2. Cultural behavior – identifying/changing one's feelings, interests, values in a STEM context.

The metric system developed on the basis of the framework will contain a developed and tested metrics that can be adapted by teachers to different STEM practices and serve both for formative and summative assessment.

In order to provide an objective view of the reliability of the framework and the future development of the metric system, the aim of this study is the main approaches for assessing STEM competences to be systematize.

Methodology

The research was conducted in two stages.

In the first stage, a systematic content analysis of frameworks and systems for the assessment of STEM-competencies was carried out. A database containing scientific publications (paper and online) and publications on institutional sites has been compiled. The search was conducted using four keywords: STEM competence, assessment, system/framework and reduced to publications in the last 10 years. 2 types of frameworks and systems for assessing STEM competencies have been identified:

- Frameworks and systems for assessment of STEM educational in educational institutions - these frameworks include criteria and indicators for assessment the organisation, content, teaching and achievement in STEM;
- Frameworks and systems (or individual parts of them) for assessment students STEM-competences – these frameworks consist of criteria for assessing the STEM-competences achieved by students in STEM education.

For the purposes of this study, the frameworks and systems of the second type were analysed, with the main criterion being the assessed competences they include. A comparative analysis between the content of the analyzed frameworks and a taxonomic framework for development of adaptive metric system for assessment of STEM-competences was made. The result serves to determine specific indicators for the evaluation of STEM practices.

In the second part of the study, 88 STEM practices published in scientific papers are analyzed. The sources used are Journal of STEM in Bulgaria, Europe and the Word (all issues between 2020 and 2022 year) and Proceedings of I. and II. National conferences “STEM education and Innovations”. The analysed practices are implemented in Bulgarian school system. The practices are selected from among 232 descriptions. Selection criteria is the availability of criteria, methods and tools used for formative assessment of students.

The content analysis is implemented in three steps:

1. The type of implemented practices is defined according to two indicators:
 - The educational stage and degree in which they were implemented;
 - The pedagogical forms through which they are realized.
2. STEM-competencies that teachers assess within each practice are defined. The categories and subcategories of a taxonomic framework for development of adaptive metric system for assessment of STEM-competencies (Kaloyanova & Papancheva, 2023) were used as criteria, adding criteria for academic competencies in the field of STEM sciences.
3. The methods and tools for formative assessment applied by the teachers within the practices are presented.

The limitations of the study are related to the problems described in the theoretical analysis, as well as supplemented by the following objective factors:

- The difference in policies for the introduction of STEM in educational systems, including the broad borders for the introduction of STEM in the Bulgarian education system;
- The multitude of sources that describe research conducted on topic of this study and which are difficult to cover;

- The probability that good STEM practices in the field of formative assessment are not published, resp. are available for analysis;
- The too narrow scientific scope of some studies – for example, with a focus on a certain educational stage, assessment method, assessment criteria, type of assessment i.e.

Results

The results of the comparative analysis between the systematized frameworks and systems for assessment of students STEM competencies and a taxonomic framework for development of adaptive metric system for assessment of STEM-competencies are shown in Table 1.

Table 1: Comparative Analyse between Frameworks and Systems to Assessment of school students STEM competences

FRAMEWORKS	COMPETENCES ASSESSED	Relevance to Taxonomic Framework	TYPE OF ASSESSMENT
STEM Common Measurement System (Students Learning Construct) <i>Saxon et al., 2013</i>	<ul style="list-style-type: none"> • Academic Identity • Motivational Resilience • Higher-Order Cognitive Skills • Application of Conceptual Knowledge 	<ul style="list-style-type: none"> • Cultural behavior • Motivation • Ampliative Skills • Structured Knowledge 	Formative
The FaSMEd framework <i>European Commission, 2016, p. 5-6</i>	<p>Sending and Displaying: These are actions that facilitate communication between the different actors in the formative assessment process.</p> <p>Processing and Analyzing: These are actions where technology supports the interpretation phase of formative assessment.</p> <p>Providing an Interactive Environment: These are actions that enable students to work individually or collaboratively to explore content and may include features from the other two categories.</p>	<ul style="list-style-type: none"> • Interaction • Relational competences 	Formative
Integrated STEM Assessment Model <i>Bicer et al., 2017</i>	Integrative knowledge and skills from the field of science and mathematics	<ul style="list-style-type: none"> • Structured Knowledge • Ampliative Skills 	Summative
Adaptive formative assessment platform for STEM Education <i>Avgerinos, 2017</i>	Knowledge and Skills from the field of mathematic in primary and secondary education	Non	Formative

A spiders' web framework for STEAM education <i>Haesen & Van de Put, 2018</i>	<ul style="list-style-type: none"> • Creativity • Communication • Ecology • Critical Thinking • Problem Solving 	<ul style="list-style-type: none"> • Innovation and Creativity • Interaction • Structured Knowledge • Ampliative Skills • Extended abstract competences • Problem Solving 	Formative
STEM Competences Assessment Framework <i>Arıcan et al., 2020</i>	Integrative knowledge and skills from the field of science and mathematics <ul style="list-style-type: none"> • Mathematics <ul style="list-style-type: none"> - Algorithmic thinking - Concepts and principles - Pattern recognition - Argumentation • Science <ul style="list-style-type: none"> - Scientific literacy: Physics - Scientific literacy: Chemistry - Scientific literacy: Biology • Technology and engineering <ul style="list-style-type: none"> - Modeling - Technology and engineering problems - Coding 	<ul style="list-style-type: none"> • Structured Knowledge • Ampliative Skills 	Summative
Assessment of Transversal Skills (ATS STEM Model) <i>Szendey, O. Et al., 2020</i>	<ul style="list-style-type: none"> • Problem Solving, Metacognitive Skills, Collaboration, Innovation and Creativity • Communication, Self-Regulation, Critical Thinking, Disciplinary Skills competences 	<ul style="list-style-type: none"> • Problem Solving • Metacognitive competences • Innovation and Creativity • Interaction • Extended abstract competences • Structured Knowledge • Self-Regulation 	Formative
Equity-Oriented Conceptual Framework for K-12 STEM literacy <i>Jackson et al., 2021</i>	<ul style="list-style-type: none"> • Critical thinking and problem-solving • Empathy • STEM dispositions – attitude toward, interest in, and motivation in STEM • Utility and Applicability • Stem Identity Development • Empowerment – ability to taking responsibility, self-control, self-development 	<ul style="list-style-type: none"> • Extended abstract competences • Problem Solving • Interaction • Cultural behavior • Motivation • Self-Regulation • Independent learning • Cultural awareness 	Formative

8 frameworks developed in the last 10 years are derived from various sources. 6 of them (75%) are for formative assessment and two (25%) – for summative (Table 1).

In the comparative analysis with a taxonomic framework for the development of an adaptive metric system for the assessment of STEM competencies, the following results are obtained:

- Structured (integrated) knowledge – 5 (62,5%);
- Ampliative skills – 4 (50%);
- Interaction – 4 (50%);
- Extended abstract competences – 3 (37,5%);
- Problem Solving – 3 (37,5%);
- Innovation and creativity – 2 (25%);
- Self-Regulation – 2 (25%);
- Motivation – 2 (25%);
- Metacognitive competences – 1 (12,5%);
- Independent learning – 1 (12,5%);
- Relational competences – 1 (12,5%);
- Cultural awareness – 1 (12,5%);
- Cultural behavior – 1 (12,5%).

The greatest comparability between the systematised frameworks/systems and the taxonomic framework is based on the criteria for assessment of Structured (integrated) knowledge, Ampliative skills and Interaction – more than 50% of the systematized frameworks/sistems contain this criterion.

The least relevance is observed for the criteria Metacognitive competences, Independent learning, Relational competences, Cultural awareness, and Cultural behavior – they are presented on average in one framework/system. There is no framework or system that covers all the criteria of a taxonomic framework.

In the second part of the study, 88 school STEM practices described by teachers are analysed. Figure 1 shows the distribution of practices according to the stage and degree in which they are implemented, as well as according to the forms to which they are implemented (Figure 1).

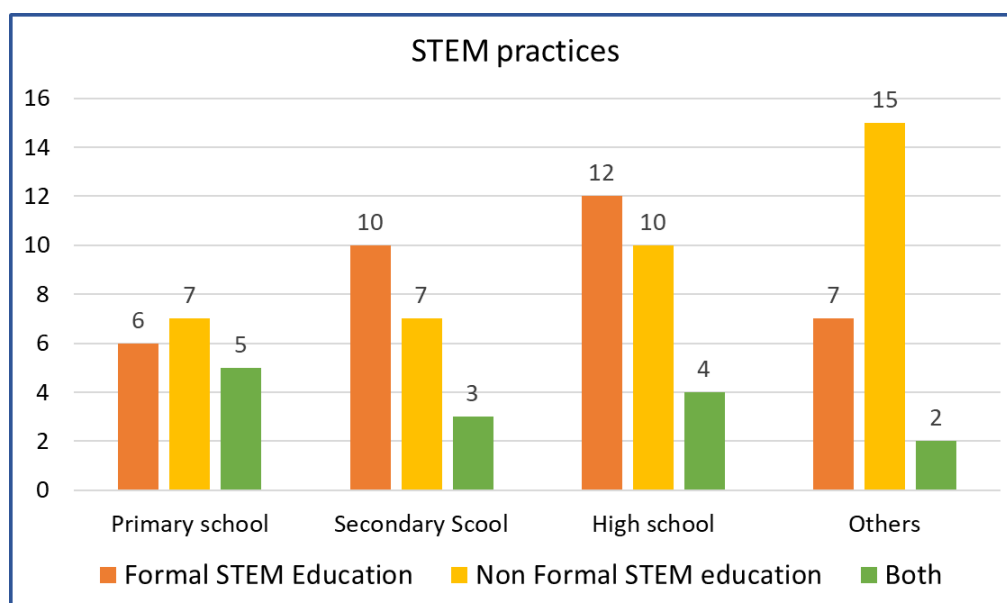


Figure 1: Type of STEM practices in %.

18 practices are implemented in the primary school stage, 20 in the middle school stage, 16 in the high school stage, and 24 practices are implemented in mixed groups with students of different degrees and ages (Figure 1).

35 STEM practices are implemented within the formal educational process – such as STEM lessons and learning projects. 39 are realised in the form of extracurricular and free time activities, and 14 covered activities both in the formal and informal educational process (Figure 1).

Through content analysis, the types of STEM competencies that teachers assess within each practice have been determined. The categories and subcategories of a taxonomic framework for development of adaptive metric system for assessment of STEM-competencies (Kaloyanova & Papancheva, 2023) are used as criteria, criteria for academic competencies in the field of STEM sciences are added. The distribution is shown in Figure 2.

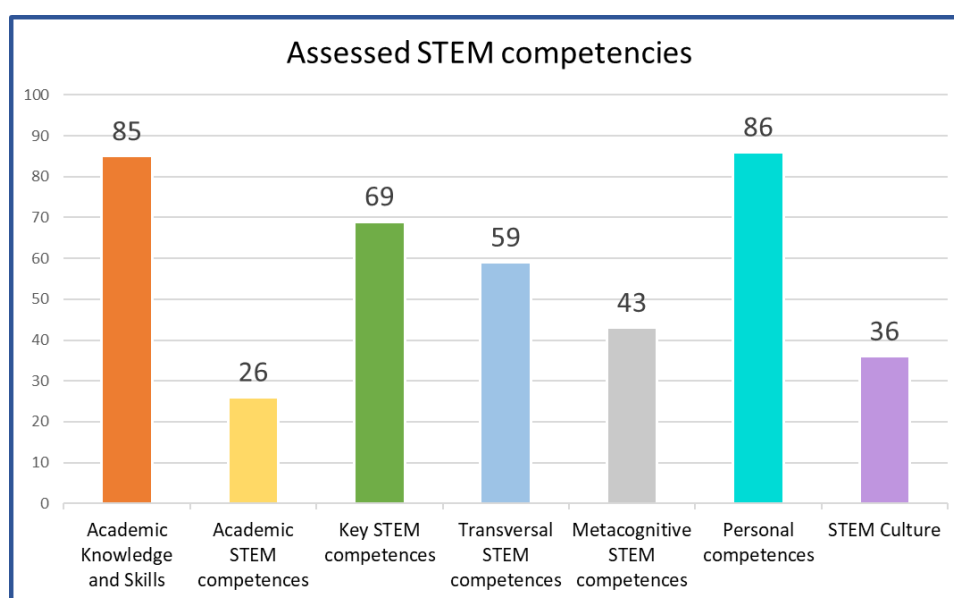


Figure 2: Types of Assessed STEM competencies in %.

According to the obtained results, teachers mainly assessed personal competences – in 86% of the practices, and academic knowledge and skills – in 85% of the practices (Figure 2).

The distribution of the identified STEM competencies and their relevance to the Taxonomic Framework are described in Table 2.

Table 2: Distribution of identified skills assessed according to the STEM competences framework.

Categories for Analyze	Subcategories for Analyze	Identified knowledge and skills	F	% of Group	% of All
Academic Knowledge and Skills	Science	Biology Knowledge and Skills	28	37,33	31,82
		Chemistry Knowledge and Skills	19	25,33	21,59
		Physics Knowledge and Skills	8	10,67	9,09
	Math	Math Knowledge and Skills	7	9,33	7,95
	Engineering	Engineering Knowledge and Skills	4	5,33	4,55
	Technology	Digital Skills	9	12	10,23
Academic STEM competences	Structured (integrated) knowledge	Math and Engineering Biology and Chemistry Math and Physics	7	30,43	7,95
	Ampliative skills	Presentation Skills	16	69,57	18,18
Key STEM competences	Relational competences	Practical Skills	7	11,48	7,95
	Extended abstract competences	Algorithmically Thinking Critical Thinking	54	88,52	61,36
Transversal STEM competences	Problem Solving	Problem Solving	29	55,77	32,95
	Innovation and creativity	Creative Thinking Imagination	23	44,23	26,14
Metacognitive STEM competences	Independent learning	Independence	14	36,84	15,91
	Self-Regulation	Active learning	24	63,16	27,27
Personal competences	Motivation	Learning Interest Learning Motivation Curiosity	42	47,72	47,73
	Interaction	Empathy Teamwork Skills Entrepreneurship Confidence	34	52,28	38,64
STEM culture	Cultural awareness	Netiquette Internet safety	12	37,50	13,64
	Cultural behavior	Feelings Attitudes, beliefs	20	62,50	22,73

According to the statistical values the most assessed competences, described in over 30% of the studied practices, are:

- Key STEM competences: Extended abstract competences – described in 61,36% (54) of the analyzed STEM practices:
 - Algorithmically Thinking – 44,31% (39 practices);
 - Critical Thinking – 17,05% (15 practices).
- Personal competences: Motivation – described in 47,73% (42) of the analyzed STEM practices:

- Learning Interests – 20,45% (18 practices);
- Learning Motivation – 17, 05% (15 practices);
- Curiosity – 10,23% (9 practices).
- Personal competences: Interaction – described in 38,64% (34) of the analyzed STEM practices:
 - Teamwork Skills – 21,59% (19 practices);
 - Confidence – 7,95% (7 practices);
 - Empathy – 6,82 (6 practices);
 - Entrepreneurship – 2,72 (2 practices).
- Transversal STEM competences: Problem Solving – described in 32,95% (29) of the analyzed STEM practices;
- Academic Knowledge and Skills in the Field of Biology – described in 31,82% (28) of the analyzed STEM practices (Table 2).

Figure 3 shows the most frequently used methods and techniques applied to formative assessment of STEM competencies by teachers.

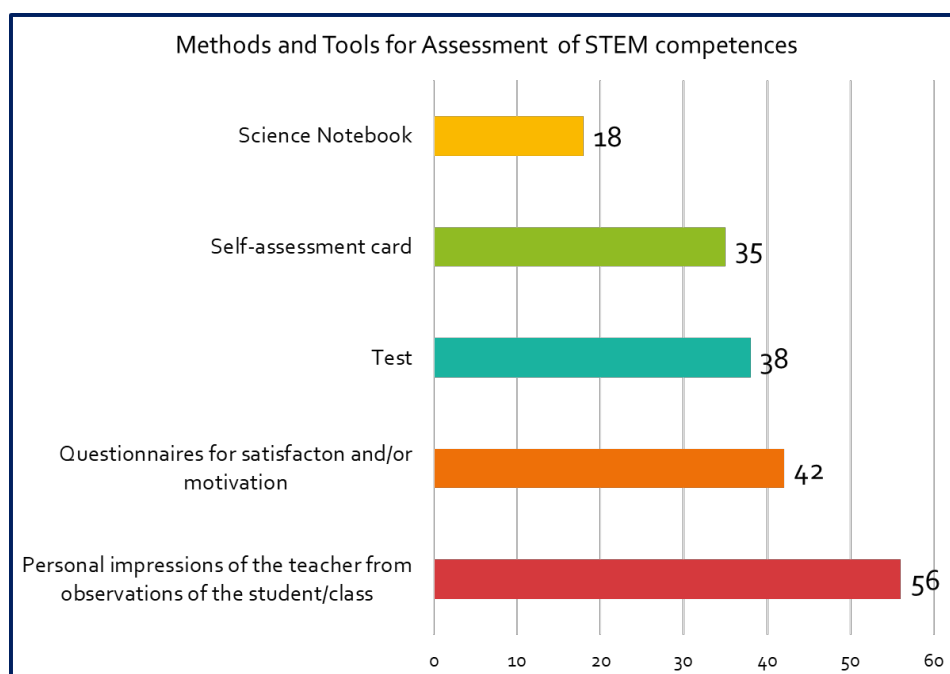


Figure 3: Distribution of used Methods and Tools for Formative Assessment of STEM competencies in %.

For formative assessment of STEM competencies by students, achieved within a specific STEM practice, teachers primarily use methods and tools of a subjective nature.

In 56% of the studied cases, teachers described their own impressions from observing students' activities in STEM (Figure 3).

They often use methods to determine the attitudes, motivation, interest and satisfaction of students in STEM, such as various types of questionnaires and self-assessment cards - in 77% of the cases studied, such tools are described (Figure 3).

In 38% of the investigated cases, after the completion of the activities within a specific STEM practice, a test to assess the achieved knowledge and skills in a certain subject or interdisciplinary area is applied (Figure 3).

Methods for comprehensive evaluation of student progress in STEM, such as notebooks and portfolios, are underutilised - only 18% of the surveyed practices indicated Science Notebook assessment (Figure 3).

Conclusion

This study proved that there is a significant deficit of models and practical solutions for assessment of student achievement in STEM education.

Formative assessment is indeed given precedence, and in practical terms teachers rely mostly on observations and self-assessment of students. The instruments they use do not demonstrate sufficient reliability, which is the likely reason why students do not perform well on large-scale assessments or test scores.

Among the most often assessed STEM competencies by teachers are academic competencies in a certain subject area, which contradicts the STEM conception.

Of the key STEM competencies, those most valued are algorithmic thinking skills, which are characteristic of some of the STEM fields – mathematics, technology and engineering.

In less than 10% of the practices described, digital skills are valued, even though they are particularly important for STEM.

Problem solving is the main transversal competence that teachers assessed, innovation and creativity are underestimated.

Within the framework of personal competences, interest in learning, teamwork and motivation to learn are primarily assessed.

In more than 50% of the practices studied, the assessment is based on the personal impressions of the teacher during the implementation of the practice, in more than 40% - on the sharing of attitudes and impressions by the students through answers to questions, and in more than 30% it is based on the self-assessment of the students. This calls into question the objectivity of the formative assessment in STEM in general. Tests retain their importance for teachers, but they measure only academic STEM competencies.

Given the limitations of the research methodology, it is not exhaustive, but it is an important step towards building a strategy for deriving uniform criteria and indicators as well as for building an adaptive metric system for assessment of STEM-competences.

Acknowledgements

This study is realised with the financial support of the science project № KII-06-H65/2. “AMS-STEM-COMP – Adaptive metric system for assessment of STEM competences in school education (1–12 grade).”

References

- Arikan, S., E. Erkin, M. Pesen. 2020. Development and Validation of a STEM Competencies Assessment Framework. *International Journal of Science and Mathematics Education*, Received: 13 December 2019 /Accepted: 28 September 2020/# Ministry of Science and Technology, Taiwan 2020, <https://doi.org/10.1007/s10763-020-10132-3>
- Haesen, St., E. Van de Put. (2018). STEAM Education in Europe: A Comparative Analysis Report
- Hipple, B. T. (2020). Formative assessment in hands-on STEM education. In C. Martin, D. Polly & R. Lambert (Eds.), *Handbook of Research on Formative Assessment in Pre-K Through Elementary Classrooms* (pp. 165–193). IGI Global. <https://doi.org/10.4018/978-1-7998-0323-2-ch009>, <https://doi.org/10.1186/s40594-020-00225-4>
- Jimenez Iglesias, M., Faury, M., Iuliani, E., Billon, N. and Gras-Velazquez, A. (2018). *European STEM Schools Report: Key Elements and Criteria*. European Schoolnet, Brussels.
- Kayan-Fadlilmula et al. (2022). A systematic review of STEM education research in the GCC countries: trends, gaps and barriers *International Journal of STEM Education* (2022) 9:2. <https://doi.org/10.1186/s40594-021-00319-7>
- Kelley, T. and J. Knowles. (2016). A conceptual framework for integrated STEM education. *International Journal of STEM Education* (2016) 3:11. DOI 10.1186/s40594-016-0046-z
- Kreamer, K. B., & Zimmermann, A. (2015). Building a strong relationship between competency-base pathways and career technical education. National Association of State Directors of Career Technical Education Consortium.
- Kuen-Yi Lin, Kuang-Chao Yu, Hsien-Sheng Hsiao, Yih-Hsien Chu, Yu-Shan Chang, Yu-Hung Chien. (2015). Design of an assessment system for collaborative problem solving in STEM education. *J. Comput. Educ.* (2015) 2(3):301–322 DOI 10.1007/s40692-015-0038-x – collaborative Problem Solving
- McNair, S., Bhargava, A., Adams, L., Edgerton, S., & Kypros, B. (2003). Teachers speak out on assessment practices. *Early Childhood Education Journal*, 31(1), 23–31. doi:10.1023/A:1025180617689
- Ng, Soo Boon. (2019). Exploring STEM Competences for the 21st Century, ser. Current and Critical Issues in Curriculum, Learning and Assessment, February, 2019, No.30. UNESCO, International Bureau of Education
- Peterson, B., & Hipple, B. T. (2020). Formative assessment in hands-on STEM education. In C. Martin, D. Polly & R. Lambert (Eds.), *Handbook of Research on Formative Assessment in Pre-K Through Elementary Classrooms* (pp. 165–193). IGI Global. <https://doi.org/10.4018/978-1-7998-0323-2-ch009>

- Reynolds, K., O’Leary, M., Brown, M. & Costello, E. (2020). Digital Formative Assessment of Transversal Skills in STEM: A Review of Underlying Principles and Best Practice. ATS STEM Report #3. Dublin: Dublin City University.
<http://dx.doi.org/10.5281/zenodo.3673365>
- Saxton, E., Burns, R., Holveck, S., Kelley, S., Prince, D., Rigelman, N., & Skinner, E. A. (2014). A common measurement system for K-12 STEM education: Adopting an educational evaluation methodology that elevates theoretical foundations and systems thinking. *Studies in Educational Evaluation*, 40, 18–35.
<https://doi.org/10.1016/j.stueduc.2013.11.005>
- Xiaoyi Gao, Peishan Li, Ji Shen and Huifang Sun. (2020). Reviewing assessment of student learning in interdisciplinary STEM education. Gao et al. *International Journal of STEM Education* (2020) 7:24

Contact email: cpcc@abv.bg

Using Biometrics to Fortify E-learning Platforms Security

Spyros Kopsidas, University of Thessaly, Greece
Eleni Ioannou-Sougleridi, University of Thessaly, Greece
Dimitris Zisiadis, University of Thessaly, Greece
George Stamoulis, University of Thessaly, Greece

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

E-learning is here to stay. During the COVID-19 pandemic, more than 1.2 billion students were educated through online learning. Platforms such as Zoom, Webex, Skype, Microsoft Teams, Google Meet, etc. were among the most popular ones during that period. However, these platforms suffer from various vulnerabilities that make them susceptible to cyberattacks, including Man-in-the-Middle attacks (MitM), during which the communication between a student and a teacher is intercepted by a ghost user. In this study, we propose the implementation of VIPSec, a secure and elaborate protocol, that is also easy to use for young and inexperienced users such as children. Thus, online learning sessions could be secured from disruptors and the threefold of confidentiality, integrity, and availability of the sensitive nature of personal data of both students and educators is respected.

Keywords: E-learning, Security, VIPSec, Education, MitM, Zoombombing

iafor

The International Academic Forum
www.iafor.org

1. Introduction

The COVID-19 pandemic has brought upon dramatic changes in education. The digitalization of education that has been happening in the last years, became more prominent as the majority of students worldwide were affected by the pandemic. During the pandemic, more than 1.2 billion students in 186 countries were out of the classroom due to school closures [1]. As a result, many educational institutions had to adopt online learning methods to continue their teaching and learning activities. Teleconferencing platforms such as Zoom, Webex, Skype, Microsoft Teams, Google Meet, VooV Meeting, and Blackboard Collaborative Ultra were among the most popular ones in downloads during the COVID-19 pandemic [2]. These platforms enabled synchronous e-learning, which is a form of online learning where learners and instructors interact in real-time through audio, video or chat features [3]. Synchronous e-learning is different from asynchronous e-learning, which is self-paced and does not require simultaneous participation [4].

One of the most widely used teleconferencing platforms during the pandemic was Zoom. Zoom is a cloud-based video conferencing service that allows users to virtually meet with others, either by video or audio-only or both, while conducting live chats [5]. In 2020, it emerged as one of the most popular mobile apps globally with more than 500 million downloads [6]. Zoom was especially popular among educators and students, as it offered free accounts for schools and universities with unlimited meeting time and up to 100 participants per session [7]. Another teleconferencing platform that was extensively utilized for educational purposes was Cisco Webex. Webex is a suite of software products that provides video conferencing, online meetings, screen sharing, and collaboration tools [8]. Webex was widely utilized as the exclusive officially authorized software for such purposes in Greece [9]. Webex also offered free accounts for educators and students with unlimited meeting time and up to 100 participants per session [10].

These e-learning platforms are heterogeneous environments with different web-enabled applications. E-learning is a structured course or learning experience that is delivered electronically [11]. E-learning can be delivered through various media, such as web pages, audio files, video files, animations, simulations, games, and virtual worlds. The use of e-learning is not only cost-effective and cost-efficient but more importantly it removes the geographical obstacles often associated with traditional classrooms. Worldwide e-learning revenue is expected to grow to \$325 billion by 2025 [12].

2. Synchronous Learning Security Risks

This sudden and unplanned influx of people using teleconferencing platforms has brought into light the insufficient existence of a normative and legislative base on e-learning and digital learning resources in general. Security is the Achilles heel of educational platforms. Since e-learning relies on the Internet for its execution [13], it entails additional security and privacy issues [14]. The weakness in design implementation, operation, or internal control could be exploitable by cybercriminals, who often target schools, where cybersecurity is not a priority. The greater number of current e-learning systems do not sufficiently meet fundamental security requirements [15]. As a consequence, some serious security incidents have taken place, such as Zoombombing.

Zoombombing, a term that was popularized in 2020, is associated with and derived from the Zoom video conferencing software program, but it also applies to other video conferencing

platforms [16]. Zoombombing is a form of cyberattack where an uninvited person joins a Zoom meeting and disrupts it by sharing inappropriate or offensive content, such as pornography, hate speech, or violence. Zoombombing has caused significant issues for schools and educators due to the minimal security implemented in teleconferencing platforms. Some organizations have even banned the use of Zoom altogether due to security concerns [17]. Zoombombing can be prevented by using some security features available on teleconferencing platforms, such as password protection, waiting rooms, host controls, and encryption [18].

The security issues of e-learning have been brought to light due to its exponential growth and its dependency upon the Internet [19]. Password-protected online classrooms are not secure since session hackers usually target browser or web application sessions, and meeting disruptors search the Internet frequently for publicly posted meeting IDs, that are being shared carelessly or the use of the same meeting link more than once. These security issues have made parents skeptical towards online learning platforms. Since 2018 there is a General Data Protection Regulation (GDPR) being applied in the EU that focuses on the protection of data privacy. Educational e-platforms should comply with the GDPR regulation. In 2021, Zoom was found to be violating the GDPR by the Data Protection regulatory agency in Hamburg, Germany, since it was transmitting data collected in the EU to the United States [6]. Children's data are sensitive and require to be secured from disruptors, as their interception might lead to phenomena such as cyberbullying, which affects the general well-being of a student. In addition, there is also the issue of copyright and ownership of the authors of educational content. When disruptors access digital content without authorization, they can make unauthorized use of it, and have a financial interest in authors' lecture notes [20].

Modern-day e-learning systems can often be connected with the user's social media accounts in several ways. Most of the online platforms offer the Social Login option that allows users to log in using their social media credentials such as Facebook or Google. Some online learning platforms have social sharing buttons integrated, allowing thus users to share their progress, achievements, or course content on their social media profiles. However, this poses an additional risk for students, because someone who penetrates into the online learning system, may be able to identify the young students, through their social media accounts. It is therefore vital to secure the digital classroom from the prying eyes of disruptors.

Online learning should rely on trust. Most young students tend to trust all sources of information and accept them as true [21]. Therefore, the importance of the content is fundamental, and it should be protected against unauthorized modifications. This trust can be built by having secure educational platforms [20].

Security issues are caused by users' poor knowledge of security measures, improper behaviors, and lack of education [22]. It is difficult for children to evaluate the risks posed to information, to appreciate security priorities, and to take responsibility for the implementation of controls. Therefore, security is critical for the protection of learners and teachers from unauthorized threats. Security refers to protection from malicious or accidental misuse of resources [23] [24]. In cybersecurity, threats are potential negative actions or events that may result in unauthorized information disclosure, theft, or damage to hardware, software, or data [25]. Threats include [26]:

- Data tampering: altering or modifying data without authorization.
- Network eavesdropping: intercepting or listening to network traffic.
- Unauthorized access to administration interfaces: gaining access to system settings or functions that are restricted.
- Disclosure of confidential data: revealing sensitive or personal information to unauthorized parties.
- Attacker exploits an application without a trace: exploiting vulnerability in an application without leaving any evidence.
- Man-in-the-Middle attacks (MitM attacks): intercepting and modifying network communication between two parties.
- Poor key generation or key management caused by weak encryption: using weak cryptographic algorithms or keys that can be easily broken or compromised.

3. Man-in-the-Middle Attack

Man-in-the-Middle (MitM) attack A Man-in-the-Middle (MitM) attack, one of the oldest forms of cyberattacks, is a cyberattack in which the communication between two parties is intercepted [27]. MitM attacks include:

- Session hijacking: taking over an active session between a user and a server.
- Replay attack: capturing and retransmitting data at a later time.
- IP spoofing: forging an IP address to impersonate another party.
- Eavesdropping attack: listening to network traffic without modifying it.
- Bluetooth attacks: exploiting vulnerabilities in Bluetooth devices or protocols.

During a typical MitM attack in an educational platform, the communication between a student and a teacher is intercepted. The disruptor then sends fake information to each party, i.e., by modifying an online quiz or exam, impersonating the teacher, or redirecting the student to a phishing website to steal their login credentials.

Project Zero, a team at Google, has discovered a way for cyber attackers to compel a victim to connect to a MitM server without any user intervention, thereby enabling the attacker to intercept and alter client update requests and responses. This allows them to send a malicious update to the victim, automatically downloading and executing, giving the attacker remote code execution (RCE) capabilities. Project Zero has stated that the only prerequisite for executing this attack is the ability to send messages to the target through Zoom chat [28].

Regarding Cisco Webex, multiple vulnerabilities have been reported, that could allow an authenticated, local attacker to gain access to sensitive information [29]. Disruptors can take advantage of these vulnerabilities by intercepting traffic between the affected user and an endpoint using MITM techniques and then impersonating the endpoint with a forged certificate. Depending on the configuration of the endpoint, an attacker could access call controls, modify presented content or view presented content modify any content being presented by the victim or have access to call controls. Successful exploits also allow the disruptors to gain access to sensitive information, including meeting data and recorded meeting transcriptions.

It is important to take precautionary measures to prevent MitM attacks before they occur, since they can be prevented or detected by authentication and tamper detection. The most

effective way to do so is encryption. Encryption is one of the techniques used for confidentiality, in order to ensure that information and data are not disclosed to any unauthorized person or entity [30]. Weak encryption mechanisms allow a disruptor to brute force his way into a network and begin MitM attacking. All cryptographic systems are secure against MitM attacks, through the use of mutual authentication. Mutual authentication is a process in which both parties verify each other's identity before exchanging data [31]. Mutual authentication can be achieved by using digital certificates, public key cryptography, or shared secrets [32].

4. Enhancing E-learning Security With VIPSec

A novel method called Voice Interactive Personalized Security (VIPSec) [33] [34] has been proposed. VIPSec is a method for enhancing the security of synchronous e-learning systems by using biometric-based authentication and voice verification. VIPSec is especially suitable for use in multi-party teleconferencing systems, as it offers several benefits over other security methods, such as:

Easiness of Use: VIPSec does not require the users to remember or enter any passwords or PINs. The users only need to speak to authenticate themselves and verify their peers. This makes it convenient and user-friendly for the participants, as they do not have to deal with complex or cumbersome authentication procedures. VIPSec also does not require any additional hardware or software installation. The users only need a device with a microphone, which is a common feature of most laptops, tablets, and smartphones. This makes it compatible and accessible for the participants, as they do not have to acquire or install any special equipment or software.

Device Independence: VIPSec does not depend on any specific device or platform. The users can use any device that supports voice communication and has a secure channel to exchange the token. This makes it flexible and adaptable for the participants, as they can use their preferred or available device to join the session. VIPSec also does not store any user data or keys on the device, so the users do not have to worry about losing or compromising their device. This makes it secure and resilient for the participants, as they do not have to risk exposing their data or keys to attackers.

Strong Encryption: VIPSec provides end-to-end encryption of the session data using a secret key derived from the token. The secret key is unique for each session and each pair of peers. The secret key is also based on user-specific biometric features, which are hard to forge or copy. The secret key is never transmitted over the network, so it cannot be intercepted or stolen by attackers. This makes it robust and reliable for the participants, as they can ensure the confidentiality and integrity of their data during the session.

Scalability and Deployability: VIPSec only requires minimal resources from the user devices and no additional support from the network. VIPSec does not rely on a central bridge circuit to mix and distribute the speech signals of the participants. Instead, each participant receives and decrypts the speech signals of all the other participants and mixes them locally on their device. This eliminates the security weakness of having a central bridge that works with clear speech and cipher keys for all of the participants. VIPSec also does not rely on a public key infrastructure (PKI), which can be costly and complex to maintain and secure. VIPSec can be easily integrated with existing synchronous e-learning systems without affecting their performance or functionality. This makes it scalable and deployable for the

participants, as they can use it with any number of peers and any existing system without any additional overhead or hassle.

Consequently, VIPSec can be a useful method for enhancing the security of LMSs, as it can address some of the common security challenges that LMSs face, such as:

Account Breaches: LMSs store sensitive information about learners, instructors, courses, and assessments. If an attacker gains access to a user account, they can steal or tamper with this information, or impersonate a legitimate user. VIPSec can prevent account breaches by using biometric-based authentication and voice verification. VIPSec does not require passwords or PINs, which can be forgotten, stolen, or guessed. Instead, VIPSec uses the user's voice or face as a unique identifier that is hard to forge or copy. VIPSec also uses liveness detection to ensure that the user is alive and present at the time of authentication, and not using a recorded or synthesized voice sample.

Data Interception: LMSs transmit data over the network, such as voice, video, text, and files. If an attacker intercepts this data, they can eavesdrop on the communication, or modify or delete the data. VIPSec can prevent data interception by using end-to-end encryption of the session data using a secret key derived from the token. The secret key is unique for each session and each pair of peers. The secret key is never transmitted over the network, so it cannot be intercepted or stolen by attackers. VIPSec also does not rely on a public key infrastructure (PKI), which can be vulnerable to man-in-the-middle attacks or other compromises.

Denial-of-Service Attacks: LMSs depend on the availability and performance of the network and the servers to deliver the learning content and services. If an attacker launches a denial-of-service attack, they can overload the network or the servers with malicious traffic, causing them to slow down or crash. This can disrupt the learning process, affect the user experience, or damage the system. VIPSec can prevent denial-of-service attacks by using a challenge/signature token to establish the session. The token is a random string of characters that is encrypted with a user-specific key derived from their biometric features, such as voice. The token is then sent to the other peer through a secure channel. The token acts as a filter that blocks any unauthorized or malicious requests from reaching the network or the servers. VIPSec also uses voice verification to confirm the integrity of the token and the identity of the peers. VIPSec can ensure the availability and performance of the LMS by preventing unauthorized or malicious traffic from accessing the system.

5. Conclusions

VIPSec is a valuable security technology that can help to enhance the security of synchronous e-learning systems. VIPSec can help to prevent Zoombombing, protect user data, improve user experience, and foster a more secure learning environment. As a result, VIPSec is a valuable security tool that can help to make synchronous e-learning systems more secure and user-friendly.

In addition to the benefits mentioned above, VIPSec can also help to:

Foster a More Secure Learning Environment. By making it more difficult for unauthorized users to join synchronous e-learning sessions, VIPSec can help to create a more secure learning environment for students and teachers.

Reduce the Risk of Data Breaches. By protecting user data from unauthorized access, VIPSec can help to reduce the risk of data breaches. This is especially important for organizations that collect sensitive data about their employees or students.

Improve Compliance With Data Privacy Regulations. By using VIPSec to protect user data, organizations can help to demonstrate compliance with data privacy regulations such as GDPR and CCPA.

Overall, VIPSec is a valuable security technology that can help to enhance the security of synchronous e-learning systems. VIPSec can help to prevent Zoombombing, protect user data, improve user experience, and foster a more secure learning environment. As a result, VIPSec is a valuable security tool that can help to make synchronous e-learning systems more secure, more user-friendly, and of course, more reliable, and trustworthy for online education and collaboration.

References

- [1] OECD (2021). *The State of School Education: One Year into the COVID Pandemic*, OECD Publishing, Paris.
- [2] Trueman C. (2020). *Pandemic leads to surge in video conferencing app downloads*. Needham, Computerworld.
- [3] Synchronous learning. (2023, March 10). In *Wikipedia*.
https://en.wikipedia.org/wiki/Synchronous_learning
- [4] Mayadas, F (March 1997). "*Asynchronous learning networks: a Sloan Foundation perspective*", *Journal of Asynchronous Learning Networks*, vol. 1(1).
- [5] Zoom Video Communications (2023, July 24). In *Wikipedia*.
https://en.wikipedia.org/wiki/Zoom_Video_Communications
- [6] Zoom (software) (2023, July 24). In *Wikipedia*.
[https://en.wikipedia.org/wiki/Zoom_\(software\)](https://en.wikipedia.org/wiki/Zoom_(software))
- [7] Zoom. (2023). *COVID-19 Support*. Retrieved July 27, 2023 from <https://zoom.us/docs/en-us/covid19.html>
- [8] Cisco. *About Us*. <https://www.cisco.com/c/en/us/about.html>
- [9] Cisco Webex. (2023, March 23). In *Wikipedia*.
https://en.wikipedia.org/wiki/Cisco_Webex
- [10] Webex, *Essentials: Education Overview*, Essentials | Education Overview, Retrieved July 27, 2023 from <https://www.webex.com/webexremoteedu.html>
- [11] Nichols, M. (2008). *E-Learning in context*. E-Primer Series, vol. 2869(1), pp. 1-2.
- [12] Tamm, S. (2023, January 11). *What is the Definition of E-Learning?*. E-student.
<https://e-student.org/what-is-e-learning/>
- [13] Alwi, N.H.M., Fan, I.S. (2010). *E-Learning and Information Security Management*. *International Journal of Digital Society (IJDS)*, vol. 1, pp. 148-156.
- [14] Neal, L. (2003). *Expectations of Privacy: Data Collected In Class Should Not Be Misused*, *e-Learn*, vol. 2003(9), Art. No. 1.
- [15] Moneo J.M., Caballe S., Pneot J. (2012). *Security in Learning Management Systems*, *eLearning Papers*, Catalonia, Spain, Retrieved from www.elearningpapers.eu
- [16] Zoombombing (2023, July 17). In *Wikipedia*.
<https://en.wikipedia.org/wiki/Zoombombing>
- [17] Wakefield, J. (2020, April 2). *Zoom boss apologises for security issues and promises fixes*. <https://www.bbc.com/news/technology-52133349>

- [18] PCMAG. *How to Prevent Zoom-Bombing*. Retrieved 2023, July 27 from <https://www.pcmag.com/how-to/how-to-prevent-zoom-bombing>
- [19] Alwi, N. H. M., Fan, I. S. (2010). *Threats analysis for e-learning*, *International Journal of Technologically Enhanced Learning*, vol. 2(4), pp. 358371.
- [20] Weippl, E. R. (2005). *Security in e-learning*, Springer publication.
- [21] Graham, L., Metaxas, P. T. (2003). *Of Course It's True, I Saw it on the Internet*, *Critical Thinking in the Internet Era*, Communications of the ACM, vol. 46(5), pp. 70-75.
- [22] Adams, A., Blandford, A. (2003). *Security and online learning: To protect or prohibit. Usability Evaluation of Online Learning Programs*, Ghaoui, Claude ed. Usability Evaluation of Online Learning Programs. UK: IDEA Publishing, pp. 331–359.
- [23] Hina, S., Dominic D.D. (2016). *Information security policies: investigation of compliance in universities*, 2016 3rd International Conference on Computer and Information Sciences (ICCOINS). Piscataway: IEEE, pp. 564-569.
- [24] Neumann, P. G. (1994). *Computer related risks*. Addison-Wesley Professional.
- [25] Computer security (2023, July 24). In *Wikipedia*.
https://en.wikipedia.org/wiki/Computer_security
- [26] Meier, J. D., Mackman, A., Vasireddy, S., Dunner, M., Escamilla, R., Munikan, A. (2003). *Improving Web Application Security: Threats and Countermeasures*, Microsoft Press.
- [27] Man-in-the-middle attack (2023, July 25). In *Wikipedia*.
https://en.wikipedia.org/wiki/Man-in-the-middle_attack
- [28] Seals, T. (2022, May 25). Zero-Click Zoom Bug Allows Code Execution Just By Sending a Message, *DARK Reading*. <https://www.darkreading.com/application-security/zero-click-zoom-bug-allows-remote-code-execution-by-sending-a-message>
- [29] Cisco Security Advisory (2021, July 15). *Cisco Intelligent Proximity SSL Certificate Validation Vulnerability*.
<https://sec.cloudapps.cisco.com/security/center/content/CiscoSecurityAdvisory/cisco-sa-proximity-ssl-cert-gBBu3RB>
- [30] Schneier, B. (1996). *Applied Cryptography: Protocols, Algorithms, and Source Code in C*, John Wiley & Sons, ISBN 978-1-119—09672-6.
- [31] Mutual authentication (2023, June 14). In *Wikipedia*.
https://en.wikipedia.org/wiki/Mutual_authentication
- [32] *Improving Web Application Security: Threats and Countermeasures*, 1st Edition, Microsoft Press, (2003). ISBN: 0735618429.

- [33] Kopsidas, S. et al, *Voice Interactive Personalized Security Protocol: Definition and Security Analysis*, IEEE Conference Publication, IEEE Xplore
<https://ieeexplore.ieee.org/document/4371621/>
- [34] Kopsidas, S. et al, *Voice Interactive Personalized Security (VoIPSEC) protocol: Fortify Internet telephony by providing end-to-end security through inbound key exchange and biometric verification*, IEEE Conference Publication, IEEE Xplore
<https://ieeexplore.ieee.org/document/4178383/>

Contact email: spyros@uth.gr

Means of Expression of Metaphorical Thinking in Primary School Lithuanian Language Textbooks

Vaida Padgurskytė, Vilnius University Šiauliai Academy, Lithuania
Daiva Malinauskienė, Vilnius University Šiauliai Academy, Lithuania

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The development of metaphorical thinking occupies a significant place in the process of holistic (total) education of the personality. The development of children's metaphorical thinking is a current issue that opens up new opportunities for scientific and practical researches in the field of cognitive potential of childhood; therefore it is especially important that this education begins as early as possible in both formal and informal environments. The aim of the study is to analyze the means of expression of metaphorical thinking in primary school Lithuanian language textbooks. Having analyzed the literature of Lithuanian and foreign authors and the qualitative analysis of the content of primary school Lithuanian language textbooks, can be stated that the development of metaphorical thinking is an important criterion in the education of primary schoolers. The development of metaphorical thinking in primary classes takes place consistently and systematically – new words / phrases are presented; figurative words/phrases; thoughts that can be expressed indirectly; international words are used. The means of artistic expression, which are abundant in primary school textbooks, are one of the forms of expression of metaphorical thinking. In conclusion, it can be stated that the analyzed Lithuanian language textbooks for primary classes correspond to the 2022 updated concept of general education programs.

Keywords: Metaphorical Thinking, Primary Schoolers, Textbooks

iafor

The International Academic Forum
www.iafor.org

Introduction

In recent scientific literature, discussing the features of human thinking, metaphorical thinking is increasingly mentioned. However, in the psychological, philosophical, pedagogical, etc. literature of the scientific fields, there is still no universally accepted description of metaphorical thinking, but there are several concepts that define metaphorical thinking as cognitive activity (metaphor, metaphorical process, metaphorical abilities, metaphorical abilities, metaphoricality) (Malinauskienė, 2011). Scientists also give different interpretations of metaphorical thinking. Metaphorical thinking shapes the meaning of the perception of different phenomena, and it is also argued that the result of the development of metaphorical thinking is the formation of critical thinking (Alfayez, 2022). With the help of metaphors – visual, written, linguistic symbols, it is possible to convey several meanings that we can interpret in different ways. Most likely, we will not find a single point of view and direction of interpretation. Each of us thinks differently, we can discover much more expressions of interpretations in a language.

Metaphorical thinking is associated with students' learning possibilities, which determine the mentee's ability to relate concepts/statements with experiences outside the school environment, therefore it can be said that the regular application of metaphorical thinking practices in teaching and learning processes stimulates the abilities of systematization and processing of information ("Lapaas Digital," n.d.). The use of symbolic meanings in practice indicates the gradual development of linguistic abilities and intelligence, which depends on the experience, environment, period of development of children, therefore, active involvement of educators and family members is necessary (Balut, 2021). According to Malinauskienė (2011), metaphorical thinking becomes especially important in the school environment, since there are situations when children's abilities to distinguish essential qualities are required and transfer them according to similarity from one object to another, from one cognitive sphere to another, the ability to move from specific to abstract, from figurative to conceptual, from imagination to thinking in concepts. In today's educational reality, children's abilities to critically assess problems, apply symbols and associations to express thoughts, to metaphorize various texts, which are abundant in educational content, are of great importance. The expression of metaphorical thinking with the help of metaphors in educational content stimulates children's creativity, helps to develop critical thinking, develops imagination, because it combines feelings, experiences, and knowledge, helps to specify complex learning constructs, concepts, easier to understand and empathize. According to Malinauskienė (2011), metaphorical thinking is related to students' abilities to move from concrete to abstract, i.e., by interpretive abilities to relate concepts, phenomena with existing experiences and create new knowledge and experiences outside the already familiar environment. Thus, the results of the expression of metaphorical thinking: the ability to critically evaluate and creatively solve problems, the ability to distinguish the essential properties of a thing or attribute and transfer them according to similarity, the ability to systematize and process information during the transition from images to concepts, from concrete to abstract, etc. These skills are extremely important for primary schoolers and must be developed in both formal school's environment and informal setting.

As changes take place in the Lithuanian education system, general education curricula (2022) are being updated and textbooks on subjects taught in the general education curricula are being updated at the same time. However, it should be noted that textbooks have long been the main teaching tool, today it is becoming only one of them (National Agency for Education, 2022). The updated Program of the Lithuanian language and literature (2022)

distinguishes abilities that are attributed to primary school students: to enrich the language with new words, expressions, words of figurative meaning and international words; find picturesque words, phrases in the text and explain their meaning/ purpose; to recognize and explain thoughts expressed indirectly, to argue why such means of expression were chosen; also, in order to understand the text as the whole message, attention is paid to the illustrations, the structure of the text and other relevant information. In the description of the development of the competences of the updated general education curricula (2022), one of the expected results of cognitive competence is the development of critical and metaphorical thinking, which is recognized and evaluated when the same information is presented in different contexts and interpreted differently. In textbooks, the educational material will be updated and adapted to achieve the goals and objectives set out in the programs, to help develop the essential subject and general competencies and achievements of students provided in them, and to perform the defined learning content. (National Agency for Education, 2022).

Methods


In the course of the empirical study, scientific literature, informational sources were analyzed, in which the importance of the expression and education of metaphorical thinking was emphasized. To achieve the goal of the study, a qualitative research strategy was applied. A content analysis of primary school Lithuanian language textbooks was carried out. Lithuanian language textbooks for the analysis were chosen, which are used for students of the first, second, third and fourth grades.

The main criteria for analyzing textbooks of the Lithuanian language have been identified:

- (1) Textbook structure, content.
- (2) Means of artistic expression (new words, expressions, figurative meanings and international words, figurative words and phrases presented in the text; to recognize and explain indirectly expressed thoughts).
- (3) The results of the analysis are the number of artistic means of expression presented.

Results

The results of the analysis of the 1st grade Lithuanian language textbook "TAIP" by Dailidėnienė, Jakavonytė-Staškuvienė and Kasperavičienė (2017) (Figure 1).

	
<i>The structure of the textbook</i>	<i>4 units – 45 topics</i> Creating a dialogue; listening to the recording; creation of stories according to presented situations; answers to the questions posed; text comprehension tasks

<i>Means of artistic expression (with examples)</i>	<p>Picturesque words/phrases (metaphors): January sits on the throne of snow; play white games; fluff bedding.</p> <p>New words: juggler; alphabet; lettering; fed up; slumber; density; storm; brisk; oak; swell; buddy; cupcake; bog; goose; gosling; dive; subdue; hut; bottom; chew; delicious; snoring; single-family; allure; rinse; homeland; diffuse; buddy.</p> <p>International words: coat of arms; regatta.</p> <p>Implicitly expressed thoughts: spring changes every day; house of pimps.</p>
<i>Findings</i>	38 means of artistic expression.

Figure 1. 1 Class Textbook

This Lithuanian language textbook for grade 1 consists of: 4 chapters and 45 topics. The 1st grade Lithuanian language textbook "TAIP" contains 38 means of artistic expression. The textbook in the "TAIP" series focuses on the categories of new words and figurative concepts/phrases – examples of new words: "<... > juggler; alphabet; slumber; density; storm; brisk; oak; swell; goose; Gosling; Dive; subdue <... >" end etc. Examples of figurative phrases/words category: "<... > January sits on the throne of snow; play white games; fluff bedding <... >" The textbook also contains international words, such as: "<... > coat of arms; regatta <... >"

The results of the analysis of the 1st grade the newest Lithuanian language textbook by Correia, Šliumkienė and Žukas (2023) (Figure 2).


	
<i>The structure of the textbook</i>	<p>3 unit - 42 topics</p> <p>Complex texts are voiced; reading tasks; tasks of perceiving the text; "Owl's Tasks" – tasks of a more difficult level; highlighting the most important statements; visualizations in the text, if the child has difficulties to read; digitized task content for each topic is provided.</p>
<i>Means of artistic expression (with examples)</i>	<p>New words: to urge; wallow-log; click-crunch; translated head-mischievous; squealing – howling, crying; run.</p> <p>Picturesque words/phrases: "I pull down the street"; by no means; rules of life; a thought came to mind; the bird scolds beetles.</p> <p>Implicitly expressed thoughts: a dark teacher; pure truth.</p>
<i>Findings</i>	14 means of artistic expression.

Figure 2. 1 Class Textbook

The latest 1st grade Lithuanian language textbook "Lithuanian Language" consists of 3 chapters and 42 topics. It should be mentioned that this learning tool will reach primary school students in September 2023. After analyzing the latest textbook on Lithuanian language, was noticed that the authors, while presenting the structure of the textbook, distinguished the following categories, which are attributed to the criteria for the development of metaphorical thinking – highlighting the most important statements and visualizations of the text, which help to better understand the symbolic / figurative meanings of the text and words. The 1st grade Lithuanian textbook contains 14 means of artistic expression, of which new words: "<... >to urge; wallow-log; squealing-howling <... >" end etc. Examples of picturesque words/phrases: "<... >rules of life; a thought came to mind; the bird scolds beetles<... >". Words with a figurative meaning, which we express in the following phrases have been also discovered: "<... > a dark teacher; pure truth <... >"

The results of the analysis of the 2nd grade Lithuanian language textbook by Dailidėnienė, Jakavonytė-Staškuvienė and Kasperavičienė (2017) (Figure 3).

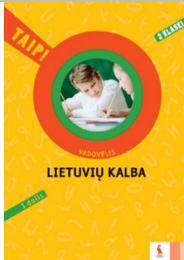
	
<i>The structure of the textbook</i>	<i>3 units – 46 topics</i> Tasks that encourage self-assessment; tasks of perceiving the text; audio recordings according to the questions posed; the section "Remember" will help you to get to know the Lithuanian language better ; tips on how to read texts; tasks that help to learn not only new words, expressions, but also their proper use (The basics of metaphorical thinking).
<i>Means of artistic expression (with examples)</i>	Picturesque phrases/words: book houses; "in the open air"; the country of the book; "like two big pea eyes"; wet eyes; not that's the price. New words: curious; haze; farm; užynė is the oldest Lithuanian word; fictions; sandals; sledgehammer; Linas-Rope; blanched – white, fizzle; to stumble – to slowly go; gurgle – pinecone; fox-leafworm; spy –snout; wick – candle thread. Implicitly expressed thoughts: the book is like a beacon; the leaves of the book are like wings; signpost – lighthouse; squinted his eyes – he looked; picture- take pictures; pointed-eyed – observant; buzz-mood.
<i>Findings</i>	35 means of artistic expression.

Figure 3. 2 Class Textbook

The 2nd grade Lithuanian language textbook "TAIP" consists of 3 chapters – 46 topics. Studying the structure of the textbook presented by the authors, the basics of the elements of the development of metaphorical thinking was noticed: the section "Note" will help to get to know the Lithuanian language better, and in the presented tasks, after which not only new words and expressions are learned, but also the proper use of those words / expressions is

presented. The textbook for grade 2 presents 35 means of artistic expression. For example, new words include: "<... > *curious; haze; sandals; fizzle; to stumble – to slowly go <... >*" and etc. Examples of implicitly expressed thoughts: "<... > *the book is like a beacon; leaves of the book are like wings <... >*" and others.

The results of the analysis of the 3rd grade Lithuanian language textbook by Banytė, Kuzavinienė and Vyšniauskienė (2018) (Figure 4).

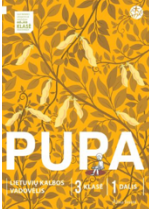
	
<i>The structure of the textbook</i>	<i>3 units- 27 topics</i> Learn to listen; Learn to speak; Learn to read; Learn to write and create; Learn to self-assess.
<i>Means of artistic expression (with examples)</i>	Picturesque words/phrases: "spider maps"; "science virus." New words: karklas/Karklyn (tree); rainstorms; silk wool; embers; thrashing; white-tailed; Bushes; puppet; glove dolls; finger dolls; dundule – thunder; colic; apostasy. International words: biography; photography; history; geography; atmosphere; crater; dome; reportage; purpura; professor; laboratory; epidemic; chemistry; object; process; graph; diagram; editor; autobiography; procession; muskrat; route; Altar; philosophical; parasite.
<i>Finding</i>	<i>41 means of artistic expression.</i>

Figure 4. 3 Class Textbook

The 3rd grade Lithuanian language textbook "PUPA" consists of 3 chapters and 27 topics. The 3rd grade Lithuanian language textbook "Pupa" contains even 41 means of artistic expression. Most of the means of artistic expression consisted of international words, such as: "<... > *biography; laboratory; reportage; editor; route; parasite <... >*" and etc. Also, a significant part of the artistic means of expression consisted of words with new meaning, for example: "<... > *glove dolls; silk wool; embers; white-tailed <... >*" and others.

The results of the analysis of the 4th grade Lithuanian language textbook by Dailidėnienė, Jakavonytė- Staškuvienė and Kasperavičienė (2019) (Figure 5).


	
<i>The structure of the textbook</i>	<p><i>3 units – 43 topics</i></p> <p>Tasks and questions for the development of various reading abilities; in several ways the text is presented; explanations of unknown and less frequently used words; storytelling scheme; tasks for those who know how to create interesting stories; questions to find out if the narrative is based on the scheme; problematic issues; tasks that encourage the study of the meanings of the word. (Developing metaphorical thinking)</p>
<i>Means of artistic expression (with examples)</i>	<p>Picturesque words/phrases: "To heart and lips, do not cease to repeat"; "On straight streets, in four-sided houses, there was no place left for them (secrets)"; "That's how it came out — the two of them, getting ahead of the cities, not stopping where the meadows, the restless waters, are still there."</p> <p>Implicitly expressed thoughts: sonorous speech; gentle speech; smirked – slowly walked; posturing is to have fun telling; smirked – worried.</p> <p>International words: Delta; association.</p> <p>New words: centipede; spit; sea; horn; ornithologist; unique; peninsula; oops; pasteurized; newspaper; volunteer.</p>
<i>Findings</i>	<i>30 means of artistic expression.</i>

Figure 5. 4 Class Textbook

The 4th grade Lithuanian language textbook "TAIP" consists of 3 chapters and 43 topics. After reviewing the structure of the textbook presented by the authors, the elements of the development of metaphorical thinking - unknown and less frequently used words, their explanation and tasks that encourage the study of the meanings of words were noticed. The 4th grade Lithuanian language textbook contains of 30 means of artistic expression. The most common means of artistic expression are picturesque words/phrases, for example: "<... > *To heart and lips, do not cease to repeat*"; "*On straight streets, in four-sided houses, there was no place left for them (secrets)*"; "*That's how it came out — the two of them, getting ahead of the cities, not stopping where the meadows, the restless waters, are still there.*" "<... >". The 4th grade textbook "TAIP" also contains new words that are still little known to children, for example: "<... > *spit; centipede; horn, newspaper; volunteer* <... >" end etc.

Conclusion

The change in the general curricular has led to the need and possibilities for the updating of teaching and learning tools – textbooks. The aim is to properly implement the curricular defined in the general curriculum and to develop students' competences. The development of metaphorical thinking in primary classes takes place consistently and systematically – using various artistic means of expression that respond to the Lithuanian national, artistic, cultural

context and introducing international words that expand and activate primary schoolers vocabulary and perception. Summarizing the insights of scientists and the results of the analysis of textbooks of the Lithuanian language, can be stated that the development of metaphorical thinking is a very important criterion in the education of primary schoolers. The means of artistic expression, which are abundant in primary school textbooks, are one of the forms of expression of metaphorical thinking.

References

- Alfayez, A. F. (2022). Saudi Female Teachers Identify Through the Use of Metaphors. *Arab World English Journal*, 13(3), 139-158. <https://dx.doi.org/10.24093/awej/vol13no3.9>
- Banytė, J., Kuzavinienė, D., Vyšniauskienė, V. (2018). *PUPA Lietuvių kalbos vadovėlis 3 klasei, I dalis*. Alma Littera.
- Bulut, A. (2021). Investigation of Metaphorical Perceptions of Preschool Teachers on the Concept of Language Development. *International Journal of Research in Education and Science*, 7(2), 351-366. <https://doi.org/10.46328/ijres.2126>
- Correia, A., Šliumkienė, G., Žukas, S. (2023). *Lietuvių kalba vadovėlis, I dalis*. Baltos lankos.
- Christopher Roosen (2022, January 31). *Adventures in the Designed World*. <https://www.christopherroosen.com/blog/2022/1/31/metaphors-for-learning-and-teaching>
- Dailidėnienė, V., Jakavonytė-Staškuvienė, D., Kasperavičienė, N. (2019). *TAIP serija, Lietuvių kalba 4 klasei I dalis*. Šviesa.
- Dailidėnienė, V., Jakavonytė-Staškuvienė, D., Kasperavičienė, N. (2017). *TAIP serija, Lietuvių kalba 1 klasei I dalis*. Šviesa.
- Dailidėnienė, V., Jakavonytė-Staškuvienė, D., Kasperavičienė, N. (2017). *TAIP serija, Lietuvių kalba 2 klasei I dalis*. Šviesa.
- Lapaas Digital (n.d.). *Metaphorical thinking – Express Ideas and Solve Problems*. <https://lapaas.com/metaphorical-thinking-express-ideas-and-solve-problems/>
- Malinauskienė, D. (2011). Vaikų metaforinio mąstymo raiška kognityvinės raidos kontekste. *Pedagogika*, 101, 57-62.
- National Agency for Education. (2022, December 05). *Bendrojo ugdymo dalykų vadovėlių, išleistų 2008-2022 metais, apžvalga*. https://www.emokykla.lt/upload/EMOKYKLA/vadoveliu/AKTUALIJOS_vadoveliai/Vadov%C4%97li%C5%B3%20ap%C5%BEvalga%202008_2022%20m._2022%2012%2005%20virselis%20red%20pv.pdf
- National Agency for Education. (2022, March 22). *Priešmokyklinio, pradinio, pagrindinio ir vidurinio ugdymo programų, Kompetencijų raidos aprašas*. https://www.emokykla.lt/upload/EMOKYKLA/BP/2022-03-10/1%20priedas.%20Kompetencij%C5%B3%20raid%C5%A1as_04-22.pdf

Contact email: vaida.padgurskyte@sa.vu.lt

Automatic Formative Assessment of Programming Tasks

Janet Liebenberg, North-West University, South Africa

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The onset of Covid-19 has impacted educational processes, particularly assessment, in a way never seen before. Automatic Programming Assessment (APA) can be unfair and inaccurate when used for summative assessment. This paper aimed to investigate to what extent the students had to adapt to automatic assessment and to determine the value of APA as a formative assessment tool. During a practical session in the computer lab, seven tasks were assigned to the students. The tasks resembled a step-by-step guide for writing a complete program that takes a user-specified number of integers, determines the minimum and maximum of these values, and performs calculations involving the minimum and maximum. The code that the students had written was uploaded to the APA system, allowing students to resubmit their work and improve their solutions as they went along. The analysis included marks per task, final marks of students, number of uploads per task, and the total number of uploads per student. General trends of these metrics were also observed. It was established that the majority of the students could successfully complete small programming tasks when re-acting to about two feedback comments per task. APA systems can be instrumental in supporting learning and are useful as a formative assessment tool. As a result of this study, we can point the way to develop systems which are smarter and more flexible.

Keywords: Automatic Assessment, Introductory Programming, Formative Assessment

iafor

The International Academic Forum
www.iafor.org

Introduction

The onset of Covid-19 has impacted educational processes and particularly assessment in a way never seen before or imagined. Education systems across the globe have responded to the Covid-19 induced disruptions in the manners mediated by their contexts. In previous research, it was found that Automatic Programming Assessment (APA) can be unfair and inaccurate when used for summative assessment (Liebenberg & Pieterse, 2018; Pieterse & Liebenberg, 2017; Ullah et al., 2018). However, APA may show potential for formative assessment purposes. What makes APA very appealing for formative assessment is the fact that it allows instant feedback to support real-time learning. This research aimed to investigate to what extent the students had to adapt to automatic assessment and to determine the value of APA as a formative assessment tool.

Related Work

Automatic Assessment

Automatic program assessment systems have been used for more than 50 years (Douce, Livingstone, & Orwell, 2005). In a review of APA systems by Ihantola, Ahoniemi, Karavirta, and Seppälä (2010), developed in the period 2006 to 2010, it was observed that APAs are mainly used in programming contests and introductory programming courses. A tremendous number of tools and systems for APA have been developed (Ullah et al., 2018). Mekterović, Brkić, Milašinović, and Baranović (2020) and Cipriano, Fachada, and Alves (2022) remark that APA systems are rarely used outside the institutions in which they are developed and cite a number of systems which are not available or have not been updated in a long time.

Many benefits of applying automatic assessment of programming assignments have been reported. Automatic assessment is bound to be consistent and objective (Arifi, Abdellah, Zahi, & Benabbou, 2015; Staubitz, Klement, Teusner, Renz, & Meinel, 2016), enables rapid feedback (Arifi et al., 2015; Liu et al., 2016; Ullah et al., 2018), and allows students to submit multiple improved versions of the programs they have written (Del Fatto et al., 2017; Staubitz et al., 2016). It can play a motivational role to engage students in the educational process (Šťastná, Juhár, Biñas, & Tomášek, 2015; Staubitz, Klement, Renz, Teusner, & Meinel, 2015). The most appealing benefit seems to be the possibility of saving time (Ullah et al., 2018). This comes as no surprise as it has been reported that assessment is one of the most often mentioned tasks that lecturers find burdensome (Pieterse & Sonnekus, 2003). Del Fatto et al. (2017) report how they effectively saved time when using a system, which can automatically identify correct code, reducing manual assessment to involve only code, which contains errors.

Staubitz et al. (2015) describe a number of challenges associated with applying automatic assessment of programming tasks. Ullah et al. (2018) mention the problem that many APA systems suffer from inflexibility and unfair grading. An important challenge, which is often overlooked, is that considerable time and effort need to be devoted to the implementation of resources for automated assessment (Ala-Mutka, 2005; Pieterse, 2013; Pieterse & Liebenberg, 2017; Watanobe, Rahman, Rage, & Penugonda, 2021). Another problem is that the development of new exercises often requires considerable technical skills beyond the scope of the content being assessed (Korhonen & Malmi, 2000; Pieterse, 2013). To address this problem Solms and Pieterse (2016) and Ullah et al. (2018) call for standardization.

Combéfis and Schils (2016) point to the complexity of being able to provide sensible feedback as it is nearly impossible to anticipate all errors that can occur in novice programs and to have test cases to identify each of the anticipated errors. They propose similarity clustering to improve the accuracy of feedback. Lepp et al. (2016) report that the design of automatically assessed exercise tests was one of the most difficult challenges they faced when applying a Moodle plug-in VPL for automatic assessment of programming assignments.

When using an APA system, educators should keep the reasons for assessment in mind and also guide their students to appreciate these goals in order to gain the most value from the assessment.

Assessment Goals

Tew and Guzdial (2010) suggest that there is no agreement on what constitutes valid measures of student learning in computing. Researchers speculate that students' poor performance may be indicative of inaccurate measures of their ability and knowledge (Lister, 2010; Tew & Guzdial, 2010). Often Bloom's cognitive taxonomy (Battestilli & Korkes, 2020; Bloom & Committee of College and University Examiners, 1964; Thompson, Luxton-Reilly, Whalley, Hu, & Robbins, 2008; Ullah et al., 2019) or The Structure of the Observed Learning Outcome (SOLO) taxonomy (Biggs & Collis, 1982; Petersen, Craig, & Zingaro, 2011) are used to determine the assessment goals of questions asked to evaluate the programming competence of students.

The assessment of programming tasks is classified into three categories according to the assessment goals of the measure of student skills and understanding of programming tasks namely structural, functional and conceptual.

Structural: A structural evaluation may include scrutiny of syntactical constructs and compliance with coding standards. These aspects are usually achieved through manual inspection. However, some authors have endeavoured to automate aspects of the structural assessment of programs (Ala-Mutka, Uimonen, & Jarvinen, 2004; Ali, Shukur, & Idris, 2007). Parsons and Haden (2006) developed a drill and practice computer game for mastering syntax constructs. The game itself serves as a formative assessment of mastering these constructs and the scores of students when playing the game, can be used for summative assessment of the skills and knowledge of students regarding structural aspects of programs.

Functional: The assessment of the functional correctness of a program written by a student can be achieved through the execution of the program using well-designed test cases (V Pieterse, 2013). Functional correctness may include the evaluation of aspects such as efficiency and proper memory management such as avoiding memory leaks (Ala-Mutka, 2005). These may be measured using popular profiling tools such as Valgrind1, Pin2 and Dr. Memory3. The automation of the functional correctness of programs is commonplace (Arifi et al., 2015; Ihantola et al., 2010), and according to Tirronen and Tirronen (2016), modern techniques can practically ensure the functional correctness of student solutions.

Conceptual: Evaluating the programming accomplishments of students on a conceptual level is probably the most difficult of the assessment goals to achieve. It is common to evaluate this using code reading questions or questions asking definitions or explanations in written exams (Petersen et al., 2011). Visual programming environments such as Scratch (Resnick et

al., 2009) and Alice (Dann, Cooper, & Pausch, 2008) can be used to promote conceptual understanding. The evaluation of conceptual aspects when assessing programs written by students is, however, not easy to automate (Posavac, 2015).

Formative Assessment

Formative assessment or Assessment for learning aims at monitoring student learning to provide ongoing feedback that can aid in identifying students' strengths and weaknesses in order to improve student attainment (Black & Wiliam, 2009). Ideally, in programming assessment, one should aim to take the whole spectrum of student achievement namely the students' structural, functional and conceptual understanding of the work into account when assessing their programs. Although an automated assessment system is less suitable for summative assessment, it shows promise for formative assessment of programs written by students during their practical lab sessions – especially monitoring the performance of students and improving their programming ability over time (Ho, Chean, Chai, & Tan, 2019). Automated assessment can reduce educators' effort, besides benefiting students with immediate feedback. Good and immediate feedback is one of the key components of learning programming (Lokar, 2019).

Battestilli and Korkes (2020) found that it takes students more submission attempts in the APA when they are given questions that contain some starter code, than when they have to write their solution from scratch. However, when writing code from scratch, the students' code quality can be impaired because the students are not required to actually understand the concept being tested and might be able to find a way to bypass or hack the tests of the APA.

Zingaro, Petersen, and Craig (2012) state that traditional code-writing exam questions seem to require in addition to a mastery of several concepts, the ability to design with or synthesize those concepts. As a result, students obtain marks for peripheral code in addition to code that satisfies the aim of the question and the mark awarded may therefore not alert students to core misconceptions. Zingaro et al. (2012) propose that single-concept questions - questions targeting one concept, or adding one concept over a previous concept question - are more effective formative feedback tools.

Tirronen and Tirronen (2016) saw how insufficient feedback, such as complicated compiler error messages or mere pass/fail feedback can hinder student progress. However, it is possible to induce positive behaviour with formative feedback.

Methodology

Scenario

The study was carried out at a South African university. A convenience sample of 187 first-year students enrolled in a Java programming course in the second semester made up the participants.

Prior to the study's session, the students completed an assignment during the seven weekly practical lab sessions while they could seek assistance and feedback from the tutors and lecturer. Following completion of the task, a student submitted the program for manual assessment by a tutor.

Data Collection

The assignment that served as the source of the data for this study was automatically evaluated by the APA system (APAS) Fitchfork, which uses dynamic testing-oriented assessment. The system runs the student's solution against a number of test inputs, checking the results against a regular expression that specifies the expected results for each test input. This method has two significant drawbacks: it requires a working program, and the test cases that are selected for evaluation may reduce the effectiveness of the evaluation.

Seven tasks were assigned to the students. During the session, the code that the students had written was posted to the APAS. It was assumed that they would complete the tasks in the prescribed order, which resembles a step-by-step guide for writing a complete program that takes a user-specified number of integers, determines the minimum and maximum of these values, and performs calculations involving the minimum and maximum. Table 1 summarizes the seven tasks.

Table 1: The seven tasks

Task Nr	Task Name	Max marks
1	Input	4
2	Loop	9.5
3	MinMax	12
4	getSum	2
5	getDiff	3
6	getQuo	4
7	Main	6

Task 1 as Example

To complete the first task, the students had to create a simple program that would ask the user for an integer number and then display that value in an output statement. A single test case was used to assess the task. Table 2 displays the feedback for projected output lines created by the student programs.

```
Enter an integer: 9
You entered 9
That's all folks!
```

Figure 1: Expected output for Task 1

Table 2: Assessment of Task 1 with test value = 5

Line	Possible output	Message	Mark (max)
1	Enter an integer: Other	PASS prompt line FAIL The prompt should end with a colon and a space	1 (1) 0 (1)
2&3	You entered 5 That's all folks! You entered: 5 That's all folks! 5 Other	PASS output line FAIL Program output line 2 should NOT contain a colon FAIL The input should be on the same line as the prompt FAIL The acknowledgement line is missing FAIL User input	3 (3) 2 (3) 1 (3) 1 (3) 0 (3)

Analysis

The uploaded files were downloaded after the students completed the assignment. The uploaded files as well as the marks and feedback that was given to students were analysed. The quantitative analysis included marks per task, final marks of students, number of uploads per task, and the total number of uploads per student. General trends of these metrics were also observed.

Results and Discussion

First Encounter

The way students participated in the first task was investigated in order to determine to what extent the students had to adapt to automatic assessment, as this was their first encounter with an APAS.

Figure 2 shows the number of students in three categories namely, file naming errors, other errors and no errors. Of the 184 students who attempted this task, only 128 (69.57%) completed the task successfully on their first attempt. Since this task is very easy, it is alarming that 56 (30.43%) of the students encountered problems when attempting this task.

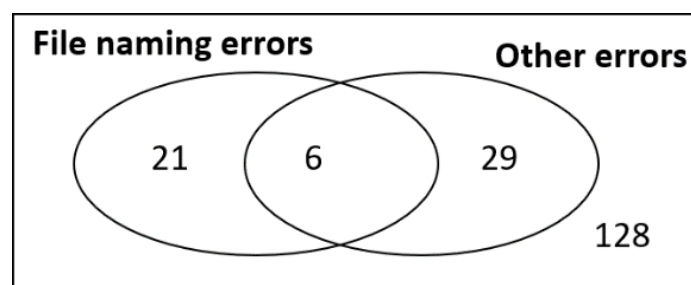


Figure 2: Types of errors in the first task (n=184)

Analysis of the types of errors made by the students who were unsuccessful on their first attempt to get full marks for the task reveals that 27 (14.67%) saved their solutions using a file name other than the prescribed name at some stage. Under manual assessment, this kind of error would have no ill effect. Yet under automatic assessment, this error causes Fitchfork

to fail, as the name of the file that is automatically compiled, executed and evaluated is key to the assessment of the code. If the file name is wrong the code is not assessed.

Further analysis of the submissions of the 35 (19.02%) students who made mistakes other than file naming errors revealed only three types of errors:

1. Uploading in the wrong slot: The solution to each task had to be uploaded to the designated upload slot which is specifically configured to assess the given task. Since there were seven tasks, there were seven different upload slots. Students can easily by accident just pick the wrong slot.
2. Compiler errors: If the student code does not compile, it cannot be executed and evaluated, leaving the student with zero marks for the specific task.
3. Layout errors: In order to simplify the memo specifications, a coding convention was adopted that required command line prompts to end with a colon and the input value to be typed on the same line as the prompt. Also, program output, other than prompts, should not contain colons. The students who violated this convention got feedback pinpointing this specific violation and corrected their transgression in their subsequent uploads.
4. All errors students encountered when uploading their solutions to the first task had to do with the limitations and quirks of Fitchfork.

Marks Distribution

The distribution of the total marks that were automatically awarded to the students while completing the assignment is shown in Figure 3. It can be seen that the bulk of the students was awarded more than 60% for the assignment and that the final mark for the vast majority of the students ($78 \div 187$) = 41.7% were in the category $92\% < x \leq 100\%$.

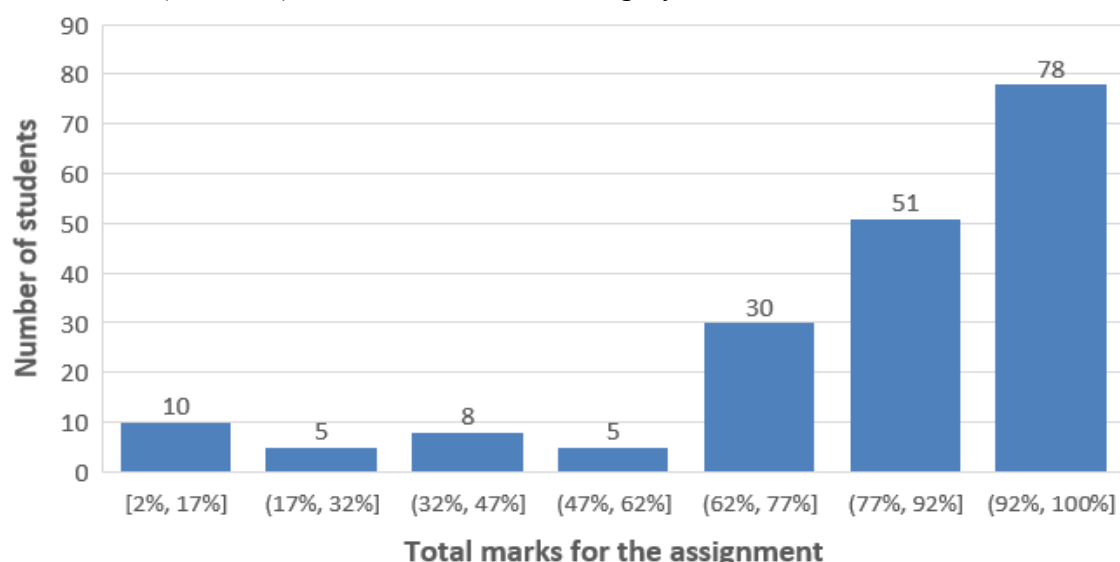


Figure 3: Distribution of marks (n=187)

When comparing this distribution with the distribution of automatically assigned marks by Matthíasdóttir and Arnalds (2015), the marks in our example show an obvious difference in the absence of high volumes of students being awarded very low marks. The same can be observed when comparing the distribution of marks reported by Liebenberg and Pieterse (2018) with the distribution of marks of our sample in Figure 3. This difference can be

attributed to the use of formative assessment and the option granted to students to resubmit their solutions to rectify their mistakes.

Number of Uploads

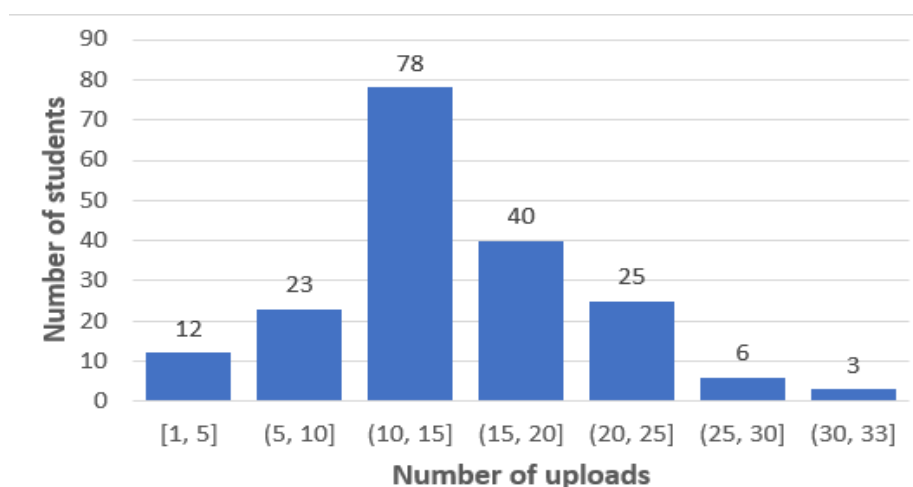


Figure 4: Distribution of the number of uploads (n = 187)

In Figure 4 the distribution of the total number of uploads for the assignment is shown. There were seven tasks and at least one upload per task was required to complete the assignment. The histogram is showing an almost normal distribution, slightly skewed to the left and having a peak in the number of students who uploaded between 10 and 15 times.

Bottom 18 Students

There were 18 students who had 10 or fewer uploads and achieved low marks. All but one did not complete all the tasks. They completed an average of 2.4 tasks and their average mark is 17.5%. The behaviour of these students represents that of non-committed students who often put in very little effort and just want to get out of the lab as soon as possible.

Careless or Effortless

Only two students uploaded exactly seven times with one upload per task. They obtained an average mark of 76.5%. Their behaviour might be similar to the abovementioned non-committed students, the only difference being they were able to complete most of the tasks correctly. They seemed to be careless about the tasks they did not complete correctly and probably did not even read the feedback.

Ninety-three students completed the assignment using between 9 and 15 uploads. Their average mark is 84.9% and 29% of them achieved 100%. The average number of uploads per task is 1.82. These students seem competent in terms of programming abilities, can follow instructions carefully and can successfully resolve problems based on the feedback.

Majority Group

There are 74 students in the category of students who used more than 16 uploads during the assignment. Three of them uploaded more than 30 times. The average mark of these 74 students is 85.1% and 24.3% of them achieved 100%. The average number of uploads per

task is 2.98. These students achieved on average slightly better than those discussed above, in terms of marks. They, however, needed more uploads to reach this achievement. These students may be less competent in programming than the previous category, yet they achieved good results. Since every upload is accompanied by feedback, pinpointing specific errors, they may have benefited from the feedback.

Conclusion

Despite this study being conducted before the pandemic, the rapid transition to remote emergency teaching and learning has accelerated the adoption of automatic assessment systems, particularly in the computing fields, leading to the widespread implementation of APASs.

Arguably, the most advantageous aspect of APASs is their ability to offer instant feedback. Unlike the situation where students had to wait for several minutes for a tutor to address their concerns, or even not receive feedback at all during the lockdown, all students utilizing the APAS in this lab session received feedback for each submission. This immediate feedback empowers students to make corrections to their programs and, in the process, facilitates their learning as they progress. The majority of the students uploaded about 3 times per task and managed to perform quite well. Their achievement might be explained by their learning from the feedback as intended with formative assessment.

The students who are used to manual assessment where they receive partial marks even if their programs do not compile are forced by Fitchfork to upload programs that do compile. This can be considered an educational benefit in terms of encouraging careless students to pay more attention to syntax and programming language features when writing their solutions. Based on our observations, students tend to be lax in following instructions, whereas the APAS demands meticulous attention to instructions. Consequently, the APAS presents valuable opportunities for students to hone their ability to pay attention to detail and follow instructions accurately. This skill holds particular significance in the field of IT.

The assessment done with Fitchfork is based only on the output of the student's solution. Sometimes a small deviation in the code can derail the whole assessment process. For example, a spelling error in a variable name can cause a compiler error resulting in Fitchfork being unable to assess the code. If the code was assessed manually, the assessor can give partial marks for the overall structure and algorithm used whereas automatic assessment awards zero in such cases. Furthermore, it is not possible to verify compliance with coding standards such as identifier names, indentation and comments, use of system constants, implicit and explicit type casting and types of loops used.

Since this was the students' first encounter with an APAS, we suspect that some of the problems mentioned above will get better over time as the students get acquainted with the system.

In this study, we established that the majority of our students managed to successfully complete small programming tasks using an average of about three tries per task. This means that they reacted about two times to feedback comments and improved their solutions towards the requirements for the task. Regrettably, we observed that there were cases where the feedback the students received was confusing and misleading. This is particularly true for cases where students' programs did not compile - this is not conducive to learning.

In light of the above-mentioned advantages and drawbacks of APASs in the context of post-pandemic pedagogy, we conclude that APASs may effectively support learning. APA systems can be instrumental in supporting learning and are useful as a formative assessment tool. As a result of this study, we can point the way to develop systems which are smarter and more flexible.

References

- Ala-Mutka, K. (2005). A survey of automated assessment approaches for programming assignments. *Computer Science Education*, 15(2), 83-102.
- Ala-Mutka, K., Uimonen, T., & Jarvinen, H.-M. (2004). Supporting students in C++ programming courses with automatic program style assessment. *Journal of Information Technology Education: Research*, 3, 245-262.
- Ali, N. H., Shukur, Z., & Idris, S. (2007). Assessment system for UML class diagram using notations extraction. *International Journal on Computer Science Network Security*, 7, 181-187.
- Arifi, S. M., Abdellah, I. N., Zahi, A., & Benabbou, R. (2015). Automatic program assessment using static and dynamic analysis. *Proceedings of the 2015 Third World Conference on Complex Systems (WCCS)*, 1-6.
- Battestilli, L., & Korkes, S. (2020). *Writing effective autograded exercises using Bloom's Taxonomy*. Paper presented at the 2020 ASEE Virtual Conference, Virtual conference.
- Biggs, J. B., & Collis, K. F. (1982). *Evaluating the quality of learning: The SOLO taxonomy (Structure of the Observed Learning Outcome)*: Academic Press.
- Black, P., & Wiliam, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation and Accountability (formerly: Journal of Personnel Evaluation in Education)*, 21(1), 5.
- Bloom, B. S., & Committee of College and University Examiners. (1964). *Taxonomy of educational objectives: The Classification of Educational Goals* (Vol. 2): Longmans, Green New York.
- Cipriano, B. P., Fachada, N., & Alves, P. (2022). Drop Project: An automatic assessment tool for programming assignments. *SoftwareX*, 18, 101079.
- Combéfis, S., & Schils, A. (2016). Automatic programming error class identification with code plagiarism-based clustering. *Proceedings of the 2nd International Code Hunt Workshop on Educational Software Engineering*, 1-6.
- Dann, W. P., Cooper, S., & Pausch, R. (2008). *Learning to program with Alice*: Prentice Hall Press.
- Del Fatto, V., Dodero, G., Gennari, R., Gruber, B., Helmer, S., & Raimato, G. (2017). Automating Assessment of Exercises as Means to Decrease MOOC Teachers' Efforts. *Proceedings of the Conference on Smart Learning Ecosystems and Regional Development*, 201-208.
- Douce, C., Livingstone, D., & Orwell, J. (2005). Automatic test-based assessment of programming: A review. *Journal on Educational Resources in Computing (JERIC)*, 5(3), 4.

- Ho, S. B., Chean, S.-L., Chai, I., & Tan, C. H. (2019). *Engineering Meaningful Computing Education: Programming Learning Experience Model*. Paper presented at the 2019 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM).
- Ihantola, P., Ahoniemi, T., Karavirta, V., & Seppälä, O. (2010). Review of recent systems for automatic assessment of programming assignments. *Proceedings of the 10th Koli Calling international conference on computing education research*, 86-93.
- Korhonen, A., & Malmi, L. (2000). Algorithm simulation with automatic assessment. *ACM SIGCSE bulletin*, 32(3), 160-163.
- Lepp, M., Luik, P., Palts, T., Papli, K., Suviste, R., Säde, M., Tõnisson, E. (2016). Self-and Automated Assessment in Programming MOOCs. *Proceedings of the International Computer Assisted Assessment Conference*, 72-85.
- Liebenberg, J., & Pieterse, V. (2018). Investigating the Feasibility of Automatic Assessment of Programming Tasks. *Journal of Information Technology Education: Innovations in Practice*, 17, 201-223.
- Lister, R. (2010). Computing Education Research - Geek genes and bimodal grades. *ACM Inroads*, 1(3), 16-17.
- Liu, L., Vernica, R., Hassan, T., Damera Venkata, N., Lei, Y., Fan, J., . . . Wu, S. (2016). Metis: A multi-faceted hybrid book learning platform. *Proceedings of the 2016 ACM Symposium on Document Engineering*, 31-34.
- Lokar, M. (2019). *Project Tomo: automated feedback service in teaching programming in Slovenian high schools*. Paper presented at the Proceedings of the 8th Computer Science Education Research Conference.
- Matthíasdóttir, Á., & Arnalds, H. (2015). Rethinking teaching and assessing in a programming course a case study. *Proceedings of the 16th International Conference on Computer Systems and Technologies*, 313-318.
- Mekterović, I., Brkić, L., Milašinović, B., & Baranović, M. (2020). Building a comprehensive automated programming assessment system. *IEEE Access*, 8, 81154-81172.
- Parsons, D., & Haden, P. (2006). Parson's programming puzzles: a fun and effective learning tool for first programming courses. *Proceedings of the 8th Australasian Conference on Computing Education*, 52, 157-163.
- Petersen, A., Craig, M., & Zingaro, D. (2011). Reviewing CS1 exam question content. *Proceedings of the 42nd ACM technical symposium on Computer science education*, 631-636.
- Pieterse, V. (2013). Automated assessment of programming assignments. *Proceedings of the 3rd Computer Science Education Research Conference (CSERC 2013)*, 45-56.

- Pieterse, V., & Liebenberg, J. (2017). *Automatic vs manual assessment of programming tasks*. Paper presented at the Proceedings of the 17th Koli Calling International Conference on Computing Education Research.
- Pieterse, V., & Sonnekus, I. P. (2003). Why are we doing IT to ourselves? *Proceedings of the 33rd annual conference of the Southern African Computer Lecturers' Association (SACLA)*, Paper 9.
- Posavac, E. J. (2015). *Program evaluation: Methods and case studies* (8th ed.). New York: Routledge.
- Resnick, M., Maloney, J., Monroy-Hernández, A., Rusk, N., Eastmond, E., . . . Silverman, B. (2009). Scratch: programming for all. *Communications of the ACM*, 52(11), 60-67.
- Solms, F., & Pieterse, V. (2016). *Towards a generic DSL for automated marking systems*. Paper presented at the Annual Conference of the Southern African Computer Lecturers' Association.
- Šťastná, J., Juhár, J., Biñas, M., & Tomášek, M. (2015). Security Measures in Automated Assessment System for Programming Courses. *Acta Informatica Pragensia*, 4(3), 226-241.
- Staubitz, T., Klement, H., Renz, J., Teusner, R., & Meinel, C. (2015). Towards practical programming exercises and automated assessment in Massive Open Online Courses. *Proceedings of the 2015 IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE)*, 23-30.
- Staubitz, T., Klement, H., Teusner, R., Renz, J., & Meinel, C. (2016). CodeOcean-A versatile platform for practical programming exercises in online environments. *Proceedings of the 2016 IEEE Global Engineering Education Conference (EDUCON)*, 314-323.
- Tew, A. E., & Guzdial, M. (2010). Developing a validated assessment of fundamental CS1 concepts. *Proceedings of the 41st ACM technical symposium on Computer science education*, 97-101.
- Thompson, E., Luxton-Reilly, A., Whalley, J. L., Hu, M., & Robbins, P. (2008). Bloom's taxonomy for CS assessment. *Proceedings of the tenth conference on Australasian computing education*, 78, 155-161.
- Tirronen, V., & Tirronen, M. (2016). *A framework for evaluating student interaction with automatically assessed exercises*. Paper presented at the Proceedings of the 16th Koli Calling International Conference on Computing Education Research.
- Ullah, Z., Lajis, A., Jamjoom, M., Altalhi, A., Al-Ghamdi, A., & Saleem, F. (2018). The effect of automatic assessment on novice programming: Strengths and limitations of existing systems. *Computer Applications in Engineering Education*, 26(6), 2328-2341.

Ullah, Z., Lajis, A., Jamjoom, M., Altalhi, A. H., Shah, J., & Saleem, F. (2019). A rule-based method for cognitive competency assessment in computer programming using Bloom's taxonomy. *IEEE Access*, 7, 64663-64675.

Watanobe, Y., Rahman, M. M., Rage, U. K., & Penugonda, R. (2021). *Online automatic assessment system for program code: Architecture and experiences*. Paper presented at the 34th International Conference on Industrial, Engineering and Other Applications of Applied Intelligent Systems, IEA/AIE 2021, Kuala Lumpur, Malaysia, July 26–29, 2021, Part II 34.

Zingaro, D., Petersen, A., & Craig, M. (2012). *Stepping up to integrative questions on CSI exams*. Paper presented at the Proceedings of the 43rd ACM technical symposium on Computer Science Education.

Contact email: janet.liebenberg@nwu.ac.za

Factors Influencing Faculty Willingness to Engage in Academic Service-Learning Approach With Businesses for Graduates Employability Skills Development: Benin Perspectives

Hermine, C. Sossouhounto, International SEPT Competence Center–Leipzig University,
Germany

Utz Dornberger, International SEPT Competence Center–Leipzig University, Germany

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Graduates from all over the world face a labour market completely transformed by dynamic changes. Indeed, employers nowadays are hiring employees with employability skills, thus forcing universities to produce graduates who ideally respond to their needs. Faced with this pressure, universities are required to engage with businesses to develop teaching methods that foster employability skills. Several scholars view academic service learning as the required pedagogy for universities to achieve such an objective. Whilst service-learning implementation is known with public institutions and non-governmental organizations, little research has been done on its application with businesses. Therefore, this study seeks to investigate the factors influencing faculty willingness to engage in such an approach with community-based businesses in Africa, especially in the Benin Republic. This study adopts a sequential mixed method. A focus group discussion was conducted with ten faculty and the results were extended with a quantitative method. Findings indicate that faculty competencies in service learning, and resources support positively influence the willingness of faculty to implement such an approach while organizational support and business engagement show a negative effect.

Keywords: Academic Service Learning, Innovative Teaching Method, Employability Skills, Soft Skills, Businesses, Community-Based Businesses

iafor

The International Academic Forum
www.iafor.org

Introduction

Labour market is perceived by Rakowska & Juana-Espinosa (2021) as a social context in which the interaction between the labour supply and labour demand is observed. Labour supply representing employees produced by universities and demand representing employers and therefore businesses. Nowadays, such social contexts around the world are undergoing dynamic changes which call for novel qualifications, skills and abilities. According to Bhorat, Goga, & Stanwix, (2013), several factors such as globalization and technological changes explain these shifts. Globalisation and technological changes that generate new types of environmental collaboration, thus driving companies through a form of revolution. As a result, the world is witnessing the creation of new job opportunities but also difficulties for actors in the labour markets (Rakowska & Juana-Espinosa, 2021). A new working context demands new strategies to prepare graduates to access and move effectively within labour markets. This requires young generations to develop their employability skills i.e. soft skills in order to access employment. The latter consists according to Igwe, Lock, & Rugara (2020) of “the knowledge, skills and attributes that graduates are expected to demonstrate to have acquired”. The World Economic Forum (2016) pointed out ten skills required for graduates to thrive and succeed in the future workplace. This includes among others complex problem-solving skills, creativity, critical thinking, resource management, and coordinating with others. These are flexible skills that enable one to perform and progress in a job environment. The question is whether higher education institutions (HEIs) are ready to engage in the change by developing these various skills among their graduates (Rakowska & Juana-Espinosa, 2021). This appears even an issue in African countries such as the Benin Republic where there is a rapidly growing young population but the quality of education is still low (Rakowska & Juana-Espinosa, 2021). A number of studies have shown that universities in Benin are failing to develop graduates that meet the labour market needs, thus raising a debate on the nature of educational programs and their capacity to enhance graduates’ employability (Igwe, Lock, & Rugara, 2020). According to Okolie & Mlanga (2019), most universities predominantly use the traditional teaching approach, which unfortunately offers no opportunities for soft skills development and mastery. The logic of the Education system as highlighted by Dewey (1986) should be reversed from a one-way teaching approach to an experiential method. An experiential method in which learners are the centre and actors of their own learning construction. To achieve this, Guàrdia, Mancini, Jacobetty, & Maina (2021) recommends universities engage in collaboration with businesses through a novel teaching approach such as academic service learning (ASL). Wijayanama, Ranjani, & Devadas (2020) defined service learning as a teaching and learning method that involves three components:

- a) A service activity tied to an academic curriculum.
- b) that meet a community partner’s needs; and
- c) provide time for critical and intensive reflection activities.

It is a process whereby students’ learning is extended beyond the classroom boundaries to enable them to apply their knowledge and theories to real-life problem-solving situations. In doing so, they gain a better understanding of their course contents and develop various skills and abilities, including the employability skills required in the workplace. According to Simola (2009), academic service learning is an effective and viable teaching approach that allows the transformation of learners and its application with community-based businesses enables them to conduct and manage real business projects. However, academic service learning for decades has been touted as a pedagogy that solely involves collaboration

between universities and non-profit organizations. Little research has been conducted on its implementation with community-based businesses. In addition, since ASL implementation involves a revision of the curriculum, which falls under faculty responsibility, Bringle & Hatcher (1995) emphasized that their willingness to engage in is crucial for its success. Therefore, this study sought to investigate the factors influencing faculty willingness to engage in ASL with community-based businesses in the Benin Republic.

Academic Service Learning and Employability Skills

Academic service-learning rooted in experiential education is perceived as a pedagogy that combines students' academic learning with service activities in a community-based business setting with structured time for intensive reflection. Prior research emphasized the numerous benefits of academic service learning on students' development (e.g. Heffernan, 2001; Wijayanama, Ranjani, & Devadas, 2020; Novak, Markey, & Allen, 2007 etc...). This session addresses how academic service learning with businesses enhances work readiness. While career preparation is not the primary concern of academic service learning, Mtawa, Fongwa, & Wilson-Strydom (2019) found its relevance to enable graduates' employability skills development. For instance, Tumuti, Mule, Gecaga, & Manguriu (2013) identified after completing a service learning project with the private sector a range of soft skills such as communication, initiative, networking, teamwork, problem-solving, etc among students of Kenyatta University. Additionally, Black (2002) found academic service learning with businesses relevant to enable students to understand the variety of challenges related to the current uncertain business world. Furthermore, academic service learning with businesses allows students ethical development (Black, 2002). According to Matthews, Dorfman, & Wu (2015), academic service learning enhances graduates' critical thinking, leadership, and adaptation skills. Pena (2020) pointed out that these soft skills are extremely important and top the list of qualities needed in the workplace. Woefully, universities seem to struggle in developing such skills through a traditional teaching method (Pacho, 2019). Facing the 21st-century challenges, Tumuti, Mule, Gecaga, & Manguriu (2013) challenged African universities to proceed with a strategic adaptation that reflects the employability skills discourse through academic service learning implementation with businesses.

Research Methodology

The current paper presents the results of a sequential mixed methodological approach. An exploratory phase was conducted using a qualitative approach with ten (10) faculty as respondents. Respondents were drawn from three different universities and the sampling was snowballing. The objective of this qualitative data collection was to identify the key factors that influence faculty willingness to engage in academic service learning with businesses in the Benin Republic. The data were recorded and transcribed verbatim. The researcher proceeded afterwards to a thematic analysis following Braun & Clarke's (2006) guidelines. The results were used thereafter to assess faculty in Benin Republic using a quantitative approach. The instrument was a 1-5 Likert survey questionnaire. A pilot test was conducted and the instrument was adjusted based on reviews/comments and submitted afterwards to respondents. The respondents were hundred fifty (150) teaching faculty in total and the sampling was purposive. The assessment was conducted using soft and hard survey instruments. After the data collection, validity and reliability tests, as well as hypotheses testing using multiple regression analysis, were carried out to draw conclusions in the study. The various results are presented in the session below.

Results and Discussion

The current study generated primary data using a mixed research methodology. The results from the qualitative approach revealed seven themes meaning the factors that influence faculty willingness. These factors include the four competencies required for faculty to implement service-learning pedagogy meaning personal and interpersonal competencies, social competencies, pedagogical competencies, and reflective competencies. Additionally, the findings revealed institutional support, business engagement, and government support as factors influencing faculty willingness. These factors incorporated 26 items in total. The researcher proceeded to the assessment of respondents using the seven factors meaning constructs with the 26 indicators. The statistical results of the analysis are as follows.

1. Validity Test

The validity test was conducted after the data collection using exploratory factor analysis (EFA). The factor analysis followed Taherdoost, Sahibuddin, & Jalaliyoon's (2022) five steps guidelines including the evaluation of data suitability for EFA, factor extraction method, factor retention method, selection of rotational method, interpretation and labelling. The results showed a Kaiser-Meyer- Olkin (KMO) range of 0.804 which is above the 0.70 value suggested by (Taherdoost, Sahibuddin, & Jalaliyoon, 2022). Besides the KMO results, the study tested the correlation among items using Bartlett's test of sphericity and the matrix exhibited a Chi-Square value of 1600.103 with Sig = 0.000 meaning $p < 0.50$. This indicated then a significant correlation between items and the results is suitable for EFA analysis. The researcher continued the EFA process and proceeded to four (4) iterations especially cross-loaded items and items with no minimum of 0.50 factor loading. At the end, five (5) factors were retained in the process. The first factor (F1) in the matrix represents service-learning competencies (SLC) which include the four competencies loaded together as one factor. The second factor (F2) represents resource support (RS) which incorporated some items of institutional support. The third factor (F3) involves the dependent variable faculty willingness (FW), and the fourth factor (F4) involves organizational support (OS) which incorporated another set of items that were under institutional support. For the ease of readers, the initial construct named institutional support was divided in the EFA matrix into two different constructs or factors which represent resource support and organizational support. Besides, the last factor (F5) observed in the matrix is business engagement (BE). Table 1 displays the EFA results.

Items	1	2	3	4	5
SLC (F1)					
Development of learners.	.928				
Being able to implement educational learning.	.850				
Evaluation of learning outcomes	.801				
Ability to communicate or interact effectively with others for SL success.	.723				
Ability to enhance the mental activities on students to enable their development.	.677				
Collaborate or work with others and in teams.	.591				
Being a role model or guide for students.	.533				
Planning/organizing activities	.485			.308	
RS (F2)					
Financial support		.898			
Logistical support		.845			
Material support		.749			
Faculty Training		.549			
FW (F3) Dependent Variable					
Willingness to engage in SL.			.896		
SL Effectiveness			.740		
Positive Perception of its Implementation with Businesses			.647		
Willingness to Improve			.623		
OS (F4)					
Support in SL curricula development				.838	.303
University support in collaboration establishment				.825	
Provide autonomy for faculty				.555	
BE (F5)					
Business Availability					.835
Business Commitment					.828
Business non-Reluctance to exchange internal Information					.529

Source: Survey Data (2022)

Table 1: EFA results

These results show that the matrix retained in total five (5) constructs with twenty-two items. Specifically, F1, F2, F4 and F5 represent the independent variable while F3 represents the dependent variable of the study. In the table, the item “planning/organizing activities” was retained because the item was slightly loaded with the minimum requirement. In addition, the table observed some cross-loading, but these items were retained in the process since the table exhibited the maximum factor results. The research model based on the EFA results is presented as follows.

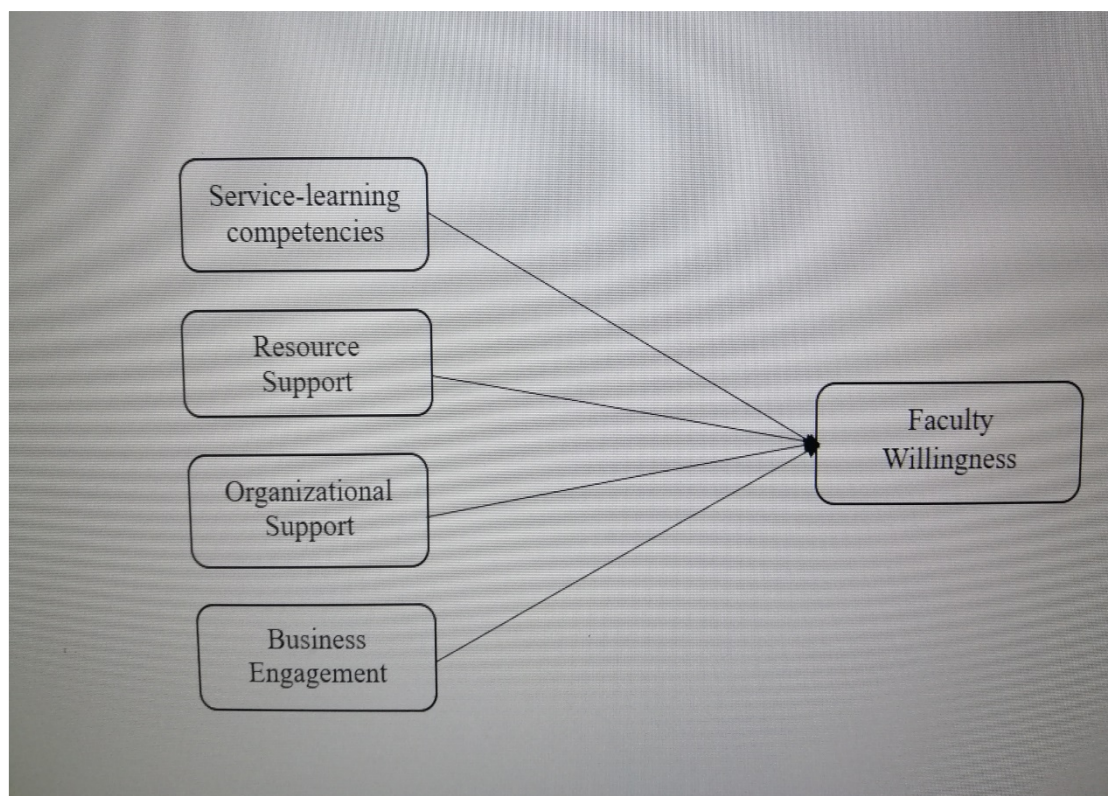


Figure 1: Research Model

The research hypotheses are as follows:

- H1: There is a significant positive relationship between SLC and FW.
- H2: There is a significant positive relationship between RS and FW.
- H3: There is a significant positive relationship between OS and FW.
- H4: There is a significant positive relationship between BE and FW.

Before testing these various hypotheses, the study first assesses the reliability of each construct.

2. Reliability Test

After testing the validity using EFA, the study tested the reliability of each construct using Cronbach's Alpha value. In the process, we eliminated items whose presence reduced the Cronbach's Alpha value. Thus, the item “business non-reluctance to exchange internal information” was eliminated to improve the value of its construct business engagement (BE). The results of the reliability test show that all constructs present a Cronbach's Alpha value above 0.60 except the construct BE which presents a value of 0.66. This implies that all constructs under study were reliable. The complete results are presented in the table below.

Constructs	Cronbach's Alpha Based on Standardized Items
Faculty Willingness (Dependent variable)	0.766
Service-learning Competencies	0.883
Resources Support	0.792
Organizational Support	0.718
Business Engagement	0.668

Source: Survey Data (2022)

Table 2. Results of the Reliability Test

Table 2 suggests that all constructs are reliable. The study tests then the various hypotheses under study using multiple regression analysis.

3. Multiple Regression Analysis

The study conducts a multiple regression analysis to test the influence of the independent variables including service-learning competencies, resource support, organizational support and business engagement on the dependent variable faculty willingness as suggested in the hypotheses. The table below presents the results of the regression.

Independent Variables	Dependent Variable	t	Sig.
Service-learning competencies	Faculty Willingness	7.131	0.000
Resource support		3.831	0.000
Organizational support		-0.623	0.534
Business Engagement		-2.076	0.040
R ² Value			0.422
F			26.420
Sig F			0.000

Source: Survey Data (2022)

Table 3: Results of Multiple Regression Analysis

The results of the multiple regression analysis showed that the R² Value was 0.422, which indicated that 42% variable in the dependent variable meaning FW can be explained by variations from all four independent variables under study while the remaining 57.8% is explained by other factors outside the model. The table showed an F value of 26.420 with a p-value = 0.000 ($p < 0.05$) which is significant. The t-test results revealed that not all independent variables had a significant value of below 0.05 and a positive effect on the dependent variable. Specifically, the constructs business engagement and organizational support were found not to have a positive and statistical effect on faculty willingness. Even though the construct business engagement had a p-value of 0.040 which is below 0.05, the t-value was negative. This means that both H₃ and H₄ were rejected. Meanwhile, the two other independent variables (Service-learning competencies, and resource support) were statistically proven to have a positive influence on faculty willingness with significant p-values below 0.05. The findings in this study show that service-learning competencies (SLC), and resource support (RS), were significant contributors to Faculty willingness (FW), while organizational support (OS) and business engagement (BE) had a negative effect on faculty willingness. This study attempted to analyze the influence of service-learning competencies, resource support, organizational support, and business engagement on faculty willingness. The results of the positive influence of SLC on faculty willingness support prior research

such as Smith (2008) who found that faculty show their interest meaning their willingness to service learning approach when they have the related capabilities or competencies. This is explained by the relevance of faculty capabilities in the introduction of a new teaching method. Indeed, introducing a change in the educational arena requires that faculty possess the competencies to effectively engage in the change. It determines whether the change will be successful or not and their willingness stems from their confidence in their ability to perform the approach. While assessing their competencies to perform ASL with businesses, the study revealed a variation in the results. However, all scores were positive meaning that faculty in Benin perceived that they possess the related competencies for ASL implementation. This might reflect an overestimation of faculty in terms of ASL competencies.

Therefore, the study suggests that universities in Benin in attempting to introduce ASL pedagogy may engage in faculty training to strengthen their competencies and enhance as well their willingness to the approach. The study also supports Bringle & Hatcher (1996), who found the relevance of resource support in enhancing faculty motivation and commitment to ASL approach. Indeed, faculty are committed to a new teaching approach when convinced that significant resources are made available for its effectiveness and sustainability. In this study, resource support was measured through financial support, material support, logistical support and faculty training. These supports appear important in any new teaching approach introduction but even more so in ASL with businesses. Providing these supports prevents faculty from resisting the change and allows them as well to effectively perform the due tasks with interest and enthusiasm. As Fullan (2007) mentioned in his change management theory, resources are required for any change introduction in educational settings. Hence, the finding suggests that universities provide the required resources to faculty while introducing SL to enhance their commitment and enable them to succeed and sustain the approach. Another findings of this study show that organizational support and business engagement had a negative effect on faculty willingness. Organizational support was measured in this study through three indicators including university support in SL curricula development, university support in collaboration establishment, and providing autonomy for faculty. The negative effect of the construct can be explained by the fact that such support may not be a necessary condition for faculty willingness. In other words, the lack of organizational support is not a barrier for faculty in Benin to engage in SL, unlike resource support which was seen as a necessary condition for their willingness. Resource support was measured using components which were perceived as indispensable for SL success. Whether they are provided with organizational support or not, they can develop by themselves SL curricula since this falls normally under their responsibility. In addition, they didn't perceive the need for a new collaboration establishment since evaluated faculty works in universities that already have ongoing institutional partnerships with businesses. In this sense, with organizational support or not faculty willingness to engage in ASL will remain. Although this finding revealed a negative effect, the study suggests universities provide organizational support to ease faculty from the heavy load related to ASL implementation and strengthen their willingness. This may improve their performance and thus the success of the approach. The finding also showed a negative effect of business engagement. In the study, faculty assessed business engagement from their perspectives, this means that the more willing faculty are to implement SL, they are sceptical about business engagement in the country. Even though the p Value is significant, the coefficient is negative meaning that an increase in faculty willingness results in a decrease in business engagement from respondents' perspectives. This might be explained by the fact that faculty noticed in their current partnership with businesses no significant engagement from their side. This is supports by

Hamann & Acutt (2003) who highlighted the lack of motivation or engagement from businesses for partnerships in Africa. The study suggests in this sense that universities in the Benin Republic engage in business awareness programs to enhance their motivation. In addition, the government may put in place policy-related programs in order to promote university-business collaboration in the Benin Republic.

Conclusion

This study attempts to investigate the factors influencing faculty willingness to engage in ASL with businesses in Benin. After testing the various hypotheses using multiple regression analysis, the key findings revealed that service learning competencies and resource support had a positive and significant effect on faculty willingness while organizational support and business engagement had a negative effect. Based on the findings, the study suggests that universities in Benin provide faculty with resources and training in academic service learning implementation to strengthen their competencies, thus enabling the success of the approach. Although organizational support and business engagement exhibited insignificant results, these factors should not be neglected. Universities are required to provide organizational support to enhance teaching faculty motivation and engage as well in business awareness for effective and sustainable service-learning programs in the country. In terms of limitations, the sample size in this study is relatively small. Only ten (10) faculty were interviewed during the qualitative data collection and the quantitative step was conducted with only hundred fifty faculty. This means that the final results of the study can not be generalized to the whole population. Therefore, the study recommends further research to replicate the research with a large sample size in order to generalize the results.

Acknowledgements

This work is based on the research supported wholly by the ACCESS Network and Leipzig University through funding from DAAD with funds from the Federal Ministry of Economic Development and Cooperation (BMZ). The Grant-holder acknowledges that opinions, findings, and conclusions or recommendations expressed in this publication are that of the author(s) and that Leipzig University accepts no liability whatsoever in this regard.

References

- Bhorat, H., Goga, S., & Stanwix, B. (2013). Changing Dynamics in the Global Labour Market: Evidence from South Africa. International Labour Office, Bureau for Employers' Activities, Geneva: ILO.
- Black, G. (2002). Incorporating service learning into the business curriculum. *Journal of Business Administration Online*, 1(2), 1-13.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Bringle, R. G., & Hatcher, J. A. (1995). A Service-Learning Curriculum for Faculty. *Michigan Journal of Community Service Learning*, 112-122.
- Bringle, R. G., & Hatcher, J. A. (1996). Implementing Service Learning in Higher Education. *The Journal of Higher Education*, Vol. 67, No. 2, 221-239.
- Dewey, J. (1986). Experience and education. In *The educational forum* (Vol. 50, No. 3). Taylor & Francis Group., 241-252.
- Forum, W. E. (2016). The Future of Jobs: Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution. Davos: Global Challenge Insight Report.
- Fullan, M. (2007). Fundamental change: International handbook of educational change. (Vol. 3). Springer Science & Business Media.
- Guàrdia, L., Mancini, F., Jacobetty, P., & Maina, M. (2021). Graduates' employability skills in East Africa. *Journal of Teaching and Learning for Graduate Employability*, 12(2), 169–184.
- Hamann, R., & Acutt, N. (2003). How should civil society (and the government) respond to 'corporate social responsibility'? A critique of business motivations and the potential for partnerships, *Development Southern Africa*, 20:2, 255-270.
- Heffernan, K. (2001). SERVICE-LEARNING IN HIGHER EDUCATION . *Journal of contemporary water research and education*, 119(1), 2.
- Igwe, P. A., Lock, D., & Rugara, D. G. (2020). What factors determine the development of employability skills in Nigerian higher education? *Innovations in Education & Teaching International*, 59(3), 337-348.
- Matthews, P. H., Dorfman, J. H., & Wu, X. (2015). The Impacts of Undergraduate Service Learning on Post-Graduation Employment Outcomes . *International Journal of Research on Service-Learning and Community Engagement*, 3(1).
- Mtawa, N., Fongwa, S., & Wilson-Strydom, M. (2019). Enhancing graduate employability attributes and capabilities formation: a service-learning approach. *Teaching in Higher Education*, 26(5), 679-695.

- Novak, J. M., Markey, V., & Allen, M. (2007). Evaluating Cognitive Outcomes of Service Learning in Higher Education: A Meta-Analysis. *Communication Research Reports*, 24(2), 149-157.
- Okolie, U. C., & Mlangi, H. E. (2019). Graduate employability How the higher education institutions can meet the demand of the labour market. *Higher education, skills and work-based learning*, 9(4), 620-636.
- Pacho, T. (2019). Service-Learning: An innovative approach to education in Africa. *The good education and Africa's future: Concepts, issues and options*, 232-259.
- Pena, R. (2020). Service-Learning and the Enhancement of Employability Skills in Undergraduate Students. Doctoral dissertation, California State University, Northridge.
- Rakowska, A., & Juana-Espinosa, S. d. (2021). Ready for the future? Employability skills and competencies in the twenty-first century: The view of international experts. *Human Systems Management* 40, 669–684.
- Simola, S. (2009). A service-learning initiative within a community-based small business. *Education+ Training*, 51(7), 567-586.
- Smith, C. P. (2008). Perceptions, motivations, and concerns of post-secondary faculty regarding implementing service-learning pedagogy into curriculum. *St. John Fisher College*.
- Taherdoost, H., Sahibuddin, S., & Jalaliyoon, N. (2022). Exploratory Factor Analysis; Concepts and Theory. *Advances in applied and pure mathematics*, 27, 375-382.
- Tumuti, D. W., Mule, L. W., Gecaga, M., & Manguriu, D. G. (2013). Enhancing Graduate Employability through Community Engagement: A Case Study of Students' Community Service at Kenyatta University. *Journal of Administrative Sciences and Policy Studies*, Vol. 1 No. 1, 1-14.
- Wijayanama, C., Ranjani, C., & Devadas, U. M. (2020). Undergraduate soft skill development as an outcome of service-learning programs: A systematic literature review. *Journal of Management Matters* Volume 7 Number 2, 95-109.

Cultivating a Social Justice Pedagogy in an Introductory Japanese Language Course Through Pronunciation Instruction

Ryuichi Suzuki, Emory University, United States

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

Foreign language programs in the US are increasingly urged to cultivate a social justice pedagogy in order to address social issues surrounding language use including gender, race, social class, and identity. One of the social issues in language learning and teaching is the ideology of native-speakerism. This ideology often leads to negative attitudes towards those who speak a language with a foreign accent, which perpetuates discrimination against such speakers. This study sought to examine whether pronunciation instruction (PI) in a foreign language, specifically Japanese, could transform the learners' attitudes toward those who speak their L1/LX with foreign accents. The teacher-researcher prepared and provided a series of Japanese pronunciation lessons as part of an elementary-level Japanese language course and collected data through pre- and post-lesson surveys and comments. The surveys included questions regarding students' attitudes towards their own accents and speakers with foreign accents. The data were analyzed quantitatively as well as qualitatively. The results showed that following PI, students' awareness of the difficulty of pronunciation acquisition increased, resulting in enhanced tolerance and empathy towards speakers with accents. These preliminary results indicate that PI has the potential to positively transform students' attitudes towards foreign accents, dismantling the ideology of native-speakerism. This study explores an approach to foster social justice in foreign language instruction through teaching pronunciation of the target language and provides recommendations for implementation in foreign language programs.

Keywords: Pronunciation Instruction, Japanese, Native-Speakerism, Social Justice Pedagogy, Transformative Language Learning and Teaching

iafor

The International Academic Forum
www.iafor.org

Introduction

Given the increased emphasis on developing students as global citizens who can address social issues, foreign language programs in the US are increasingly urged to cultivate a social justice pedagogy. Both applied linguistics and world language teaching acknowledge the significance of addressing social issues related to language use, such as gender, race, social class, and identity (e.g., Avineri & Martinez, 2021). Randolph and Johnson (2017) argue that the scope of social justice can be effectively included in transformative learning, which has started receiving attention in the field of language teaching and learning and aims for personal change as an outcome. As Leaver (2021) highlights the potential of foreign language learning to bring about changes in learners, such as shifts in “thinking, behavior, acceptance of the other, values, mindset, and/or emotion” (p. 16), transformative learning and social justice have a place in language pedagogy.

One of the language use issues on a societal level is the ideology of native-speakerism. This ideology assumes that first language (L1) speakers of a language are considered superior to those who speak it as a second or third language (LX; i.e., those who learned an additional language after the age of three, previously called nonnative speakers, Dewaele, 2018). Despite the fact that the ideology of native-speakerism can be determined by various factors, “accents matter” (De Costa, 2019, p. ix). Accented speech is frequently subject to negative perceptions and provokes stereotyping, false assumptions, and stigmatization of LX speakers, resulting in discrimination across different contexts, including employment, call centers, and academic settings (e.g., Lippi-Green, 2012). Moreover, research from the learners’ perspective has indicated that language learners often aspire to attain native-like pronunciation (e.g., Derwing, 2003) and hold negative perceptions of foreign accents (e.g., Tokumoto & Shibata, 2011). Such negative attitudes and beliefs towards accents can impact interactions among speakers (Holmes, 2013), resulting in diminished engagement and missed opportunities for meaningful social interactions, cultural exchanges, and connections between individuals from diverse backgrounds (e.g., Gluszek & Dovidio, 2010).

These negative perceptions of accents underscore the importance of pronunciation instruction (PI), which traditionally focuses on learners’ pronunciation development (e.g., Saito & Plonsky, 2019), but PI also can promote transformative learning. For instance, it can enhance students’ ability to listen to and comprehend speakers with accents (Derwing & Munro, 2014). Some studies have demonstrated that interventions aimed at L1 English speakers reduce negative stereotypes, prejudices, and assumptions regarding the accented speech of learners (LX speakers) (e.g., Kang et al., 2015). Moreover, these studies suggest that such interventions can foster listeners’ empathy and willingness to engage in conversations with individuals who speak with accents (e.g., Derwing et al., 2002). Given the importance of fostering connections among individuals from diverse backgrounds in the globalized 21st century (Tohsaku, 2021) and recognizing that successful communication requires efforts from both speakers and listeners, it is imperative for both parties to address obstacles that impede effective interactions.

Accordingly, this study sought to examine whether PI in a foreign language, specifically Japanese, could transform the learners’ attitudes towards those who speak their L1 or LX with foreign accents. Specifically, the current research explored whether PI prompted learners to recognize the difficulties involved in mastering Japanese pronunciation and whether this recognition resulted in attitudinal changes towards foreign accents, particularly in terms of developing empathy for other people with accents in any language.

Literature Review

Transformative Language Learning and Teaching

Transformative learning theory, long established in the field of adult education (e.g., Mezirow, 1991), is defined as “the learning process that takes place when adults reevaluate previously held beliefs and attitudes and begin to interpret experiences in a new way” (Johnson, 2015, p. 18). In the context of foreign language education, the theory has gradually been introduced as a novel approach known as transformative language learning and teaching (TLLT; see Leaver et al., 2021). This approach was promoted by the recognition of the significance of language and cultural competence in response to social and political changes, as well as the need to address the challenges associated with proficiency-based language learning, leading to a shift away from the transactional educational approaches, including communicative language teaching (Johnson, 2015; Leaver, 2021). TLLT is a particularly valuable and critical approach for addressing political issues, such as diversity and social justice (Randolph & Johnson, 2017), as it enables learners to critically reassess and transform their behavior, emotions, and thinking by encountering diverse linguistic forms and cultural norms different from their own. To facilitate the transformation of learners, particularly in terms of their attitudes towards accented speech, language teachers can introduce PI as a means to encourage learners to engage with and compare various phonological aspects of the target language with their acquired languages. Research in pronunciation has shown that such instruction can encourage L1 listeners to engage in conversations with LX speakers who have foreign accents.

Transforming Listeners’ Attitudes Towards LX Speakers and Accented Speech

With the growing recognition of the listeners’ role in communication, particularly in interactions between L1 and LX speakers, researchers have explored the development of L1 listeners’ ability to comprehend LX speakers with accents. This skill is valuable in higher education because U.S. universities aim to cultivate students as proficient global citizens and equip them with the capacity to gather information from international scholars and peers (Kang et al., 2015). Some studies suggest that foreign language courses facilitate interactions with individuals from diverse backgrounds. For instance, Rubin and Smith (1990) and Kang et al. (2015) found that students better understood accented speech when they took more language-related courses (such as linguistics and foreign languages) or courses taught by international instructors. These results align with those of other studies demonstrating that increased familiarity with accented speech is generally associated with improved comprehension and more positive evaluations of such speech (e.g., Gass & Varonis, 1984).

Subsequent studies have attempted various interventions to specifically target L1 listeners, aiming to identify more effective and targeted approaches to transform positively their attitudes towards LX speakers with accents (see Derwing & Munro, 2014 for an overview). Creating an environment where L1 listeners engage in interactions with LX speakers yielded mixed results. Rubin (1992) found limited effects, whereas Kang et al. (2015) demonstrated a positive impact on the comprehension of LX speech. Additionally, Weyant (2007) employed a perspective-taking approach that involved explicitly instructing L1 listeners to empathize with LX speakers by imagining themselves in the speaker’s position and writing about the speaker using the first-person pronoun after listening to an LX speaker’s speech passage. The study demonstrated that engaging in perspective-taking could mitigate listeners’ tendency to

stereotype LX accented speech, as compared to the group that did not engage in perspective-taking.

Derwing et al. (2002) investigated the changes in attitudes of L1 English listeners towards LX speech by providing them with explicit linguistic instruction on the pronunciation characteristics of a particular accent variety, specifically Vietnamese English. The study revealed that the group receiving explicit instruction developed empathy for and willingness to engage in conversation with individuals with accents, as the instruction enabled participants to appreciate the challenges faced by language learners and equipped them with the ability to attentively listen to the accented speech. A similar explicit intervention conducted by Lindemann et al. (2016) demonstrated the effectiveness of explicit training in improving listening comprehension of a specific accent variety. Such interventions that target listeners' attitudes towards accents, therefore, potentially contribute to fostering successful interactions with LX speakers by mitigating negative stereotypes, prejudices, and assumptions that listeners may have regarding accented speech. However, these studies primarily focused on providing explicit instruction to L1 speakers rather than LX speakers.

Pronunciation Instruction and Research for LX Learners

Pronunciation is widely regarded as one of the most challenging skills to master (e.g., Fraser, 2010). Given the centrality to speech and its crucial role in achieving intelligibility, most studies in L2 speech acquisition have focused on various aspects of LX speakers' pronunciation (e.g., Derwing & Munro, 2015). Several studies on pronunciation have specifically targeted local features (e.g., Saito & Lyster, 2012 for teaching English /ɹ/ to Japanese learners of English) and examined the global dimensions of speech (comprehensibility, fluency, and intelligibility: e.g., Derwing et al., 1998). These studies have demonstrated that these targeted features can be improved through the implementation of PI. Additionally, meta-analytical research has provided evidence of the positive impact of PI on the enhancement of LX speakers' pronunciation (e.g., Saito & Plonsky, 2019). Nevertheless, despite the positive improvements observed in empirical studies, PI is frequently overlooked in language teaching, particularly in beginner-level courses (Pennington, 2021), due to various factors, including time constraints (see Darcy, 2018 for additional constraints).

Another crucial aspect that researchers have explored in the realm of pronunciation studies and teaching revolves around the tension between striving for native-like pronunciation and prioritizing intelligibility (as exemplified by the Nativeness Principle versus the Intelligibility Principle; Levis, 2020). The primary goal in language teaching often involves achieving a level of pronunciation that is indistinguishable from that of L1 speakers and minimizing learners' accents (e.g., Thomson & Derwing, 2015). Furthermore, LX learners also aspire to attain pronunciation similar to that of L1 speakers (e.g., Derwing, 2003). However, some researchers (e.g., Derwing & Munro, 2015; Levis, 2020) endorse the Intelligibility Principle, which posits that learners should strive for intelligible and comprehensible speech while retaining L1-influenced accents. They claim that possessing a strong accent does not automatically result in unintelligible and incomprehensible speech (e.g., Derwing & Munro, 1997), and that the degree of accentedness (how far different the speech is from that of a target language variety) is unlikely to be altered through PI, unlike comprehensibility (the ease of comprehending speech, e.g., Saito, 2021). Language teachers can effectively support learners' pronunciation development in their classrooms by targeting features that might impede listeners' comprehension. While these features have been extensively studied, primarily within the English language context (e.g., Trofimovich & Isaacs, 2012), such

features in other languages, such as Japanese, remain unclear and warrant further investigation.

Motivation of the Current Study

TLLT has the potential to encourage learners to transform their perspectives on accented speech. Research has shown that PI can positively impact learners' pronunciation, and interventions targeting L1 listeners can influence their attitudes towards speakers of the target language with accents. Nevertheless, little research has been conducted to examine whether PI for LX learners can lead to attitudinal changes towards accented speech. Moreover, PI is rarely offered to beginning-level learners, despite its benefits and the importance of teaching pronunciation in beginner-level classes (Zielinski & Yates, 2014). Developing language learners as both "active listeners and eloquent speakers" (Derwing et al., 2014, p. 76) is crucial for facilitating successful communication among diverse individuals across language varieties in today's globalized society (Kang & Yaw, 2021). This study, therefore, introduced PI for Japanese language learners in an elementary-level course and addressed the following two research questions:

- (1) How do Japanese language learners feel about having received Japanese PI in an elementary-level course?
- (2) Does Japanese PI transform Japanese language learners' attitudes towards those who speak their L1/LX with accents?

Method

Design of the Study

The current study was conducted as action research, employing a pretest-intervention-posttest design in a classroom setting. Over an eight-week period within a sixteen-week timeframe, the author, who was also the teacher-researcher, delivered six pronunciation lessons as a part of classroom activities. Survey questionnaires were administered immediately before and after the series of pronunciation lessons.

Target Students & Course

The study targeted twenty-nine undergraduate students enrolled in a Japanese elementary-level course at a university in the southern United States. The course was offered during the second semester of the 2022-2023 academic year to students who had no previous experience learning Japanese before the first semester. The course consisted of two 75-minute in-person sessions and one 50-minute Zoom meeting per week, targeting the four general language skills and cultural components of Japanese language and society. The instructor primarily used English to explain target grammar items, while students had ample opportunity to engage in Japanese with their peers during the lessons.

Of the 29 targeted students, 16 students attended all the pronunciation lessons; only their responses were analyzed. These students were from China, Korea, Taiwan, and the United States, and grew up speaking Chinese ($n=10$), English only ($n=3$) and English plus another language at home ($n=2$), and Korean ($n=1$). The students' ages ranged from 18 to 38, with a mean age of 21.2. They pursued diverse non-language related majors. While many students had experience learning other languages (such as Chinese, English, and Spanish), only a few

had received PI, and none in Japanese. Their exposure to Japanese outside the classroom was limited except for some weekly or daily exposure in watching and listening to Japanese videos and music.

Instruction Approach and Content

As shown in Table 1, the lesson content covered basic Japanese pronunciation features that were considered to be crucial in Japanese, with a focus on segmental and suprasegmental features. To determine the target items, various materials were consulted, including a practice handbook by Akagi et al. (2010) and online training modules such as *eNunciate!* [<https://enunciate.arts.ubc.ca/japanese/introduction/>] and the Tobira website [<https://tobirabeginning.9640.jp/>]. Based on these references, the instructor created six instructional handouts (see Figure 1), ensuring that the content fit the students' proficiency and linguistic knowledge in Japanese. The teacher-researcher conducted nearly one pronunciation lesson per week, with each lesson taking 15-20 minutes of the regular class time. In each lesson, the instructor displayed the handout on PowerPoint slides (see Figure 1) and followed a traditional pronunciation teaching approach: description of the sound system, reading aloud, repeating and imitating a model. The model was based on standard Tokyo Japanese, which the instructor grew up speaking.

Table 1: *The Schedule and Content of Pronunciation Lessons*

Lesson	Date	Content
1	Jan 11 th	Pre-survey Introduction
2	Jan 18 th	(1) Segmental
		a) Japanese vowels, consonants, and basic sounds
		b) Voiced, voiceless, and semi-voiced sounds
		c) Katakana
3	Jan 25 th	d) Japanese R
		e) Contracted sounds / Consonant clusters
		f) Devoiced vowels
		g) Distinctive sounds
4	Feb 15 th	(2) Intonation 1 (Mora & Duration)
		a) Mora
		b) Contracted sounds / Long & Short vowels
		c) Single & Double consonants
5	Feb 22 nd	d) The Japanese syllabic nasal sound
		(3) Intonation 2 (Pitch)
		a) Word-level
		b) Sentence-level
6	March 1 st	(Statements, questions/invitations, casual speech)
		c) Pause
		Post-survey

Figure 1: An Example Handout and PowerPoint Slides

Japanese Pronunciation Lesson 2

(1) Segmental

- ② Voiced, voiceless, and semi-voiced sounds
- ③ Katakana
- ④ Japanese R

<1-② Voiced, voiceless, and semi-voiced sounds>

- The consonants [k], [s], [t], and [h] sounds have their voiced versions, [g], [z], [d], and [b], respectively.
- [h] sounds change to their semi-voiced sounds [p].
- Japanese relies on voicing to differentiate sounds (cf. aspiration in Chinese).
- Your vocal cord is vibrating when making voiced sounds.

p	b	h	d	t	z	s	g	k	a
ぱ	ば	は	だ	た	ざ	さ	が	か	
び	び	ひ	ち	ち	じ	し	ぎ	き	i
ぶ	ぶ	ふ	つ	つ	ず	す	ぐ	く	u
べ	べ	へ	で	で	ぜ	せ	げ	け	e
ぼ	ぼ	ほ	ど	と	ぞ	そ	ご	こ	o

1. 仕事: job

しごと

2. 鉛筆: Pencil

えんぴつ

3. 漢字: Kanji

かんじ

4. バス: Bus

ばす

5. 電話: Call

でんわ

6. ポケモン

ぽけもん

<1-③ Distinctive sounds (つ vs ちゅ)>

しゅうまつ

ちゅうしゃじょう

げつようび

ユーチューブ

<3-① Word-level>

- The meaning of some words can change depending on their pitch pattern.

	あめ (雨: rain)	かき (牡蠣: oyster)	はし (箸: chopsticks)
HL ○			
LH ○	あめ (飴: candy)	かき (柿: persimmon)	はし (橋: bridge/溝: edge)

Note. On the left is a page of a handout; on the right are two PowerPoint slides.

Measurements

In order to elicit learners' attitudes towards their own pronunciation and others' pronunciation, two questionnaires for pre- and post-intervention were created, including both nine-point scale and open-ended question items (see Appendix), some of which were borrowed from previous research regarding pronunciation attitudes (Derwing et al., 2002; Foote et al., 2012; Tokumoto & Shibata, 2011; Tsunemoto & McDonough, 2021). For most of the questions, a nine-point scale (1 = *strongly disagree* – 9 = *strongly agree*) was utilized, while a different nine-point scale was adapted (1 = *very poor* – 9 = *excellent*) for Q2-8 and 9 items. An online survey platform, *Microsoft Forms*, was used to collect students' responses, and students completed the questionnaire before and after the intervention during the regular class time.

Data Analysis

The questions relevant to the research were first analyzed quantitatively using a web-based statistical tool called *Langtest* (<https://langtest.jp/>). Wilcoxon signed-rank tests were conducted separately for each question to examine the differences between pre- and post-test responses regarding the students' attitudes. Qualitative data analysis was then conducted using a thematic analysis approach (Braun & Clarke, 2006) with the assistance of *MAXQDA* software. The qualitative data were entered into the software and underwent coding, categorization, and theme creation. The theme names were reviewed with an English Language Specialist at the university to ensure alignment between the themes and responses.

Results

In order to answer the research questions, both quantitative and qualitative data are presented accordingly; all names used for students' comments are pseudonyms. For the first research question, the focus was whether acquiring Japanese pronunciation was challenging. Based on the statement 'acquiring Japanese pronunciation was challenging' (Q1-6), the quantitative

data showed no significant difference pre- ($M = 6.06$, $SD = 1.44$) and post-instruction ($M = 5.44$, $SD = 1.55$). In the post-survey responses, the challenges were related to specific challenging pronunciation features (e.g., Japanese R and word-level pitch accent), linguistic differences between Japanese and their L1/LX, and required investment of time and practice. However, some students did not feel challenged due to positive language transfer and the facilitating effect of input outside the classroom.

Furthermore, when students were asked if it was possible to improve their Japanese pronunciation without PI (Q1-7), they responded negatively. The mean scores were generally low ($M = 4.62$) in the pre-instruction, and even lower in the post ($M = 3.88$), although a significant difference was not found. These lower scores indicate that PI appeared to be necessary to improve their pronunciation. On pre- and post-responses, many of the students affirmed their belief in the necessity of PI. In particular, the students attested that, by providing guidance and teacher assistance, PI facilitated their pronunciation learning, increased explicit pronunciation knowledge, and reinforced their existing knowledge. Other students, however, believed that exposure to input outside the classroom and practice in output would help them improve their pronunciation. Therefore, while receiving the pronunciation lessons was partly challenging, many of the students perceived them as necessary.

Concerning the second research question, the data regarding the question items (Q2-1~12) on students' attitudes towards others' accents were analyzed. Table 2 shows the descriptive statistics for these question items. The results of the quantitative data indicated no significant differences for most of the question items. However, on one question item 'rate your ability to understand speakers with foreign accents in your L1' (Q2-9), the result showed a significant difference between pre- and post-instruction scores. That is, students felt their ability to comprehend interlocutors speaking their L1 with a foreign accent increased following PI.

Table 2: Descriptive Statistics for the Question Items Related to Attitudes Towards Others' Accents

Items	Questions		$M (Md)$	SD	Z	p (Effect size r)
*Q2-1	When I hear someone start to speak with a foreign accent in English, I expect that it will be difficult to understand them.	Pre	5.18 (6)	2.18	0.38	.71 (.08)
		Post	5.09 (6)	1.81		
Q2-2	When I hear someone start to speak with a foreign accent in my first language, I expect that it will be difficult to understand them.	Pre	3.06 (3)	1.57	0.76	.45 (.13)
		Post	3.38 (3)	1.63		
Q2-3	I believe people should eliminate their foreign accents.	Pre	3.88 (4)	1.75	0.4	.69 (.07)
		Post	4.25 (5)	2.29		
*Q2-4	I would hesitate to communicate with speakers with accents in English.	Pre	3.36 (3)	2.34	0.59	.55 (.13)
		Post	3.36 (3)	2.38		

Q2-5	I would hesitate to communicate with speakers with accents in my first language.	Pre	1.88 (1.5)	1.09	0.1	.91 (.02)
		Post	1.81 (1)	1.52		
*Q2-6	When I communicate with speakers with accents in English, their accents would distract me.	Pre	4.55 (6)	2.21	0.6	.48 (.13)
		Post	4.18 (4)	3.09		
Q2-7	When I communicate with speakers with accents in my first language, their accents would distract me.	Pre	2.69 (3)	1.54	1.21	.23 (.21)
		Post	2.31 (2)	1.25		
*Q2-8	Rate your ability to understand speakers with foreign accents in English.	Pre	6.18 (6)	1.33	0.65	.52 (.14)
		Post	5.91 (6)	1.58		
Q2-9	Rate your ability to understand speakers with foreign accents in your first language.	Pre	6.88 (7)	1.75	2.03	.042 (.36)
		Post	7.79 (8)	1.01		

Note. *M* = Mean, *Md* = Midian, *SD* = Standard Deviation

* indicates the analysis was conducted for the data answered by LX speakers of English (*n* = 11).

To further understand students' attitudinal changes before and after PI, their attitudes towards others' accents were qualitatively analyzed. On the pre-test question items (Q2-10 and 11), when students were asked how they would feel when talking to people with foreign accents in English or their first language, they expressed mixed attitudes. As seen in Table 3, the following themes emerged. On the positive side, students raised themes of the acceptance of accents, positive emotions, and understanding the challenge of eliminating accents; negative responses included concerns about the negative impact on understanding, emotional impact, and novelty. As a neutral theme, the matter of accents depended on overall understanding specifically in terms of degree of accentedness and intelligibility.

Table 3: Themes and Sub-Themes Regarding Students Talking to People with Accents Prior to PI

Themes		Sub-themes
Positive	Acceptance of accents	<ul style="list-style-type: none"> • Normal • No problem • Representation of cultural backgrounds • Understanding the cause of accents
	Positive emotions	<ul style="list-style-type: none"> • Curiosity of the speaker's origin • Viewing equally • Respect for LX speakers • Likeness of accents
	Understanding the challenge of eliminating accents	

Neutral	Depending on overall understanding	<ul style="list-style-type: none"> • Degree of accentedness • Intelligibility
	Negative impact on understanding	<ul style="list-style-type: none"> • Degree of accentedness • Impact on comprehensibility
Negative	Emotional impact	<ul style="list-style-type: none"> • Annoyance • Embarrassment • Nervousness • Worry
	Novelty	

Despite these mixed responses in the pre-test, students' perspectives altered after receiving PI. Eleven students answered 'Yes' (compared to $n = 5$ for 'No') to the question item (Q2-10) if the lessons affected any of their perspectives. While acknowledging their increased awareness of pronunciation, some students revealed the impact of PI on their attitudes towards others' accent. Two themes emerged, specifically (1) an understanding of the difficulty of acquiring accurate pronunciation and (2) tolerance towards speakers with accents. Examples of the themes follow:

(1) *I felt that Japanese is more challenging than I thought, for different intonation and tones can affect meanings of sentence.* (Ferris)

(2) *I feel like I became more lenient towards speakers with accents of any language. Removing a foreign accent can be really hard.* (Andy)

I next analyzed whether PI affected students' interactions with people with foreign accents in their languages (Q2-12). The theme 'tolerance towards speakers with accents' emerged again. Furthermore, the analysis revealed themes of (3) sympathy and (4) empathy, as students commented:

(3) *It makes [me] understand some reasons of why people have accents.* (Bob)

(4) *I can think more on their side about how much time and effort it takes to eliminate that foreign accent.* (Oliver)

The other themes were "students' concern about other speakers' attitudes towards accents" and "the importance of pronunciation in communication."

Finally, students were asked specifically if the lessons affected their beliefs about accents (Q2-11). The responses indicated that their beliefs about accented speech were reversed. Similar to the previous question, the theme of tolerance towards speakers with accents emerged. However, it appeared that the pronunciation lessons also made students realize the importance of less accented speech as seen in the following:

Andy: Pronunciation lessons made me aware of the importance of eliminating accented speech. I knew it was important since the start, I just did not know it was this important.

Jacob: ...a foreign accent isn't [wasn't] a big issue to me until I realize[d] how difficult it is sometimes to understand my classmates and even my own Japanese through recording.

Discussion and Conclusion

The current study examined whether Japanese PI induced students to transform their attitudes towards foreign accents and to develop empathy for other people who speak with foreign accents. The analysis of students' responses revealed several transformative effects of PI. Students reported that PI was partly challenging but necessary for improving their pronunciation skills, which, in turn, could transform their attitudes towards accented speakers. PI also raised students' awareness of the difficulty of pronunciation acquisition. Finally, consistent with a previous study (Derwing et al., 2002), PI fostered students' tolerance and empathy towards speakers with foreign accents.

Despite the positive potential of PI, the current study identified some concerns regarding PI. The intervention in this study increased students' awareness of the importance of pronunciation and its potential impact on communication. The responses to questions Q2-12 revealed that PI could serve as an opportunity for students to recognize the adverse influence of pronunciation on their speech, particularly because the lessons emphasized their pronunciation skills more than regular non-PI lessons. As a result, some students felt that speech should not be strongly accented, and that other people might negatively judge their accents. Previous research has reported that imagining negative judgements of pronunciation by other people can provoke anxiety (e.g., Baran-Łucarz, 2014). The current study suggests that some improvements are needed in the instructional approach.

Before concluding, some limitations should be noted, including the number of lessons, limited time, and the single model. Only six lessons, each lasting 15-20 minutes, were conducted during the normal lesson time, and the teacher-researcher served as the sole model for students to listen to and imitate. Moreover, due to the scope of this study, it was not possible to include a large number of student responses or measure the actual development of pronunciation (i.e., intelligibility and comprehensibility). Importantly, this research stands as action research in a classroom context, suggesting further research is needed to generalize the findings.

Despite the limitations, it can be concluded from the current study that PI can cultivate a social justice pedagogy. PI for a target language has the potential to increase awareness of pronunciation and to promote empathy for and willingness to communicate with speakers who have accents, but it may also foster the idea of accent fallacy. Therefore, a revised approach to PI should (1) prioritize intelligibility and comprehensibility over achieving perfect nativeness (e.g., Derwing & Munro, 2015; Levis, 2020), (2) explicitly address the relationship between accents and intelligibility (Munro, 2003), and (3) incorporate speech recordings of diverse speakers (e.g., Darcy, 2018). According to Darcy (2018), teaching pronunciation fosters diversity by acknowledging a range of speakers, including not only L1 speakers but also LX speakers of the target language. Implementing this suggestion would enable language teachers to promote social justice pedagogy in pronunciation instruction, even in elementary-level courses.

Acknowledgements

I would like to express my gratitude to Dr. Mizuki Mazzotta for her invaluable guidance and insightful recommendations during the planning stage of my research. I am also grateful to Grace Song and Peggy Wagner for their language assistance and writing support in the preparation of this presentation and article.

Appendix

Scales

A nine-point scale (1 = *strongly disagree* – 9 = *strongly agree*) was utilized for Q1 and Q2-1~7.

For Q2-8 and 9 items, a different nine-point scale was adapted (1 = *very poor* – 9 = *excellent*).

Q1: Attitude toward one own pronunciation

Q1-1 (Pre/Post): Pronunciation is important to communicate with people of a target language.

Q1-2 (Pre/Post): Acquiring pronunciation like speakers who grew up in the target language environment is important to make yourself understood by interlocutors.

Q1-3 (Pre/Post): I am confident in my Japanese pronunciation.

Q1-4 (Pre/Post): I would like to eliminate foreign accents as much as possible.

Q1-5 (Pre/Post): I am afraid that Japanese people do not like my accented speech.

Q1-6 (Pre/Post): Acquiring Japanese pronunciation is/was challenging. [Describe the reason for post]

Q1-7 (Pre/Post): I believe it is/was possible to improve my Japanese pronunciation without pronunciation instruction. [Describe the reason]

Q2: Attitude toward others' pronunciation

Q2-1 (Pre/Post): When I hear someone start to speak with a foreign accent in English, I expect that it will be difficult to understand them.

Q2-2 (Pre/Post): When I hear someone start to speak with a foreign accent in my first language, I expect that it will be difficult to understand them.

Q2-3 (Pre/Post): I believe people should eliminate their foreign accents. [Describe the reason]

Q2-4 (Pre/Post): I would hesitate to communicate with speakers with accents in English.

Q2-5 (Pre/Post): I would hesitate to communicate with speakers with accents in my first language.

Q2-6 (Pre/Post): When I communicate with speakers with accents in English, their accents would distract me.

Q2-7 (Pre/Post): When I communicate with speakers with accents in my first language, their accents would distract me.

Q2-8 (Pre/Post): Rate your ability to understand speakers with foreign accents in English.

Q2-9 (Pre/Post): Rate your ability to understand speakers with foreign accents in your first language.

Q2-10 (Pre): How would you feel when you talk to people who speak English with a foreign accent?

What do you think of them? [Describe the detail]

Q2-11 (Pre): How would you feel when you talk to people who speak your first language with a foreign accent? What do you think of them? [Describe the detail]

Q2-10 (Post): Have the pronunciation lessons affected part of your perspectives? <Yes/No> [Describe the detail]

Q2-11 (Post): Do you think the pronunciation lessons have affected your belief about accented speech? <Yes/No> [Describe the detail]

Q2-12 (Post): Do you think the pronunciation lessons have had an effect on your interaction with people with foreign accents in the language(s) you speak? <Yes/No> [Describe the detail]

Q2-13 (Post): How were the pronunciation lessons? [Describe the detail]

References

- Akagi, H., Furuichi, Y., & Uchida, N. (2010). *Mainichi renshu! Rizumu de minutsuku nihongo no hatsuon* [Practice every day! Acquire Japanese pronunciation with rhythm]. 3A Corporation.
- Avineri, N., & Martinez, D. C. (2021). Applied linguists cultivating relationships for justice: An aspirational call to action. *Applied Linguistics*, 42(6), 1043–1054. <https://doi.org/10.1093/applin/amab065>
- Baran-Łucarz, M. (2014). The link between pronunciation anxiety and willingness to communicate in the foreign-language classroom: The Polish EFL context. *The Canadian Modern Language Review*, 70(4), 445–473. <https://doi.org/10.3138/cmlr.2666>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Darcy, I. (2018). Powerful and effective pronunciation instruction: How can we achieve it? *The CATESOL Journal*, 30(1), 13–45.
- De Costa, P. (2019). Foreword. In F. G. Fang (Ed.), *Re-positioning accent attitude in the global Englishes paradigm: A critical phenomenological case study in the Chinese context* (pp. ix–xi). Routledge.
- Derwing, T. M. (2003). What do ESL students say about their accents? *The Canadian Modern Language Review*, 59(4), 547–567. <https://doi.org/10.3138/cmlr.59.4.547>
- Derwing, T. M., Fraser, H., Kang, O., & Thomson, R. I. (2014). L2 accent and ethics: Issues that merit attention. In A. Mahboob & L. Barratt (Eds.), *Englishes in multilingual contexts: Language variation and education* (pp. 63–80). Springer Netherlands. https://doi.org/10.1007/978-94-017-8869-4_5
- Derwing, T. M., & Munro, M. J. (1997). Accent, intelligibility, and comprehensibility: Evidence from four L1s. *Studies in Second Language Acquisition*, 19(1), 1–16. <https://doi.org/10.1017/S0272263197001010>
- Derwing, T. M., & Munro, M. J. (2014). Training native speakers to listen to L2 speech. In J. M. Levis & A. Moyer (Eds.), *Social dynamics in second language accent* (pp. 219–236). De Gruyter Mouton. <https://doi.org/doi:10.1515/9781614511762.219>
- Derwing, T. M., & Munro, M. J. (2015). *Pronunciation fundamentals: Evidence-based perspectives for L2 teaching and research*. John Benjamins. <https://doi.org/10.1075/llt.42>
- Derwing, T. M., Munro, M. J., & Wiebe, G. (1998). Evidence in favor of a broad framework for pronunciation instruction. *Language Learning*, 48(3), 393–410. <https://doi.org/10.1111/0023-8333.00047>

- Derwing, T. M., Rossiter, M. J., & Munro, M. J. (2002). Teaching native speakers to listen to foreign-accented speech. *Journal of Multilingual and Multicultural Development*, 23(4), 245–259. <https://doi.org/10.1080/01434630208666468>
- Dewaele, J.-M. (2018). Why the dichotomy ‘L1 versus L2 user’ is better than ‘native Versus non-native speaker.’ *Applied Linguistics*, 39(2), 236–240. <https://doi.org/10.1093/applin/amw055>
- Foot, J. A., Holtby, A. K., & Derwing, T. M. (2012). Survey of the teaching of pronunciation in adult ESL programs in Canada, 2010. *TESL Canada Journal*, 29(1), 1–22. <https://doi.org/10.18806/tesl.v29i1.1086>
- Fraser, H. (2010). Cognitive theory as a tool for teaching pronunciation. In S. D. Knop, F. Boers, & A. D. Rycker (Eds.), *Fostering language teaching efficiency through cognitive linguistics* (pp. 357–380). De Gruyter Mouton. <https://doi.org/doi:10.1515/9783110245837.357>
- Gass, S., & Varonis, E. M. (1984). The effect of familiarity on the comprehensibility of nonnative speech. *Language Learning*, 34(1), 65–87. <https://doi.org/10.1111/j.1467-1770.1984.tb00996.x>
- Gluszek, A., & Dovidio, J. F. (2010). The way they speak: A social psychological perspective on the stigma of nonnative accents in communication. *Personality and Social Psychology Review*, 14(2), 214–237. <https://doi.org/10.1177/1088868309359288>
- Holmes, J. (2013). *An introduction to sociolinguistics* (4th ed.). Routledge. <https://doi.org/10.4324/9781315833057>
- Johnson, S. M. (2015). *Adult learning in the language classroom*. Multilingual Matters. <https://doi.org/10.21832/9781783094172>
- Kang, O., Rubin, D., & Lindemann, S. (2015). Mitigating U.S. undergraduates’ attitudes toward international teaching assistants. *TESOL Quarterly*, 49(4), 681–706. <https://doi.org/10.1002/tesq.192>
- Kang, O., & Yaw, K. (2021). Social judgement of L2 accented speech stereotyping and its influential factors. *Journal of Multilingual and Multicultural Development*, 1–16. <https://doi.org/10.1080/01434632.2021.1931247>
- Leaver, B. L. (2021). Transformative language learning and teaching: The next paradigm shift and its historical context. In B. L. Leaver, C. Campbell, & D. E. Davidson (Eds.), *Transformative language learning and teaching* (pp. 13–22). Cambridge University Press. <https://doi.org/10.1017/9781108870788>
- Leaver, B. L., Davidson, D. E., & Campbell, C. (Eds.). (2021). *Transformative language learning and teaching*. Cambridge University Press. <https://doi.org/10.1017/9781108870788>
- Levis, J. M. (2020). Revisiting the intelligibility and nativeness principles. *Journal of Second Language Pronunciation* 6(3), 310–328. <https://doi.org/10.1075/jslp.20050.lev>

- Lindemann, S., Campbell, M., Litzenberg, J., & Close Subtirelu, N. (2016). Explicit and implicit training methods for improving native English speakers' comprehension of nonnative speech. *Journal of Second Language Pronunciation*, 2(1), 93–108. <https://doi.org/10.1075/jslp.2.1.04lin>
- Lippi-Green, R. (2012). *English with an accent: Language, ideology and discrimination in the United States* (2nd ed.). Routledge. <https://doi.org/10.4324/9780203348802>
- Mezirow, J. (1991). *Transformative dimensions of adult learning*. Jossey-Bass.
- Munro, M. J. (2003). A primer on accent discrimination in the Canadian context. *TESL Canada Journal*, 20(2), 38–51. <https://doi.org/10.18806/tesl.v20i2.947>
- Pennington, M. C. (2021). Teaching pronunciation: The state of the art 2021. *RELC Journal*, 52(1), 3–21. <https://doi.org/10.1177/00336882211002283>
- Randolph, L. J. J., & Johnson, S. M. (2017). Social justice in the language classroom: A call to action. *Dimension*, 99–121.
- Rubin, D. L. (1992). Nonlanguage factors affecting undergraduates' judgments of nonnative English-speaking teaching assistants. *Research in Higher Education*, 33(4), 511–531. <https://doi.org/10.1007/BF00973770>
- Rubin, D. L., & Smith, K. A. (1990). Effects of accent, ethnicity, and lecture topic on undergraduates' perceptions of nonnative English-speaking teaching assistants. *International Journal of Intercultural Relations*, 14(3), 337–353. [https://doi.org/10.1016/0147-1767\(90\)90019-S](https://doi.org/10.1016/0147-1767(90)90019-S)
- Saito, K. (2021). What characterizes comprehensible and native-like pronunciation among English-as-a-second-language speakers? Meta-analyses of phonological, rater, and instructional Factors. *TESOL Quarterly*, 55(3), 866–900. <https://doi.org/10.1002/tesq.3027>
- Saito, K., & Lyster, R. (2012). Effects of form-focused instruction and corrective feedback on L2 pronunciation development of /ɹ/ by Japanese learners of English. *Language Learning*, 62(2), 595–633. <https://doi.org/10.1111/j.1467-9922.2011.00639.x>
- Saito, K., & Plonsky, L. (2019). Effects of second language pronunciation teaching revisited: A proposed measurement framework and meta-analysis. *Language Learning*, 69(3), 652–708. <https://doi.org/10.1111/lang.12345>
- Thomson, R. I., & Derwing, T. M. (2015). The effectiveness of L2 pronunciation instruction: A narrative review. *Applied Linguistics*, 36(3), 326–344. <https://doi.org/10.1093/applin/amu076>
- Tohsaku, Y.-H. (2021). Social networking approach: Language education for global citizenship. In Y.-H. Tohsaku, F. Nazikian, & J. Park (Eds.), *Social networking approach to Japanese language teaching* (pp. 1–17). Routledge.

- Tokumoto, M., & Shibata, M. (2011). Asian varieties of English: Attitudes towards pronunciation. *World Englishes*, 30(3), 392–408. <https://doi.org/10.1111/j.1467-971X.2011.01710.x>
- Trofimovich, P., & Isaacs, T. (2012). Disentangling accent from comprehensibility. *Bilingualism: Language and Cognition*, 15(4), 905–916. <https://doi.org/10.1017/S1366728912000168>
- Tsunemoto, A., & McDonough, K. (2021). Exploring Japanese EFL learners' attitudes toward English pronunciation and its relationship to perceived accentedness. *Language and Speech*, 64(1), 24–34. <https://doi.org/10.1177/0023830919900372>
- Weyant, J. M. (2007). Perspective taking as a means of reducing negative stereotyping of individuals who speak English as a second language. *Journal of Applied Social Psychology*, 37(4), 703–716. <https://doi.org/10.1111/j.1559-1816.2007.00181.x>
- Zielinski, B., & Yates, L. (2014). Pronunciation instruction is not appropriate for beginning-level learners. In L. Grant (Ed.), *Pronunciation myths: Applying second language research to classroom teaching* (pp. 56–79). University of Michigan Press.

Contact email: ryuichi.suzuki@emory.edu

Addressing the Root Causes: An In-Depth Analysis of Uzbekistan's Approach to Resolving the Issue of Underqualified Preschool Teachers

Munis Khusanova, University College London, United Kingdom

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

This article seeks to evaluate one of the components of the “Promoting early childhood development” project introduced to improve the qualification and Early Childhood Development (ECD) knowledge of preschool teachers in Uzbekistan. The Theory of Change (ToC) framework and SWOT analysis are adopted to evaluate the intervention. The ToC comments on the design of the intervention which complements the exploration of strengths, weaknesses, opportunities, and threats of the project. The article findings are presented upon these frameworks and arguments are justified with evidence from research papers. The intervention attempts to address the issue connected with the poor qualification of preschool teachers in Uzbekistan and brings them into a new level of development with the help of an updated in-service curriculum that is used to conduct a series of training. The critical analysis of the intervention explores an array of benefits of the intervention which brings positive change to the preschool teachers’ pedagogical competencies as well as improves their understanding of ECD. Along with it, the demerits of the intervention are identified, and it requires immediate mitigation. The article finishes by recapping the main points followed by the author’s recommendation to resolve the shortage of preschool teachers in Uzbekistan.

Keywords: ECD, Theory of Change, SWOT

iafor

The International Academic Forum
www.iafor.org

Introduction

Planning Problem: Poor Qualification of Preschool Teachers in Uzbekistan

The provision of good quality education by qualified teachers has always been one of the issues that challenge the GoU. Despite the efforts of the GoU, the attempts to improve the qualifications of teachers have resulted in uncertainty (The World Bank, 2019). According to the World Bank's report as of May 7, 2019, 77 percent of preschool teachers have a secondary vocational degree, so the country is facing a shortage of qualified preschool teachers (The World Bank, 2019). Despite a high number of graduates from local and foreign pedagogical universities, professionals with a degree in preschool education are departing from their careers and it is causing the disruptions in provision of good quality education as well as depriving children to develop physically and mentally in this critical stage of life. The GoU as a solution is focusing on the provision of training current preschool teachers which requires investment, as well as time. It is interesting to observe if this approach can improve teachers' knowledge, competencies, intrinsic motivation, and commitment.

Background

Having gained its independence from the Union of Soviet Socialist Republics (USSR) in 1991, the Government of Uzbekistan (GoU) has prioritized the education sector as the main tool of development. With the emergence of the Sustainable Development Goals Agenda (SDG) 2030, the GoU has focused on reaching a high enrolment rate in preschool education by 2030 to meet the requirements of SDG4.2 which states that the government should ensure access to a good quality preschool education delivery by the well-trained teachers so that children are ready for primary education. With the emergence of this goal, the issues related to preschool education became obvious.

From a critical assessment of preschool educational institutions, preschool education has been far from the level of modern requirements both in quantitative and qualitative terms. The President of the Republic of Uzbekistan Sh. M. Mirziyoev in his speech stressed that preschool education has been lagging for 25 years because the system was not adequately funded (Mirziyoyev, 2016). Statistics show the enrolment of children aged between 1 to 6 to preschool education in the republic decreased from 35.1 percent in 1991 to 17.3 percent in 2016 which happened due to the reduction of preschools across the country. In 1991 there were 9834 preschools, but by 2016 their number decreased to 5138, which means the number decreased by 47 percent (The Statistics Committee of the Republic of Uzbekistan, 2016). Inadequate support and attention to the system led to significant problems such as the deterioration in the quality of the educational process, limited economic opportunities, and low level of knowledge and qualifications of those working in this area, especially teachers. The state's ignorance of this system can still be observed, and the recovery will require a huge amount of effort, time, and finance.

The establishment of the Ministry of preschool education in 2016 was one of the biggest transformations in the country's history in the field of early childhood development. Since then, to ensure the legal status and support activities of the ministry, 27 regulatory documents have been adopted (Muminova, 2020). As a result of the reforms, the number of private preschool educational institutions increased to 568 meanwhile public-private preschool educational institutions reached 741 (Muminova, 2020). Within a short period of time, MPSE could double the salary of teachers and adopted policies expanded the enrolment and

attendance rate: from 2017 to 2019, the rate increased from 29 % to 52% and was expected to reach 100% for kids in grades 6-7 by 2022.

Due to the low percentage of preschool teachers with a university degree, over 9,000 preschool teachers have been retrained. Also, the GoU has started opening branches of foreign universities like Bucheon University in Tashkent and Russian State Pedagogical University named after A.I.Herzena which focus on training highly qualified preschool teachers (Muminova, 2020).

Despite these reforms, the level of qualification of preschool teachers does not allow children to prepare well for primary school, and an unknown preschool curriculum does not develop the social, personal, emotional, speech, mathematical, physical, and creative skills of children as many parents are using shadow education to help their children to develop.

The policymakers of Uzbekistan have stressed the significance of expanding preschool education and improving the teachers' qualifications as part of the country's educational policy because the shortage of qualified teachers and issues related to their retention have significant drawbacks on the child outcome and this lowers the status of the education system in general (Watlington et al., 2010a).

Theory of Change to Improve Preschool Teacher Qualifications in Uzbekistan

Currently, the MPSE has ongoing the "Promoting Early Childhood Development" Project, which costs US\$ 73.85 million. The length of the project is 5 years (2019-2024) and by the end of the cycle it aims to "increase access to early childhood education, improve the quality of learning environments in selected public preschools, and enable a systematic measurement of education quality for informed decision-making" (The World Bank, 2019). The improvement in education quality at preschool is going to be achieved by training teachers using a reviewed in-service training program because the project anticipates thousands of new preschool instructors and supervisors are annually needed to develop Early Childhood Education (ECD) services across the country. Broadly, qualified/trained teachers are one of the factors that produce a better outcome. Therefore, one of the components of the intervention is to improve the in-service training program which ultimately improves the quality of preschool education. The project allocates US \$5 million for the teacher training program (ibid.). The intervention aims to upgrade teachers' skills in developing the content and materials, and class delivery competencies in the form of continuous professional development (ibid.). Moreover, teachers are expected to be delivered complimentary modules on ECD development, climate change, child safety, and so on (ibid.). Financial technical assistance like the purchase of printing machines is expected to be delivered so that teaching happens in line with international practices. The program's goal is to reach out to 14,000 public preschool teachers, which represent nearly 25 percent of all public preschool teachers in Uzbekistan under the supervision of 700 master trainers (ibid.). The rest of the preschool teachers' training expenses are to be covered by other funding sources, such as the state budget, and are monitored during project implementation. From the intervention description, the following ToC has been framed.

Table 1 – The Theory of Change framework of the intervention

PDO: Improve quality of education in project supported public preschools				
Input	Activities	Output	Short-term Impact (PDO)	Long-term Impact
<ul style="list-style-type: none"> Improving the existing in-service training program for preschool teachers. Supporting the content, materials, and plan of delivery development processes. Engaging 700 master trainers to the program Purchase and installation of printing equipment and supplies for this equipment Technical assistance to develop a framework for professional development of preschool education staff 	<ul style="list-style-type: none"> Delivering peer-to-peer training program to public preschool teachers across the country to improve their skills and competencies Delivering complementary modules on child nutrition, hygiene, immunization, child protection, labour rights, climate change and child safety Training the remaining of preschool teachers with the state budget and other funds. 	<ul style="list-style-type: none"> In-service training program is updated with modern approaches and content 14000 preschool teachers are trained with modern child-centered approach 14000 preschool teachers expertise on child nutrition, hygiene, immunization, child protection, labour rights, climate change and child safety 75 percent of preschool teachers are training with the help of state budget 	<ul style="list-style-type: none"> Increased human resources capacity in preschool education 	<ul style="list-style-type: none"> Improved child development and human capital accumulation

(Source: The author's interpretation of ToC according to the intervention description)

Methodology

This study adopts the Theory of Change (ToC) as a framework to analyze the design of the intervention to understand how and why the initiative works. The analysis investigates the results chain which includes input, activities, output, and outcome to understand if they help achieve the objective of the intervention. Each division is introduced with its corresponding definition followed by its importance in relation to the designing process and comments to what extent each division is designed well. Having analyzed the design, the SWOT framework will be adopted to identify strengths, weaknesses, opportunities, and threads of the intervention. Conclusions and recommendations will be based on these frameworks.

Analysis and Findings

The Analysis of the Design of Theory of Change

A theory of change is a technical planning tool used to make a causal analysis based on the available data about a specific field to explain how an intervention is likely to result in a development change (United Nations Development Group, n.d.). A good ToC describes how the project is supposed to achieve the anticipated results (Gertler et al., 2016), addresses the root of the problem that impedes progress, and serves as a solution mechanism that embraces benefits, effectiveness, and feasibility (United Nations Development Group, n.d.). Moreover, it identifies important assumptions and risks to ensure that the intended change is achievable (ibid). It is important to strategically plan the intervention which should map out the results chain that includes input, activities, output, and outcomes (Gertler et al., 2015). Mostly, it is

presented in the form of a diagram or table (ibid.). The evaluation of the results chain will be based on these questions ¹:

Table 2 - Questions to evaluate the results chain

Results chain components	Questions
Input	Does it define the necessary resources to accomplish the objective?
Activities	Are the actions complimenting the project objectives?
Output	Is the time frame clearly stated? Is the output comprehensive? Is it beneficiary oriented? Is it demand-driven? Is it feasible in terms of resources?
Impact	What changes are emerging in education and society ultimately?

The *ToC* is targeted to address an issue regarding the poor quality of preschool services and low capacity. The “low capacity” refers to the poor qualifications of teachers and the capacity of preschool teachers in the system. The MPSE stated the need for the introduction of modern pedagogical technologies, effective forms and methods of education to integrate into the educational process (Ministry of Preschool Education of the Republic of Uzbekistan, 2018). The intervention is addressing the issue.

Moving further, the *input* element of the results chain clearly states the allocated budget for the teacher training program, the number of master trainers engaged in the training process, the support to update the training develops the content, resources, and delivery method of the in-service training program which result in a linear impact. However, there are some points that challenge the completeness of the input section. Firstly, an accountable person or organization for updating the in-service training curriculum is obscure. Secondly, if master teachers are hired locally or internationally and if their qualifications, as well as competencies, are sufficient to train preschool teachers using a reviewed curriculum are not mentioned in the description part of *ToC*. In case, local professionals are engaged in program design, the extent they are likely to influence the current in-service program is uncertain. Thirdly, it remains unclear to the reader if the MPSE has an in-service program in general and how it is superior in comparison with the reviewed one. The situational analysis part fails to shed the light on the current in-service programs. Lastly, other resources necessary for a long-term change, such as how continuous professional development is ensured not stated in the *ToC*. In terms of program content, the intervention fails to verify the integration of digital literacy skills. The covid-19 outbreak urged the need for digital literacy and accordingly, with the integration of ICT skills into the curriculum, teachers will be able to create digital learning resources (Nilsen et al., 2020).

¹ The World Bank’s The LogFrame handbook has been used to develop questions

The activities state the actions that transfer inputs into outputs (Gertler et al., 2016). ToC is targeting to improve the conditions for quality teaching by improving the existing in-service training program which is aimed at training teachers' skills (The World Bank, 2019). The rationale is based on the evidence – poor qualification of teachers (ibid.), but the intervention's causal chain does not present full information on how the teacher training process happens. From the description, a newly adopted in-service training program avoids the traditional way of teaching, and instead, peer-to-peer teaching practice is adopted. There is no justification if peer-to-peer teaching is effective. It raises concern if beneficiaries can comment on each other's performance without developing an adequate understanding of new methods or approaches. According to the research of Isner et al., coaching appears to be beneficial in in-service training programs (Egert et al., 2018) and the training delivery mode needs to be reconsidered. Another thing that is worth mentioning about activities, before scaling up on the country level and massively training 14000 teachers with an unspecified curriculum, the initial focus should be targeted on designing the curriculum and then piloting it with a control and target group as randomized controlled trials (RCTs). To understand what works in education and why, policy-making decisions should be based on practical evidence using RCTs rather than blindly following political desires (Morrison, 2001).

The output section of the results chain shows the impact that is produced due to the activities (Gertler et al., 2016). The expected output is that a new teacher training program is developed and teachers are trained in modern child-centered approaches. In terms of time frame, the duration of the teacher training program is not specified and if the duration of training can produce the desired impact remains unclear. Furthermore, ToC does not provide adequate information on the number of sessions, and the number of teachers expected to participate in each session. Eventually, it raises the question if the training can cause the COM-B² model of behavior change (Mayne, 2016). The vision should be plausible and must focus on the qualitative change that will happen in people's behavior, attitude, capabilities, or values (Keystone, 2009) rather than the quantitative. The class size yet need to be clarified. The mitigation measures to deal with the larger class ratio should be adequately stated in the intervention. A newly adopted in-service training curriculum most probably will create a demand for new teaching resources like textbooks. The intervention should come up with the ways of integrating new resources to the system in the next phases of the intervention. It is also worth mentioning that short-term courses can be equally beneficial as long-term ones if they are targeted at developing a specific set of skills (Egert et al., 2018). However, the scope of the training is broad, and it is uncertain if it produces the ultimate result. The studies of Barenthien et al. (2020) found that professional development courses may enhance teachers' motivation, but they may not ensure that teachers in fact learn knowledge.

One of the essential elements of the results chain is the *outcomes* which show that the results are attained only when the population starts using the project's output within a short or medium period (Gertler et al., 2016). A glance at the intervention reveals that PDOs and output not producing the desired outcome. The PDO aims at improving the quality of education and teacher training has been chosen as one of the actions. Nowadays, teacher training has become the most popular strategy for raising teacher quality (Shanti Mahendra & Sandra Baxter, 2011) but the measurement of the impact and effectiveness of teacher training programs on improving the quality of preschool education remain vague because

² The COM-B model of behaviour assumes that the combination of capabilities (C), opportunities (O), and motivation (M) produce a change in behaviour (B) (Mayne, 2016)

accomplishment indicators are measured only in numbers. Furthermore, the measurements of the teacher's learning impact on child outcomes need to be specified in the intervention.

Adapting Swot Analysis for Evaluation of Intervention

SWOT analysis is used to discover the strength, weaknesses, opportunities, and threats of the project or project planning processes³. The following diagram with questions has been created by the writer to assess the intervention. The analysis will help to understand what impact the project creates on society.

Table 3 – Questions to evaluate the strength, weaknesses, opportunities, and threats of the project or project planning processes

Strengths – project features that bring change.		Weaknesses – project features which cause challenges.	
Internal factors	<ul style="list-style-type: none"> - What makes the project strong? - What will the audience benefit from the project? - What is the greatest achievement of the project? 	<ul style="list-style-type: none"> - What needs to be improved? - What knowledge, talent, or resources does the project lack? 	
	Opportunities – aspect of the project that creates additional benefits.	Threats – aspects of project produce unintentional consequences	
External factors	<ul style="list-style-type: none"> - What unexpected positive impact does the project create in society? - What could the project do that has not been done yet? 	<ul style="list-style-type: none"> - What is the unintended negative consequence that the project create? - What obstacles does the project face? 	

(Source: Wikipedia. Accessed 10.01.23)

Strength. The following points make the intervention strong:

Sustainable Project. Intervention assumes to attract SIB for ECD projects which allow the country to pay when the results are obtained. The projects run in cooperation with SIB are result driven and can be used to reach specific outcomes. (Gustafsson-Wright & Gardiner, n.d.) With this, the GoU can avoid the risks in the provision of ineffective services (ibid.). International Educational can be attracted with the help of intermediaries to design effective in-service teacher training programs. Another option can be engaging giants in education like

³ https://en.wikipedia.org/wiki/SWOT_analysis

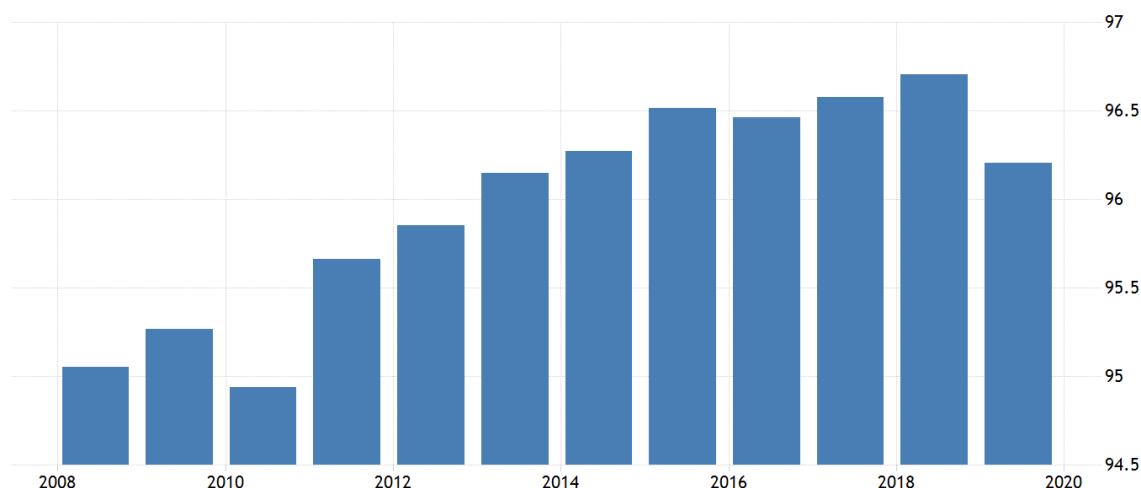
the British or American Council who can provide consultancy of developing adequate training programs. This will benefit the country not only in term of the effectiveness of the program, but it opens the way to integrate world standards into the system and improve the overall image of the country in delivering quality preschool education.

Professional Development. Teachers' knowledge and skills play a paramount role in a child's mental and physical development. If a newly adopted curriculum delivers the necessary content, integrates modern child development concepts, and hones preschool teachers' competencies, this program will truly be advantageous for Uzbek context in term of human capital development. Moreover, bringing up together preschool teachers across the country is another strength of the intervention because it gives teachers an opportunity to exchange knowledge and experience. Peer-to-peer learning gives an opportunity to look at teaching and learning processes from different perspectives (Aykaç, 2018). Peer learning hastens the development of mutual trust among learners (Pranger, 2016). Moreover, attending training sessions can boost teachers' confidence and develop networking with other teachers across the country. If organized adequately, teachers who complete the teacher training can all be united under the "Preschool Teachers' Association" which does not exist in Uzbek context with this intervention.

Weakness. Along with strength, the intervention should fix the following points to reach a desirable objective:

Lack of Monitoring and Evaluation. The role of monitoring and evaluation is important to measure the value, usefulness, and importance of the intervention (OECD/DAC Network on Development Evaluation, 2019). The measurement tools can be different from project to project. The designers of ToC choose the most appropriate and contextualize it considering the purpose of the intervention (ibid.). This intervention states that MPSE is responsible for the implementation, monitoring, and evaluation phases, but the restricted data on measurement tools or evaluation criteria for the intervention overlooks how the effectiveness is measured. Literature shows the absence of monitoring and evaluation creates an opportunity for money leakages.

Ignorance of Teachers' Well-being. Training and upgrading the skills of teachers is good from an educational perspective, however from a teacher's perspective it is an extra burden as they need to work and at the same time attend the training. Considering preschool teachers' schedules, it is difficult to realize if there is space to attend a teacher training program in the teachers' schedule. According to the information-legal portal "norma.uz", the current workload for the early-year educator is 36 hours (2018). In addition, the intervention needs to consider existing social factors in the country. According to the World Bank's development indicators, derived from official sources, the percentage of full and part-time female teachers in preschool education was reported to be more than 96 % in 2020. The diagram below shows the percentage of female preschool teachers for different periods of time.

Figure 1 – The percentage of female teachers in preschool education in Uzbekistan

(Source: World Bank, Trading Economics, accessed on 18.01.23⁴)

In Uzbek culture, women bear responsibility for the household and childcare (The Open Society Institute & Winrock, 2000). It can be said that preschool teachers are overloaded by ambitious goals, and their mental and physical well-being are ignored. Moreover, intervention activities state that teachers are expected to be trained on additional topics such as child nutrition, hygiene, immunization, child protection, climate resilience, and many more which raises a concern in the reader's mind: is being a preschool teacher a multitasking and universal job in Uzbekistan?

Vague Terminology. It is known that there are several developmental milestones for Preschoolers and this period includes children aged 3-7 in Uzbekistan (Sankar, 2021). Two preschool programs can be distinguished in the country: the first is intended to develop the cognitive and physical well-being of children (3-6) going to kindergarten and the second one offers a year before the start of primary education when children reach age 6. It teaches basic literacy and numeracy skills so that a child is ready to start primary education. The intervention fails to clearly specify the target audience. It is obscure to comprehend if it is preschool teachers who work with kids aged 3-6 or those who prepare children for primary education. In the Uzbek language, one terminology; “preschool education” is used to refer to both programs.

Absence of ECD Scientific Research Support. The intervention fails to adopt ECD scientific researchers that can be used to generate data on the effectiveness of the old and newly adopted in-service teacher training programs for the government and donor organizations. The comparative and systematic analysis of the training program before and after intervention can help to visualize what is needed to be changed in the future. Moreover, the support of research in ECD can reflect the latest concepts and approaches in the world and the GoU can refer to them while developing ECD policies developed to ensure good quality learning at preschools.

Complications With Evaluation. The intervention causes complications to evaluate how the learning from teacher training programs transfers into reality. The available evaluation

⁴ <https://tradingeconomics.com/uzbekistan/percentage-of-teachers-in-pre-primary-education-who-are-female-percent-wb-data.html>

strategies cannot be simply adopted due to contextual differences. In addition, evaluation is expensive and requires time, effort, and human resources (Ciraso, 2012). Moreover, the intervention does not mention how the project's effectiveness or efficiency will be mentioned.

Obscure Content. Improvements in in-service training programs do not define the content of the program. The realization of a successful training program initially requires conducting a needs analysis among beneficiaries. Accordingly, amendments need to be made so that the content fully satisfies the needs and preferences of beneficiaries. At the end of the program, evaluation tools should be designed to realize if the learning process and content address the needs of preschool teachers via surveys or interviews. In accordance with the finding, necessary changes and corrections can be made further to refine the in-service training program. Moreover, nowadays many European countries are implementing early science education in preschool teachers' education referring to the fact that children's early comprehension of science can influence positively their performance at further stages of education (Barenthien et al., 2020).

Opportunities. This intervention introduces an array of opportunities for the countries' well-being which include:

Developmental Outcomes for Children. One of the key factors that accelerate ECD is the enhanced skills and competencies of staff members. The research conducted by Heckman identifies a strong bond between the in-service training program and child development (Egert et al., 2018). He highlights major improvements in teachers have an impact on children's cognitive and socio-emotional development which ultimately leads to financial returns for society (Egert et al., 2018). This intervention benefits the young generation as human capital has become the most important factor in the development of the economy and society. By investing in it, it is possible to achieve economic growth rates which is a necessity for strengthening Uzbekistan's position in global competition. The quality of human capital is primarily formed by the education system, and the contribution of teachers is immense in this process.

Learning Opportunities. The effectiveness of professional development courses is acknowledged worldwide (Hamre et al., 2012). The in-service program can serve as a driving tool that keeps teachers up to date with the modern concepts, approaches, or research related to their field (Omar, 2014). The expertise, knowledge, or competencies developed through the training program, can improve teachers' performance at educational establishments (Omar, 2014) which might ultimately increase parental satisfaction with the service. Along with it, the in-service program empowers teachers' confidence and resilience to unexpected situations because the training unites novice and professional teachers and allows them to share their experiences related to the field.

Poverty Reduction. Qualified teachers have paramount importance to reduce the poverty rate, among vulnerable families or those living in rural areas. Poverty stroke areas are highly in need of professional teachers as they ensure the improvement in students' level of success and progress rather than novice ones. (Watlington et al., 2010b). This intervention may create an opportunity for a larger proportion of children coming from vulnerable families to get a good quality education so that they progress well at the further stages of education. Eventually, they will have more opportunities to become successful by having better job opportunities and increasing the outcome. Ultimately, the GoU might be able to bridge the gap between rich and poor in the future. Meanwhile, the state also benefits from this

intervention as when people earn more, they spend more and pay more taxes. Certainly, investment in human capital development has mutual benefits both for individuals and the state. All in all, in this century three things: education, skills, and knowledge determine the nation's as well as individuals' prosperity (Becker, Gary S. 1995).

Threats. As a result of the intervention unintended results may appear which include:

“Synthetic” Incentive. According to Sarvi et al. (2020), until recently the current in-service teacher training program in Uzbekistan has not been successful in creating motivation for professional development. Due to the introduction of a 25 percent growth in payment for completion of professional development courses, the situation has changed to a positive side (Sarvi et al., 2022). Due to the restricted number of literature available regarding this intervention, it is difficult to estimate the number of preschool teachers with a degree who started working in preschools after the salary increase policy. Also, teachers' incentives can differ contextually and culturally (Shanti Mahendra & Sandra Baxter, 2011). It is difficult to assume if teachers are intrinsically motivated for professional growth or if financial advantage is the only motivation for them. Financial incentives may cost the government and it does not show the improvement in the teachers' skills, competencies, or knowledge. Instead, the GoU could think of a performance-based promotion in a career like many other countries (Sarvi et al., 2022).

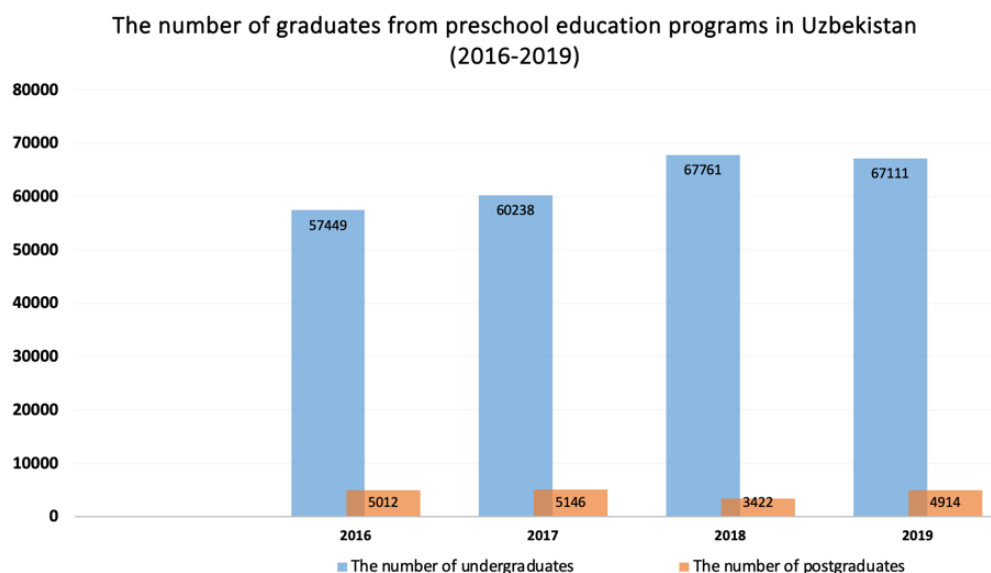
Quality Challenges. The content of the in-service teacher program in Uzbekistan has been based on memorization activities which hardly engaged teachers to think critically and develop competencies (Sarvi et al., 2022). Improving education quality requires a critical review of the content and research-based modern skills and knowledge needed for the future should be integrated into the content. Unless there is a change in the content, it is hard to achieve a change in the quality. Quality assurance remains one of the weakest points of this intervention. Moreover, if the amendments (not specified in the project) in in-service curriculum is small, the change in quality will be relatively small. Lastly, due to the limited information on the monitoring and evaluation process, it can be assumed the result of intervention will be uncertain and the preschool education system will benefit little from this intervention.

Discussions

The GoU's strong commitment to the development of the preschool education system has allowed positive changes to happen in a preschool teacher training program through intervention. Despite the limitation of the intervention, the training program will benefit preschool teachers as well as society, especially those living in rural areas. However, improving in-service programs and training teachers is not sufficient to meet the growing demand for quality education. Constant update of the training program requires funding and the measurement of impact. Therefore, the GoU should look for innovative, sustainable, long-term, and cost-effective solutions. The solution could be reconsidering current human resources and capacity. The greatest turnover in the country is the departure of high-quality teachers from the preschool field. According to the Statistics provided by the Ministry of Higher and Secondary Special Education (MHSSE) of the Republic of Uzbekistan, more than

270 000 students completed degrees (BA and MA) in preschool education between 2016-2019 ⁵.

Figure 2 – The number of graduates from a preschool education degree program in Uzbekistan between 2016-2019



(Source: MHSSE of the Republic of Uzbekistan. Unpublished material. Received 09.01.2023)

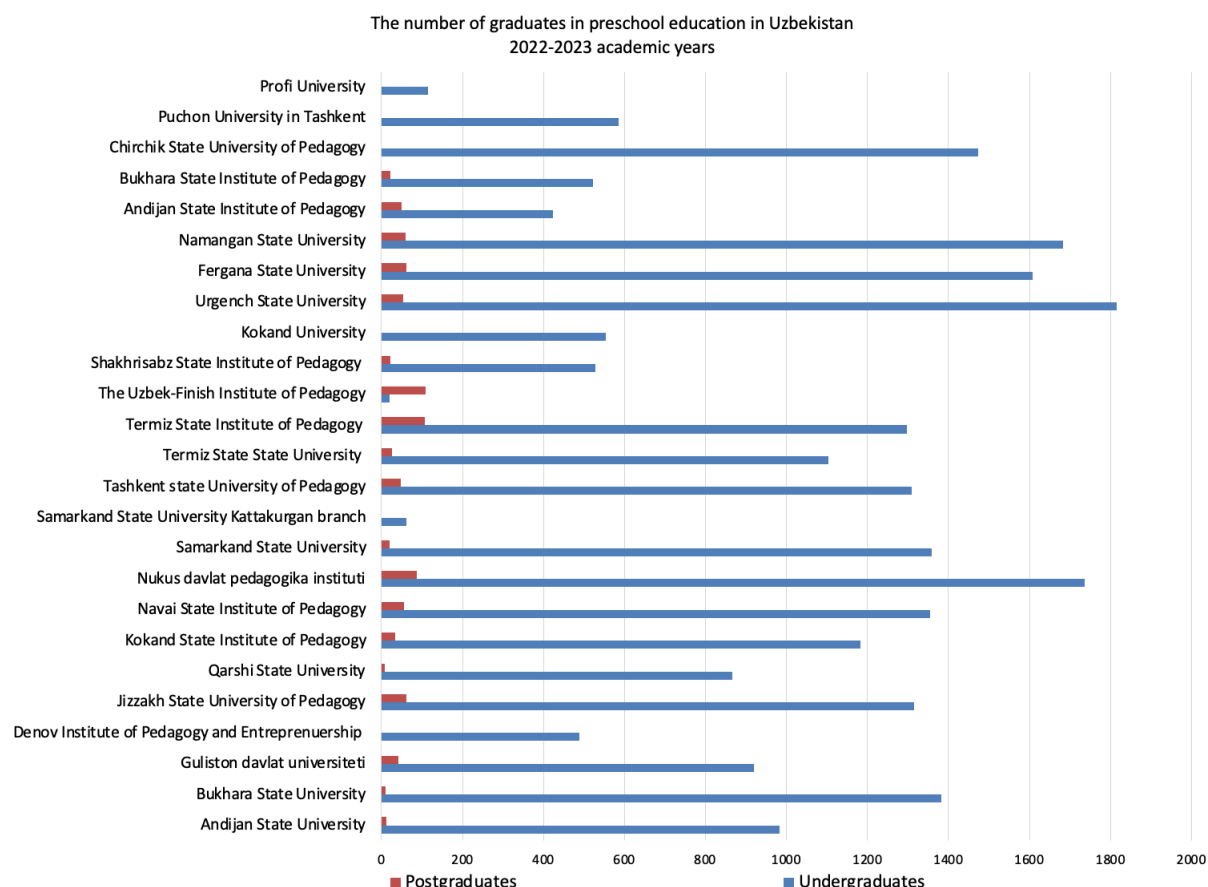
Despite a huge number of graduates in preschool education, more than 70 percent of preschool teachers have secondary or vocational degrees (World Bank Group, 2019). So, it is recommended to conduct a situational analysis to understand the barriers preventing university graduates with preschool education degrees to consider in the preschool system as a career. Instead of investing heavily in teacher training programs, finding ways to attract specialists back is advisable. Global Poverty Research Group finds that having a degree qualification in teaching increases students' achievement significantly (Shanti Mahendra & Sandra Baxter, 2011).

Currently, 24686 students have enrolled in “Preschool Education” degree programs offered by 25 universities across the country ⁶. The figures show that the GoU has got a big capacity of human resources in preschool education which can be used to improve the preschool education system.

⁵ The statistics has been provided by the Department of Coordination of Higher Education Institutions in MHSSE of the Republic of Uzbekistan in the form of excel document. 2023. Unpublished material.

⁶ The statistics has been provided by the Department of Coordination of Higher Education Institutions in MHSSE of the Republic of Uzbekistan in the form of excel document. 2023. Unpublished material.

Figure 3 – The number of students studying a preschool education degree program in Uzbekistan in 2022-2023 academic years



(Source: MHSSE of the Republic of Uzbekistan. Unpublished material. Received 09.01.2023)

Conclusion

The analysis and findings section clearly indicates that the current intervention's impact on the issue is restricted, but there is potential for effectiveness if the identified limitations are appropriately addressed. One potential approach to address the issue could involve designing an intervention that aims at engaging new/ previous graduates to the field through internship programs can ultimately evoke intrinsic, extrinsic, and altruistic motives to stay in the system and it improves the commitment to teaching as well as retention rates (Zhang et al., 2019). In addition, hiring graduates is a cost-cutting tactic that can replace a temporary remedy: teacher training programs to address the teacher crisis. Also, it is worth mentioning policies that are evidence-driven and formed by the evidence can effectively address issues rather than being a simple reaction to immediate pressures and they address causes rather than symptoms (Godfrey et al., 2010). Another minor recommendation could be reconsidering teachers' responsibilities at preschool establishments. Having analyzed their weekly workload and social responsibility, outsourcing university graduates as a part of their degree program from urban areas (2 times a week) to deliver literacy, mental activities, nutrition, and other language-related classes can take away the additional burden from preschool teachers. By creating internship opportunities and giving legal status to this activity, the ECD/ Preschool education graduates will be able to practice their knowledge at preschools and share their knowledge with preschool teachers which can address the teacher shortage and education

quality issues. However, establishing transparent and regular monitoring of the process should be ensured.

References

- Aykaç, N. (2018). Investigation of the In-service Teacher Training Programs in the United States and Recommendations for Turkey: The Case of Kent Education Excellence Partnership (KEEP) *. In *Journal of Education and Future year* (Issue 14).
- Barenthien, J., Oppermann, E., Anders, Y., & Steffensky, M. (2020). Preschool teachers' learning opportunities in their initial teacher education and in-service professional development—do they have an influence on preschool teachers' science-specific professional knowledge and motivation? *International Journal of Science Education*, 42(5), 744–763. <https://doi.org/10.1080/09500693.2020.1727586>
- Becker, Gary S. 1995. *Human capital and poverty alleviation*. Human Capital Working Paper. Retrieved from <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/121791468764735830/human-capital-and-poverty-alleviation>
- Ciraso, A. (2012). An Evaluation of the Effectiveness of Teacher Training: Some Results from a Study on the Transfer Factors of Teacher Training in Barcelona Area. *Procedia - Social and Behavioral Sciences*, 46, 1776–1780. <https://doi.org/10.1016/j.sbspro.2012.05.377>
- Davies, R. (2012). *Criteria for assessing the evaluability of a Theory of Change*. <http://mandenews.blogspot.com/2012/04/criteria-for-assessing-evaluablity-of.html>
- Egert, F., Fukkink, R. G., & Eckhardt, A. G. (2018). Impact of In-Service Professional Development Programs for Early Childhood Teachers on Quality Ratings and Child Outcomes: A Meta-Analysis. *Review of Educational Research*, 88(3), 401–433. <https://doi.org/10.3102/0034654317751918>
- Gertler, P., Martinez, S., Premand, P., Bank, W., & Vermeersch, C. M. J. (2015). Impact Evaluation in Practice Impact evaluation of the Nutritional Support Program (PAL) View project Preschool under extreme poverty View project. In *J. Vermeersch on* (Vol. 17). <https://www.researchgate.net/publication/280098184>
- Godfrey, L., Funk, N., & Mbizvo, C. (2010). Bridging the science-policy interface: A new era for South African research and the role of knowledge brokering. *South African Journal of Science*, 106(5–6). <https://doi.org/10.4102/sajs.v106i5/6.247>
- Hamre, B. K., Pianta, R. C., Burchinal, M., Field, S., LoCasale-Crouch, J., Downer, J. T., Howes, C., LaParo, K., & Scott-Little, C. (2012). A course on effective teacher-child interactions: Effects on teacher beliefs, knowledge, and observed practice. *American Educational Research Journal*, 49(1), 88–123. <https://doi.org/10.3102/0002831211434596/FORMAT/EPUB>
- Keystone. (2009). IPAL GUIDE 2. *Keystone*.
- Kim, J. H. (2022). Preschool participation and students' learning outcomes in primary school: Evidence from national reform of pre-primary education in Ethiopia. *International Journal of Educational Development*, 94, 102659. <https://doi.org/10.1016/J.IJEDUDEV.2022.102659>

Mayne, J. (2016). *The COM-B Theory of Change Model*.

Ministry of Preschool Education of the Republic of Uzbekistan. (2018, January 13). *On Measures to Improve the Management of the Preschool Education System*.
<https://mpe.uz/post-detail/posts/departamental-normative-regulations/801>

Mirziyoyev, Sh. “Tanqidiy tahlil, qat’iy tartib-intizom va shaxsiy javobgarlik – har bir rahbar faoliyatining kundalik qoidasi bo’lishi kerak”. Speech, Tashkent, 2016 Accessed January 11, 2023. Retrieved from
https://www.norma.uz/muhim_voqealar/tanqidiy_tahlil_qat_iy_tartib-intizom_va_shahsiy_javobgarlik_-_har_bir_rahbar_faoliyatining_kundalik_qoidasi_bulishi_kerak

Morrison, K. (2001). Randomised controlled trials for evidence-based education: Some problems in Judging “what works.” *Evaluation and Research in Education*, 15(2), 69–83. <https://doi.org/10.1080/09500790108666984>

Muminova, D. (n.d.). Preschool Teachers’ Beliefs and Practice Regarding Emergent Literacy in a Post-Stagnation Period: The Case of Uzbekistan. In *Sodobna pedagogika/Journal of Contemporary Educational Studies Let* (Vol. 71, Issue 137).

Nilsen, A. G., Almås, A. G., & Gram, H. (2020). Producing Digital Learning Resources (DLR) for Teacher Training. *Designs for Learning*, 12(1), 71–80.
<https://doi.org/10.16993/DFL.153>

Norma.uz - information-legal portal. (2018, January 9). *Workload and payment amounts for preschool teachers*.
https://www.norma.uz/oz/qonunchilikda_yangi/maktabgacha_talim_pedagoglari_uchun_ish_yuklamasi_va_mehnatga_haq_tulash_miqdorlari_belgilandi

O’Flynn, M. (2015). *Theory of Change*. <https://www.intrac.org/wpcms/wp-content/uploads/2016/12/Monitoring-and-Evaluation-Planning-Series.-Theory-of-Change.-16.pdf>

OECD/DAC Network on Development Evaluation. (2019). *Better Criteria for Better Evaluation Revised Evaluation Criteria Definitions and Principles for Use OECD/DAC Network on Development Evaluation*.

Omar, C. M. Z. C. (2014). The Need for In-Service Training for Teachers and It’s Effectiveness In School. *International Journal for Innovation Education and Research*, 2(11), 1–9. <https://doi.org/10.31686/ijer.vol2.iss11.261>

The Open Society Institute, A. F.-U., & Winrock, I. (2000). *The problems of women*. 1–54.

Pranger, F. (2016). Potentials and limitations of peer-learning in small groups with respect to the homogenisation of heterogeneous learning collectives. *International Journal for Lesson and Learning Studies*, 5(1), 19–35. <https://doi.org/10.1108/IJLLS-09-2015-0031>

Sankar, D., & Uzbekistan, U. (2021). *Uzbekistan Education Sector Analysis: 2021*.

- Sarvi, J., Tulivuori, J., & Asian Development Bank, for. (2022). *Challenges and Opportunities in Teacher Education Reforms Challenges and Opportunities in Teacher Education Reforms KEY POINTS*. <https://doi.org/10.22617/BRF220447>
- Shanti Mahendra, & Sandra Baxter. (2011). *Helpdesk Report: Impact of teacher training on students' learning outcomes*.
<https://assets.publishing.service.gov.uk/media/57a08ab2ed915d3cfd0008ba/Impact-of-Teacher-Training-on-Learning-Outcomes-October-2011.pdf>
- Sims, M., & Brettig, K. (2018). Early childhood education and early childhood development: Do the differences matter? *Power and Education*, 10(3), 275–287.
<https://doi.org/10.1177/1757743818771986>
- The Statistics Committee of the Republic of Uzbekistan, 2016. Access on 11.01.23. Retrieved from <https://www.stat.uz/ru/ofitsialnaya-statistika/social-protection>
- Stein, D., & Valters, C. (2012). *Understanding Theory of Change in International Development*.
- United Nations Development Group. (n.d.). *THEORY OF CHANGE. UNDAF CAMPANION GUIDANCE*.
- Watlington, E., Shockley, R., Guglielmino, P., & Felsher, R. (2010). The High Cost of Leaving: An Analysis of the Cost of Teacher Turnover. In *Source: Journal of Education Finance* (Vol. 36, Issue 1). <https://www.jstor.org/stable/40704404>
- The World Bank. (n.d.). *The LogFrame Handbook A Logical Framework Approach to Project Cycle Management*.
- World Bank Group. (2019). *Promoting Early Childhood Development Project*.
<https://www.worldbank.org/en/news/press-release/2019/05/29/new-project-aims-to-strengthen-the-quality-and-access-to-early-childhood-education-in-uzbekistan>
- Zhang, L., Yu, S., & Liu, H. (2019). Understanding teachers' motivation for and commitment to teaching: profiles of Chinese early career, early childhood teachers. *Teachers and Teaching: Theory and Practice*, 25(7), 890–914.
<https://doi.org/10.1080/13540602.2019.1670155>
- Zhang, L., Yu, S., & Liu, H. (2019). Understanding teachers' motivation for and commitment to teaching: profiles of Chinese early career, early childhood teachers. *Teachers and Teaching: Theory and Practice*, 25(7), 890–914.
<https://doi.org/10.1080/13540602.2019.1670155>

Contact email: muniskhusanova@gmail.com

Czech Higher Education in Continuity With the Challenges of the Contemporary World

Marcela Göttlichová, Tomas Bata University in Zlín, Czech Republic

The Paris Conference on Education 2023
Official Conference Proceedings

Abstract

The significant impact of the primary idea of the conference became tangible not only in the disruptive period of the COVID-19 pandemic, which strongly affected all levels of education without exception but also in the current post-covid era. Czech higher education also had to deal with some problems during its journey. The primary goal of education, according to the requirements of the Ministry of Education, Youth, and Sports presented in the Strategy of the Education Policy of the Czech Republic until 2030+, is a more significant focus of education on the acquisition of competencies needed for an active civic, professional, and personal life. This means motivating university students sufficiently, but at the same time equipping them with essential and indispensable competencies so that they can use their potential to the maximum extent within the dynamically changing world not only for their development but at the same time concerning others and for the benefit of the development of the entire society. Thus, the presented study, in continuity with the results of the survey among students of the Faculty of Multimedia Communications of the Tomas Bata University in Zlín, offers a path leading to the possibility of eliminating persistent problems in education both in the reflection of pandemic changes and in the post-Covid period. The way to re-strengthen the integration of theory and practice in the continuity of cooperation with regional non-governmental, non-profit organizations is reflected in an initiative approach to teaching and strengthening regional development.

Keywords: Higher Education, COVID and Post-COVID Era, Key Competences, Project Education/Teaching, Integration of Theory and Practice, Non-state Non-profit Organizations, Regional Development

iafor

The International Academic Forum
www.iafor.org

Introduction

"Education has the power to transform and change while constantly transforming and changing." As already mentioned in the abstract, the reflection of the impact of the primary idea of the conference became intensely tangible not only in the revolutionary period of the COVID-19 pandemic, which strongly affected all levels of education without exception, but also in the current post-COVID era. We are witnessing many social changes that affect all areas of human activity without exception. But to be able to respond to these changes, the educational system must be adequately prepared for them. Due to significant changes in society caused by dynamic development, adapting the content, methods, and forms of education to current developments becomes necessary. At the same time, create an environment in educational institutions that will be safe, fair, stimulating, and sufficiently challenging for everyone (*Strategy 30+*). Czech education also had to deal with several problems on its way. The presence indicated the need to set new paths to transform current forms and methods and improve Czech education. The presented study directs its attention specifically to the field of (Czech) higher education.

Higher Education in the Czech Republic

The tertiary education sector in the Czech Republic (CR) is divided into higher education and tertiary professional education. Higher education is traditionally provided by universities at ISCED 645, 7 and 8 levels. Higher vocational education is organized by practically oriented tertiary professional schools (conservatories) at the ISCED 655 level. Significant changes in Czech higher education took place on the basis of the Sorbonne and Bologna Declarations. Based on them, the current form of study was transformed into a two-level system (bachelor's and subsequent master's study program). Since 2001, a three-level structure of higher education has been strictly introduced: 1. *Bachelor's degree program* (ISCED 645, 3-4 years): preparation for the performance of a profession and at the same time for study in a subsequent master's degree program; state final exam, usually with the defense of a bachelor's thesis ("bachelor" - Bc., BcA.). 2. *Master's degree program* (ISCED 7): a) (ISCED 747, Bc+1-3 years): primarily acquiring theoretical knowledge with the possibility of their application and developing abilities for creative activity or talent; state final exam with thesis defense (e.g. Ing., Mgr., MgA., MUDr., MDDr.); the field of medicine and veterinary medicine and hygiene state rigorous examination; independent program ISCED 746, (4-6 years): graduates with a "master's" degree (Mgr., MgA.), rigorous state examination with defense of a rigorous thesis in the corresponding field of study (e.g. JUDr., PhDr., RNDr., etc.). 3. *Doctoral degree program* (ISCED 844, 3-4 years): scientific research and independent creative activity in the field of research, development or creative activity in the field of art; doctoral examination with dissertation defense (Ph.D., Th.D.). Higher education institutions in the Czech Republic are divided into universities (all degree programs in continuity with research, development, innovation, or artistic and other creative activities, 24 public, 2 state, 3 private), and non-university (bachelor's degree programs, exceptionally master's degree programs, 2 public, 33 private). From the founder's point of view, public (2, public law institutions), state (2, military and police, without legal personality, ministry), and private (33, legal entity) (see Table 1) (Higher education Czechia, 2023).

	Total number	Type of study program			
		Bachelor's Program	Master's Program	Follow-up Master's Program	Doctoral Program
Total number of universities	304.054	182.454	32.526	70.033	21.375
Public universities	276.422	160.755	32.526	64.064	21.291
Private universities	28.152	22.033	-	6.056	87

Table 1: The total number of students at all types of universities in the Czech Republic (2021/22).
Source: Göttlichová according to Czech Statistical Office, 2022.

Until 2003, more male students than female students studied at universities. However, female students outnumbered their male counterparts by almost 30% over the next seven years. In the last three years, a quarter (33 thousand) more women than men have been studying at universities in the Czech Republic. In contrast to the number of students, the number of university graduates in the Czech Republic continues to decrease. In 2021, 60,547 people graduated from higher education institutions in the Czech Republic, 2,400 less than in the previous year and by a third less than ten years ago (Cieslar, 2022).

Higher Education and the Pandemic

Now that the education system seems to return to normal after the pandemic, it is time to follow up on its impact after almost three years of disruption. In 2022, UNESCO published a report *Resuming or reforming? Tracking the global impact of the COVID-19 pandemic on higher education after two years of disruption*. The authors of the report pointed out that in May 2020, the International Association of Universities (IAU) initiated the implementation of a research project on the impact of COVID-19 on higher education (Regional & National Perspectives on the Impact of COVID-19 on Higher Education) (Delgado, 2023). The survey analysis is based on 424 complete responses from unique HEIs in 109 countries and two Special Administrative Regions of China (Hong Kong and Macao). The conclusions showed that about 67% of HEIs switched to online teaching, about a quarter suspended classes while searching for solutions, and 7% ultimately canceled their teaching processes. Almost all involved universities confirmed the negative impact of the transition to an online form of teaching, with only 2% of universities (7 universities) reporting that teaching and learning were unaffected (Marinoni et al., 2020).

The Impact of the Pandemic on Czech Higher Education

In Czech higher education, the academic year 2020/2021 took place almost exclusively in distance learning (135 days). Theoretical teaching was (as of spring 2020) almost entirely moved to the online space; practical education was implemented only in some fields (e.g., medical or health care) in different arrangements depending on the currently valid epidemiological measures (vlada.cz, 2021). The results of a survey carried out by the Ministry of Education, Youth and Sports of the Czech Republic (MEYS in Czech, 2021) on public universities (PU) showed that (not only) the well-being of students and academic staff, the MEYS and the entire educational system will have to focus much more attention to achieve effective educational outcomes. 23,060 students and 4,588 academic staff took part in the survey. The focus was, for instance, on the effects of the pandemic and distance learning on physical and mental health, factors affecting well-being, the financial situation of students and academic staff, or the consequences of limiting contact and face-to-face teaching

(on a scale of A/very often, B/often, C/sometimes, D/occasionally, E/rarely). The most significant adverse impacts from the student's point of view were in the areas of: 1. mental health (A/32%, B/24%); 2. overall life (A/34%, B/16%); 3. physical health (A/33%, B/13%). From the point of view of the negative influence of factors in continuity with well-being, negative aspects such as 1. uncertainty regarding rules (A/43%, B/29%); 2. lack of social contact with classmates (A/43%, B/27%) and with friends (A/38%, B/29%), etc. Subsequently, the pandemic and distance learning impact on university students play a significant role in the educational process, especially the loss of students' motivation to study, resignation from study activities, and the students' negative feelings (see Table 2) (Duspivová, Barták, 2021).

	very				
	often	often	sometimes	rarely	never
Loss of motivation to study	35%	22%	20%	11%	13%
Decrease in the quality of work	10%	13%	20%	22%	34%
Resignation from the study activity	27%	22%	15%	10%	25%
Negative feelings of the student	23%	15%	16%	13%	33%
Considerations about change of the major	11%	8%	11%	12%	58%
Considerations of dropping out	13%	9%	13%	15%	51%
Considerations of therapy	12%	10%	14%	13%	50%

Table 2: Consequences of the impact of the pandemic and distance learning on students N=23,060.

Source: Modified according to Duspivová, Barták, 2021.

In the same way, we can also talk about the overall assessment of distance learning by students compared to academic staff (see Chart 1).

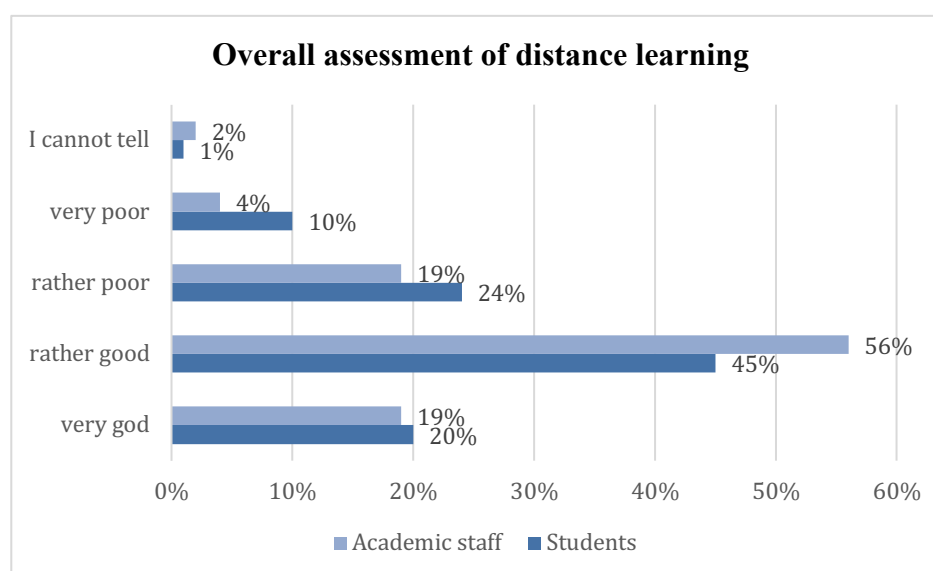


Chart 1: Overall evaluation of distance learning by university students and academic staff, N=23,060.

Source: According to the Ministry of Education, Culture, Sports, and Science, 2021.

Methodology

Problem Formulation

As mentioned in the UNESCO IESALC report, the impact of the pandemic on higher education has been profound and varied for each institution and country, generally showing great efforts to adapt to changes at all levels rapidly. The pandemic, with its strong impact on the education system, has revealed the essential need to transform educational activity. However, the rapid return to face-to-face teaching and learning and the stabilization of enrollment patterns suggest that the changes will only lead to a partial transformation of higher education as a face-to-face experience. Thus, higher education institutions may introduce some necessary new procedures long-term (Delgado, 2022, 2023, Marinoni et al., 2020, Plakhotnik, M. S. et al. 2021). We can ask whether university students will be sufficiently prepared for a professional career in continuity with the market's and society's needs? As reported by the EU Commission, more than three out of four companies in the EU currently need help finding qualified employees with the right skills, which is reflected in the demand for increased education and training of students. In the words of reporter Anna Zalewska (2023): "The world is changing at a fast pace ... and we have to face the challenges it brings. We need new skills, ... to respond to different organizational needs. Preparation for the labor market begins already at school ... it is therefore necessary to coordinate education in accordance with the current labor market (Europe Parliament, 2023)."

Changes in Czech Higher Education in Continuity With the Impact of the Pandemic

The problems brought about by the pandemic, with its impact on higher education and the dynamically changing world, were reflected in the necessity of setting a new strategic line for the education policy of the Czech Republic. The main challenge of *2020-2023 Strategic Implementation Plan (SIP 2023)* thus became "a dynamic response to a changing world." Priority objective 1 is thus oriented towards 1.A *Developing competencies directly relevant for life and practice in the 21st century*; 1.B *Developing methods for ensuring the quality of education and verifying learning outcomes*; 1.C *Strengthening the connection of study to practice and preparation for future application*, and 1.D *Further development of the professional profile of the study and strengthening of its prestige* (MSMT-12689/2022-3). *SIP 2023* represents an integral part of the strategic management of the Czech higher education system in direct continuity with *the Strategy of the Education Policy of the Czech Republic until 2030+ (Strategy 2030+)*. Implementing *Strategy 2030+* aims to create and develop an open educational system in direct continuity with the changing external environment and provides relevant educational content from a lifelong perspective. The goal of education is to provide a motivation to an individual equipped with essential and indispensable competencies, who can use his potential to the maximum extent in a dynamically changing world for the benefit of his development, as well as concerning others, but also for the benefit of the development of society as a whole, i.e., competencies needed for an active civic, professional and personal life. *The Strategy 2030+* thus primarily responds to "4. the industrial revolution" (Morgan, 2014; Schwab, 2017; Schwab, Mallert, 2021) or the "second age of machines" (Brynjolfsson, McAfee, 2015), which are among the current trends transforming many areas of human activity - and whose technological and social aspects require the development of the necessary competencies for success in personal and working life and on the labor market (MSMT 2020) (Fryč et al., 2020, Program, 2021).

Problem Solution

Innovation

Innovations change the direction of education and can replace or displace existing models, i.e., existing methodologies and ways of transferring knowledge by opening up new learning alternatives. We also include innovations in teaching methods, such as the development of new learning materials, mechanisms, and spaces, and transforming the role of students and the way they absorb and use educational knowledge (García-Morales et al., 2021). Universities must move away from a system of predominantly "lecture-based learning" to "problem-based learning" methodologies that more actively engage students (Marinoni et al., 2020), with a subsequent reflection in the re-evaluation of the skills and competencies required of students in the current environment.

Integration of Theory and Practice

One of the primary sources of innovation representing a significant driving force of sustainable economic development is creativity, which, in continuity with innovation, is of fundamental importance for the development of business and for Europe's competitiveness on an international scale; the orientation of attention leading to the acquisition of key competencies of university students, which would not be possible without ensuring a fully functional knowledge triangle: *education - research - innovation*. It is a partnership between the business world and the education, training, and research sector that can ensure a better focus on the skills and competencies required by the labor market while strengthening innovation and entrepreneurial capabilities within the educational process. In today's dynamically developing world, the set path must be aimed at supporting a more comprehensive academic community, where representatives of civil society and other interested parties will be involved to create an atmosphere that promotes creativity and a better alignment of professional and social needs, as well as the personal satisfaction of individuals. Here, more than in the pre-pandemic era, the necessity of supporting the development of transferable skills of university graduates in continuity with the development of cooperation between universities and employers (commercial and non-commercial spheres) is coming to the fore, for example, in the area of continuing to expand student practice opportunities within the educational process, in the effective contribution of employers to the creation of educational programs, teaching, practice and evaluation of results, etc. In particular, it is crucial to eliminate the persistent problem, represented by the unsatisfactory integration of theory and practice, reflected in the need for more sufficiently well-prepared, initiative, and motivated individuals.

Project Learning/Teaching

One of the ways leading to the strengthening of student motivation in continuity with reactive involvement in the educational process is the support of project teaching in continuity with the requirements of *Strategy 2030+*. Within the framework of pedagogical terminology, we are talking about a teaching method derived from pragmatic pedagogy and the principle of instrumentalism, in which students are led to work on specific projects independently, in conjunction with gaining experience based on practical activity and experimentation. We are, therefore, talking about a method that supports student motivation and cooperative learning, whether it is projects in the form of integrated topics, practical problems from real life, or functional activities leading to creating a product or product (Průcha et al., 2003). Although

W. H. Killpatrick (*The Project Method*, 1918) is considered to be the creator of the project method, we find the basis in the concept of pragmatic philosophy of J. Dewey (1859-1952), which is based on the claim that experience is the basis of knowledge, i.e., applying knowledge to life. Man encounters various problematic situations in our ever-changing world. Active experimentation is vital for the research process, by which we gain experience and knowledge, which we store and thus create a "toolbox" for further problem-solving. Learning can only be effective if it is active and based on experience. One experience is reconstructed based on another. The school is supposed to function based on real-life situations, and its main task must be to teach individuals to adapt to change (Dewey, 1926).

Key Competencies

Even the present shows us that the independent implementation of projects, the goal of which is to connect life, learning, and work, leads to the acquisition of professional and organizational competencies. By the end of May 2022, 25,000 people had been contacted. Companies or institutions use an interactive tool for data collection to fill out a questionnaire, the aim of which was, among other things, to find out the preference criteria for university graduates when hiring (Study of employers' needs). The research was carried out within the National Pedagogical Institute of the Czech Republic (2023) framework. The return represented 1188 completed questionnaires, of which 946 were complete. The conclusions showed that employers (N=652) expect a greater willingness to further education and development (60%), flexibility (47%), knowledge of new technologies and more advanced IT knowledge (45), originality of ideas (42) from university graduates (N=652). %) and an excellent ability to communicate in a foreign language (40%). Among the most common shortcomings of university graduates when entering the labor market insufficient preparation in the field of practical experience (48%), willingness to take responsibility (45%), the ability to lead and manage others (38%), the ability to deal with people (29%) stood out, the ability to solve problems (25%) and work under pressure (25%), etc. (Doležalová et al., 2023). The research thus confirmed that more and more emphasis must be placed on developing cooperation between universities and employers (commercial and non-commercial spheres) in continuity with market requirements. The respondents' answers also confirmed the necessity of a close connection between the employer and educational spheres, which they see as one of the ways that lead to the knowledge, abilities, and skills of school graduates being more in line with the requirements of the labor market.

Civil Society – Non-profit Sector – Non-governmental, Non-profit Organizations

As the previous text showed, we still need to address several things that must be addressed. However, it is more than just the commercial sphere representing an opportunity for university students. A significant role is also played here by civil society (CS), i.e., the nonprofit sector (NPS), specifically non-governmental, non-profit organizations (NGOs), bringing together different groups of citizens with other interests, a plurality of topics and goals, characterized by various structures, financing, legal forms, employees, etc. OS and its organizations play an important social, political, and economic role in democratic countries. Characteristic features include "participation and action, the central features of the activity are presented by spontaneity and creativity, autonomy and voluntariness" – "with room for creativity and innovation" (Miléřová, 2020). Already in 2016, *the Council of Europe* presented a new *competence model* for democratic culture in continuity with application to the educational system with an orientation to the development of curricula, procedures, and evaluation, at the same time also modeling attitudes and behavior, democratic processes in

the classroom, cooperative teaching, project-based teaching, and service learning with the explicit goal that active citizenship is best learned actively, and not by passive lecturing.

Out of the twenty established competencies within the competence model, the following stand out: *analytical and critical thinking skills; skills of listening and observing; empathy; flexibility and adaptability; linguistic, communicative and plurilingual skills; co-operation skills; conflict-resolution skills; knowledge and critical understanding of the self, responsibility; autonomous learning skills; self-efficacy* in continuity with one of the significant values – valuing human dignity and human rights (xxx). Similar preferences were also confirmed by research carried out in 2021 among 198 NGOs of the Zlín Region (ZR), where the following preferences stood in the foreground: communication skills (82%), teamwork skills (72%), capability of problem-solving (68%), taking responsibility (63%), adaptability and flexibility (61%), willingness to learn (58%), leadership skills (58%), etc., a significant change in preference was then noted by IT skills (49%) and foreign language knowledge (38%), in connection with patience, empathy, moral approach, tolerance, etc. NGOs saw the biggest problem for students in the ability to solve problems, lead and make decisions, and teamwork (Göttlichová, 2021).

Objectives and Methodology

To fulfill the strategic line of the University (*Strategy 2023+*) in continuity with solving problems due to the pandemic crisis, as well as the needs of a rapidly changing society with an impact on the education system, it is also necessary to understand the attitudes of students, to know their approach to solving the set problems, possible proposals to implement procedures, teamwork skills, and appropriate communication. The research was carried out in as an online questionnaire, which took place, like every year, in June 2022 among 138 students of the Faculty of Multimedia Communications of the Tomas Bata University in Zlín (FMC TBU). The answers are presented in direct correlation with the monitored issue in the post-pandemic period, i.e., comparison of students' preferences for competencies: A/2022/commercial and B/2022/non-commercial spheres, here with the values of the pre-pandemic period (C/2019/NGOs, 114 students of FMC TBU).

For the needs of the study, it is beneficial to find out whether students perceive a difference in their preference for key competencies in the commercial or non-commercial sphere and to what extent we can find changes in the perception of key competencies in the period before and after the pandemic, which is presented by the presented values (see Table 3), reflecting previous data presented (see Doležalová et al., 2023, Göttlichová, 2021). At the same time, what do they see as concerns, whether they are interested in focusing their attention on the problems of NS and participating actively in their solution, including within the practical activities of the educational process? As the results of the survey showed, the preferences of competencies in the given sectors do not show significant differences if we do not take into account the specifics of the preferred choices of NGOs, the comparison of the values before and after the covid period confirmed, in addition to the already (recurring) essential competences, the necessity of increasing IT skills, knowledge of a foreign language and willingness to learning, especially the necessity of taking responsibility in the commercial and non-commercial sectors.

Key competencies/preference (students)	2022/A		2022/B		2019/C	
	%	rating	%	rating	%	rating
Communication skills	40.2	3	58.5	2	66.7	1
Capability of problem-solving	38.5	5	52.2	4	54.4	3
Team working skills	37.2	7	58.4	3	55.2	2
Taking responsibility	68.0	1	77.6	1	47.4	4
Mastering information processing	38.0	6	29.5	8	12.8	7
Adaptability and flexibility	26.5	8	37.0	6	24.6	6
Willingness to learn	43.2	2	36.6	7	11.5	8
Ability to make decisions	39.4	4	37.8	5	29.8	5
Reading and comprehension to work instructions	14.5	9	8.8	11	10.5	9
IT skills	12.5	10	10.2	9	1.0	12/13
Leadership skills	6.2	12	8.0	12	4.9	10
Foreign language knowledge	11.5	11	9.8	10	2.0	11
Work with numbers in the working process	4.5	13	2.4	13	1.0	12/3

Table 3: Preference of key competencies in terms of university students.
Source: Göttlichová, 2022.

Even though students in the greater half (57.6%) indicated agreement within the requirements of the commercial and non-commercial sectors, the research pointed out, as in the framework of *the competence model*, the necessity of other necessary competencies (see Table 4), due to the difference like the work of both monitored sectors.

Other crucial key competencies for NOs	University students	
	%	rating
Empathy	24	1
Moral and ethical approach	21	2
Interest in the field	18	3
Relationships, kindness	16	4
Willingness, understanding, tolerance	11	5
Solidarity	8	6
Openness	6	7

Table 4: The most preferred differences in requirements for university graduates by NGOs.
Source: Göttlichová, 2022.

Part of the research was also finding which competencies the students consider problematic within the framework of NGO requirements (see Table 5).

The most common concerns perceived by students	University students	
	%	rating
Taking responsibility	64	1
Ability to make decisions	39	2
Leadership skills	36	3-4
Capability of problem-solving	36	3-4
Adaptability and flexibility	18	5
Mastering information processing	16	6
IT skills	14	7

Table 5: The most frequent concerns in continuity with NGO competence requirements in the perception of students.

Source: Göttlichová, 2022.

It is clear from the table that these are competencies important for university graduates, regardless of whether it is the non-commercial or commercial sector. At the same time, these are also the competencies that, among other things, are aimed at by the FMC TBU *Projects of Non-profit Organizations* course, enabling students to have an independent, creative approach to solving social problems. Fully 89% of students confirmed in the research the significant benefit of project implementation both for NGOs and for themselves.

Solution

Projects of Non-profit Organizations

One of the options aimed at achieving the set goal, which is to improve the quality of higher education, creating conditions for an easier transition of graduates to the labor market - and currently mitigating the impact of the pandemic, as well as the dynamism of the onslaught of the requirements of the current rapidly changing world and meeting today's demands, is the realization of a unique course at the Institute of Marketing Communications at FMC TBU in Zlín - *Projects of non-profit organizations (PRON)* - with a reflection of the combination of theory and practice in the form of direct participation of students in real projects (based on the needs of regional NGOs and students' creativity), while comprehensively mastering knowledge project management methods in practice (see Figure 1).

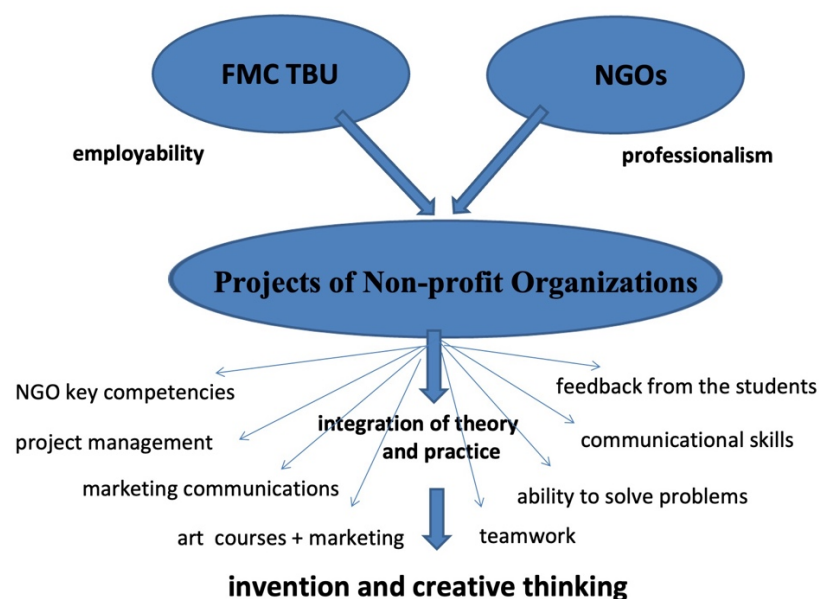


Figure 1: Projects of non-profit organizations.
Source: Göttlichová, 2018.

The course is oriented to the systematic and procedural side of project management project planning and the system of controlled communication and management of project documentation. In continuity with the requirements of potential employers in the commercial and non-commercial sphere, students encounter the specifics of teamwork, learn to discuss, process, and prepare written materials, learn about their abilities and the importance of the individual's share in determining common goals and distributing responsibility, analyze variously complex problems with the identification of their essentially, to look for an approach to their solution, to plan, implement and evaluate the effectiveness of the solution - i.e., to fulfill the essence of the curriculum based on the application of so-called vital skills within the educational process and on the requirements of practice reflected in teaching innovation. An essential aspect of the course is the connection between the work of art students and marketing communications students, enabling the implementation of projects in the entire spectrum of possibilities and preparing students for a future profession where teamwork becomes necessary. Through their projects, students help regional NGOs in the realization of their mission, whether it is helping children in orphanages, disabled citizens with various forms of illness, seniors, oncological patients, cultural organizations, or animal shelters, i.e., everyone who needs help.

Although the impact of the pandemic played a significant role here, too, as many organizations were forced to end their active activities due to the necessity of the transition to online communication, for which NGOs lacked technical equipment and knowledge, the students were (and are) a great asset at this time. Despite the necessity of transferring the implementation of projects to an online environment, it was possible to obtain the necessary financial and material assistance for NGOs to support the implementation of their activities. Still, at the same time, thanks to engaging online workshops, fashion shows, educational presentations, interesting competitions, etc., we also made this problematic period more pleasant.

Conclusion

As indicated by the presented study, *Czech higher education in continuity with the challenges of the contemporary world*, it is evident that the higher education system in the Czech Republic "has the power to transform and change, while constantly transforming and changing" ("Education has the power to transform and change while constantly transforming and changing."). It was a pandemic, and at the same time, an unceasing dynamic development, which revealed persistent problems in the University of Education and, at the same time, placed obstacles in the path set so far. And as it turns out, it will be a challenging road. One of the possibilities for solving problems is more effective constructive cooperation and communication between universities and the economic sphere, aimed at creating a higher-quality curriculum based on the necessary practice requirements in continuity with the demands and criteria of employers reflected in the key competencies assigned to university graduates. An important aspect is the subsequent reflection on teaching innovation in continuity with the enrichment of the educational program aimed at increasing the quality of professional education, which is increasingly applied in the form of direct participation of students in authentic projects while comprehensively mastering the knowledge of project management methods. To implement all the steps, it is necessary to provide the actors in education with the needed support directly in the region where they operate and to connect them. Economic entities of a commercial and non-commercial nature, based on the reflection of the level of the so-called key competencies of students, can subsequently present an offer of employment to university graduates, representing an essential advantage for both parties. And as J. Dewey (1926) already stated: "One gram of experience is more valuable than a ton of theory."

References

- Competences for democratic culture: Living together as equals in culturally diverse democratic societies.* (2016). Printed at the Council of Europe. ISBN 978-92-871-8237-1.
- Delgado, F. (2022). Post-COVID-19 transition in University physics courses: A case of study in a Mexican University. *Education sciences* 12, no. 9: 627.
<https://doi.org/10.3390/educsci12090627>
- Dewey, J. (1926). My pedagogic creed. *Journal of education*, vol. 104 (issue 21), 542-542.
- Doležalová, G., Staňková, K., Kuzmová, T., Novotná, H. (2023). *Šetření potřeb zaměstnavatelů. Výzkumná zpráva ze sběru dat 2022*. Published by the National Pedagogical Institute of the Czech Republic.
- Duspivová, K., Barták, T. (2021). *Impacts of the COVID-19 pandemic on the well-being of students, results of a survey among university students*. Published by the Ministry of Education, Youth and Sports (MEYS) in Czech.
- Erik Brynjolfsson, E., Andrew McAfee, A. (2015). *Druhý věk strojů: Práce, pokrok a prosperita v éře špičkových technologií*. (1st edition). Jan Melvil Publishing. 296. ISBN 978-80-87270-71-4.
- Fryč, J., Matušková, Z., Katzová, P., Kovář, K., Beran, J. et al. (2020). *Strategy for the education policy of the Czech Republic up to 2030+*. Ministry of Education, Youth and Sports. ISBN 978-80-87601-49-5 (paperback publication).
- García-Morales, V. J., Garrido-Moreno, A., and Martín-Rojas, R. (2021). The transformation of higher education after the COVID disruption: Emerging challenges in an online learning scenario. *Front. Psychol.* 12:616059. doi: 10.3389/fpsyg.2021.616059
- Göttlichová, M. (2018). *Projects of non-profit organizations*. TBU Zlín.
- Göttlichová, M. (2021). *Application of non-commercial marketing in continuity with the development of the relevant key competences of the students (FMK) of TUB Zlín*. IGA TBU.
- Göttlichová, M. (2022). *Application of non-commercial marketing in continuity with the development of the relevant key competences of the students (FMK) of TUB Zlín*. IGA TBU.
- Hyánek, V., Pařil, V., Pejcel, J. (2020). Definition of the civil sector and non-governmental non-profit organisations within the national economy (socio-economic importance). Research report. Faculty of Economics and Administration.
- Kilpatrick, W. H. (1918). The project method: The use of the purposeful act in the education process." *Teachers College Record*, 19, 319-335.

- Marinoni, G., Van't Land, H., and Jensen, T. (2020). *The impact of COVID-19 on higher education around the world*. IAU Global Survey Report UNESCO.
- Morgan, J. (2014). *The future of work: Attract new talent, build better leaders, and create a competitive organization*. Wiley. 256. ISBN 978-1118877241.
- Plakhotnik, M. S., Volkova, N. V., Jiang, C., Yahiaoui, D., Pheiffer, G., McKay, K., Newman, S., and Reißig-Thust, S. (2021). The perceived impact of COVID-19 on student well-being and the mediating role of the university support: Evidence from France, Germany, Russia, and the UK. *Front. Psychol.* 12:642689. doi:10.3389/fpsyg.2021.642689
- Průcha, J., Walterová, E., Marek, J. (2003). "Pedagogický slovník." Portál. 322. ISBN 978-8071787723.
- Schwab, K. (2017). *The fourth industrial revolution*. Portfolio. 192. ISBN 978-0241300756.
- Schwab, K., and Malleret, T. (2021). *COVID-19: The great reset*. RIVA PUBLISHING. 284. ISBN 978-8090832220.

Resources

- "Higher education – Czechia" by European Commission (2023):
<https://eurydice.eacea.ec.europa.eu/national-education-systems/czech-republic/higher-education>
- "Impacts of the COVID-19 pandemic on university students" by Published by the Ministry of Education, Youth and Sports (MEYS) in Czech (2021): <https://www.msmt.cz/dopady-pandemie-covid-19-na-studenty-vs?lang=1>
- "The Impact of COVID-19: How are Universities Three Years After the Pandemic? " by Delgado Francisco. Observatory of the Institute for the Future of Education (2023): <https://observatory.tec.mx/edu-news/impact-of-covid-19-higher-education-unesco/>
- "MEPs stress importance of vocational training and lifelong learning" by NEW European Parliament. Press Releases (2023): <https://www.europarl.europa.eu/news/en/press-room/20230707IPR02423/meps-stress-importance-of-vocational-training-and-lifelong-learning>
- "Plán realizace Strategického záměru pro oblast vysokých škol pro rok 2023 (MSMT-12689/2022-3)" by the Ministry of Education, Youth and Sports (MEYS) in Czech (2022): https://www.msmt.cz/file/57910_1_1/download/
- "Program na podporu strategického řízení vysokých škol pro roky 2022 až 2025 (Program)" by the Ministry of Education, Youth and Sports (MEYS) in Czech (2021): https://www.msmt.cz/file/53756_1_1/download/

"Rozhodování blíže k lidem. Přehledová studie na téma občanské participace a partnerství veřejné správy a organizací občanského sektoru se zaměřením na ústřední orgány státní správy" by Miléřová Jana. Glopolis o.p.s. (2020):
<https://www.vlada.cz/cz/ppov/rnno/dokumenty/strategie-spoluprace-verejne-spravy-s-nestatkami-neziskovymi-organizacemi-na-leta-2021-az-2030-189753/>

"Strategy for the Education Policy of the Czech Republic up to 2030 (Strategy 2030+)" by the Ministry of Education, Youth and Sports (MEYS in Czech).
https://www.msmt.cz/uploads/brozura_S2030_en_fin_online.pdf

"University education – students: public and private universities" by Czech Statistical Office (2022): <https://vdb.czso.cz/vdbvo2/faces/en/index.jsf?page>

"Vysoké školy v Česku studuje cca 300 tisíc studentů, klesá zájem o techniku, v kurzu je zdravotnictví" by Cieslar Jan. Český statistický úřad (2022):
<https://www.czso.cz/csu/czso/vysoke-skoly-v-cesku-studuje-cca-300-tisic-studentu>

"Zpráva o dopadech pandemie covid-19 na vzdělávání. Pandemie covid-19 jako příležitost pro vzdělávání" by Vláda ČR (2021): <https://www.vlada.cz/assets/urad-vlady/poskytovani-informaci/poskytnute-informace-na-zadost/material.docx>

Contact email: gottlichova@utb.cz



©The International Academic Forum 2023
The International Academic Forum (IAFOR)
Sakae 1-16-26-201
Naka Ward, Nagoya, Aichi
Japan 460-0008
www.iafor.org