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Using Sketch Notes in Higher Education Classrooms: Creating Visual Roadmaps to Foster Critical Thinking and Creativity

Jo Perry, Manukau Institute of Technology, New Zealand

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Abstract

Developing the skills to scrutinise evidence in a critical manner and adopt varied perspectives are essential for success in the 21st-century workplace. This research focuses on moving from traditional text-based, time bound lesson plans to creating visual maps of the content for each class and the discussions etc that ensued. Instead of being a guide for the teacher alone, they were developed into a form of map for the whole session. This research involved two small cohorts of early childhood student teachers in the third year of their B.Ed (Early Childhood Teaching) degree. The methodology employed a qualitative approach through a survey of students about the impact of using sketch notes in class. A self-study autoethnographic lens was applied through the researcher's reflective journal. The feedback from the students in the survey showed that they found that the non-linearity of the maps made the content easier to understand. The deconstruction of each part of the content facilitated new connections to be made by the students. These two points had an impact on the cognitive load of the class as they found the content easier to understand in the deconstructed form. This research shows that the use of a mixture of the text and visuals included in sketchnotes is an important pedagogical tool that helps students retain information and explore the topic from a range of critical perspectives.

Keywords: sketchnoting, higher education, visual learning

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Introduction

Traditional lesson plans are typically text-laden documents designed to guide the teacher through the content in the available time. Houella (2022) suggests that the lesson plan "acts as a guide to the instructor on how to identify and deliver learning objectives for the class" (p. 2). In this sense, lesson plans are written *for the teacher*. However, in today's diverse classrooms with many different learning needs to bring about success, what if the lesson plan was also *for the student*? This project introduces the idea of visual lesson plans that were shared with the whole class and were used to organise learning around "chunks" of content. These maps were intended not only to support delivery but also to scaffold students' understanding, foster deeper engagement, and reduce cognitive overload.

Literature Review

Definition

This review explores sketchnoting as a multimodal strategy that supports understanding, engagement, and reflective practice, within a higher education context. Sketchnotes as defined by Rohde (2013) are a form of non-linear, visual note-taking that combines images and text to support individual sense-making (Csachová & Kidonová, 2022; Fernández-Fontecha et al., 2018). This involves listening to a lecture or discussion and visually mapping the ideas through symbols, connectors and key words (Tidy et al., 2022).

Visual literacy has become increasingly important in the 21st century with skills such as creativity, communication, collaboration, and critical thinking seen as essential (Kim et al., 2019). Sketchnoting, as part of visual thinking practices, helps foster these competencies. Brown (2014) refers to it as "thinking in disguise" (p. 5) where visual explanations make clear previously subconscious meaning-making processes. As Brown also notes "There is no singular definition of a doodle …only insight from what you make of it" (p. xv) a perspective clearly aligned with constructivist views of knowledge building.

Constructivist theorists such as Vygotsky and Cole (1978) and Bruner (1966) both describe the importance of social interaction in building on prior experience and constructing understanding. These ideas underpin the potential of sketchnoting to personalise learning while still supporting group engagement in interpreting and synthesising knowledge.

Theory

Sketchnoting involves a process of content synthesis by identifying key ideas and restructuring them into visual form (Tidy et al., 2022). Sketchnoting aligns with Dual Coding Theory (Paivio, 1986), which hypothesises that verbal and visual information about a topic are processed in parallel systems in the brain. When both are used together, deeper learning and stronger recall are reinforced.

Wooten and Cuevas (2024) confirmed the continued relevance of Dual Coding Theory over other more contested learning style models. Bi (2021), in his research with colour-impaired participants, considered that cognition is best supported when visual and textual ideas are used together. This explains why combining simple visuals with text can enhance comprehension and long-term memory.

Sketchnotes can bring to the surface connections between ideas that may not be immediately visible (Arzaga, 2023). Its non-linear format empowers learners to return to ideas, link concepts in different ways and set their own learning pace. As Rahayu et al. (2024) explain "Students benefit from a… nonsequential learning path, because it allows them to control the pace and sequence of their learning (p. 143)." The non-linearity of sketchnotes empowers students to take their time, ask for more information and drive their own learning. Paepcke-Hjeltness et al. (2017) and Kozárová and Duchovičová (2020) support this, noting how non-linear formats empower students to guide their learning process.

This project used sketchnotes not simply for recall, but to scaffold critical thinking, helping students break down complex topics and then reconstruct them with their own understanding. Csachová and Kidonová (2022) describe how visual strategies enable deconstruction and synthesis of ideas, essential to critical thinking. DeWaard et al. (2024) reinforce this, arguing that sketchnotes promote "deeper analysis, exploration, and discovery" (p. 33) by making thinking visible.

Challenges

There are, however, some challenges associated with sketchnoting. First, students often feel anxious due to the inferred connection with required artistic skill (Nørgaard, 2017). Addressing this concern requires clear framing that sketchnoting is not about artistic ability but about supporting thinking.

Second, there are also concerns about whether the simplification required in visual summaries may lead to loss of nuance or inaccurate representations (Irving-Bell & Hartley, 2022). Learners may inadvertently distort ideas when attempting to visualise them quickly. These challenges highlight the importance of scaffolding sketchnoting with critical discussion and reflection.

Contribution

While sketchnoting is becoming more common in educational practice, most studies focus on its role as a personal note-taking device. There is limited research on its use as a shared pedagogical tool**,** particularly as a visual lesson plan, in higher education. This study seeks to extend the field by exploring how visual mapping can scaffold cognitive processing, critical thinking, and non-linear reflection. It highlights the pedagogical value of using sketchnotes not only as a record of learning but as a *thinking tool* for constructing, revisiting, and analysing ideas.

Context

This research focused on using the sketchnotes process in creating lesson plans designed for both the teacher and students for two higher education classes in a B.Ed (Early Childhood Teaching) in Aotearoa New Zealand. Previous cohorts of students had found synthesis and critical thinking difficult, so the idea evolved of deconstructing class content into smaller elements and then reconstructing into overall knowledge that the students better understood. The idea was to use a combination of visual and textual content to chunk content in the lesson plans and on the white board or tablet, gather the subsequent student research findings and notes around the appropriate chunk. Each section would include deconstruction and

reconstruction of the concepts as well as overall synthesis of the information at the end. In this way, the lesson plan would become a visual roadmap of the class.

Design and Methodology

The research is informed by an interpretivist approach which works from the premise that all knowledge is constructed from experience and context. Pervin and Mokhtar (2022) suggest that "according to the interpretive approach, it is important for researchers as social participants to understand the differences that exit between people" (p. 421). This research focuses on how each individual student used the collective sketchnotes on the whiteboard to make sense of the content for themselves.

In addition, the research was also informed by constructivism which posits that knowledge is actively built through experiences and interactions with their social and cultural communities (Vygotsky & Cole, 1978).

Finally, Dual Coding Theory (Paivio, 1986) informs the research. It supports the addition of both visual and verbal elements as key components of meaning-making, and explains how the combined use of images and text can reduce cognitive load and enhance understanding.

The study sought to answer the following research question: Can sketchnotes integrated into lesson plans increase sense-making and understanding for early childhood student teachers?

To explore this, a qualitative approach was used. Students were invited to complete a short, anonymous survey at the end of the semester. Two open-ended questions were asked:

1. In what ways (if at all) has this approach aided you to understand the class content better?
2. Are there particular parts of the text–visuals approach that you found particularly helpful for your understanding? Why was this so?

Findings and Discussion

Thematic analysis of the student survey responses revealed seven core themes. These are presented below as *Themes*, followed by a *Discussion* that interprets the themes in light of relevant literature and theory.

Themes

Clarity and Content Simplification

Students indicated that the visual layout of the lesson plan helped simplify complex content and provided an immediate sense of the session's structure.

"It has made it more understandable."

"Only takes one glance to get an overview."

"It has really helped me to understand my course better."

Visual Learning Preferences

These responses reflect a preference for materials that combine textual and visual elements, supporting diverse ways of learning and remembering.

“Being a visual learner, I like seeing what we were going to do in the session.”

“I am a visual learner. I can remember contents better when pictures are used alongside text.”

Visual Memory and Transfer

Students associated the visual layout with improved memory retention and transfer to assessment tasks.

“I can remember contents better when pictures are used.”

“It has helped me visualise the things I am planning to write for my assignment.”

Positive Emotional Engagement

Students expressed emotional and motivational benefits, linking enjoyment and positive engagement with visuals to deeper understanding.

“I genuinely enjoyed the visuals.”

“The visuals have definitely got me more engaged.”

“It helps me to understand better and it’s easy to revisit again and again.”

Reducing Cognitive Load

Students described feeling more in control of the content, suggesting that the visual structure helped reduce their perceived complexity.

“It makes it less overwhelming.”

“It doesn’t feel daunting like it's an impossible work level.”

Visual Flow and Sequencing

These comments reflect the value students placed on clearly sequenced content, enabled by visual features like arrows, containers, and spatial layout.

“I like it when it’s in boxes with arrows pointing from each point to the next.”

“Separated into easy to achieve steps.”

Revisitability, Aesthetics, and Joy

This theme highlights the emotional, aesthetic, and practical appeal of sketchnotes, especially in supporting repeated review.

"The mind maps have helped… easier to revisit again and again."

"The doodles are very good! Pleasing to the eye haha…"

"I genuinely enjoyed the visuals, where I could assess what points were going to be covered."

Discussion

The themes identified in the findings reflect a strong alignment with the theoretical frameworks guiding this study.

Clarity and Simplification

These were key benefits described by students, aligning with Fernández-Fontecha et al. (2018), who argue that sketchnotes help reduce complexity by breaking information into accessible chunks. The design elements helped students access the "bigger picture" from the outset, giving shape to the content in a memorable way.

Visual Learning Preferences and Memory and Transfer

These connect directly to Dual Coding Theory (Paivio, 1986), which proposes that the brain processes visual and verbal information through separate channels. The students' comments clearly suggest that using both together supported better retention and understanding. Camporro and Marquardt (2020) reinforce this, highlighting how the two-channel processing enhances recall. Gansemer-Topf et al. (2021) add that dual coding can also foster communication and problem-solving, both of which are vital in reflective teaching and assessment tasks. Watching collaborative sketchnotes unfold visually enabled students to personalise the material and connect it to their own contexts (Tidy et al., 2022).

Positive Emotional Engagement

The students' comments included enjoyment, confidence, and the desire to revisit the material. This aligns with Dimeo's (2021) findings that well-designed visuals improve re-read value, motivation, and recall. Fernández-Fontecha et al. (2018) also highlight the emotional benefit of using non-linear visuals to support calm, focus, and exploration. It also connects clearly to the affective elements of constructivist thinking (Taber, 2015).

Cognitive Load

This was another key area where students found the sketchnotes helpful. The format of boxes, arrows, and white space helped reduce overwhelm and made the content feel more achievable. This supports DeWaard et al. (2024) argument that sketchnotes offer a "mental model" for learners to follow, reducing perceived difficulty and improving clarity.

Flow and Sequencing

The responses show that learners valued visual elements like arrows, layout, and progression that reflect what Kress and van Leeuwen (2020) refer to as "visual grammar." Lewis et al. (2023) further support this by linking visual organisation to learner comprehension and confidence.

Revisitability and Joy

This final theme reflects the deeper engagement and ownership sketchnotes made possible. The visual appeal of doodles and the simplicity of mind mapping concepts encouraged students to return to their notes, supporting long-term learning. Baff (2020) explains how these visual summaries contribute to deeper cognitive imprinting: *"*I will remember how it looks on the page" (p. 221).

Conclusion

Although this study was small in scale, several clear conclusions have begun to emerge.

First, sketchnotes supported students' sense-making by helping them deconstruct and follow complex content more easily. Chunking information and visually organising it using containers, connectors, and deliberate spacing enabled students to clarify their understanding and identify relationships between ideas. Many valued this approach for its ability to reduce overload compared to more traditional, text-heavy lesson structures.

Second, the combination of text and simple visuals made learning more accessible to a diverse group of learners. Multilingual students, those who preferred visual or physical engagement, and students comfortable with text all found their own ways into the learning. In this way, sketchnotes functioned not only as a pedagogically sound strategy, but also as a culturally responsive and multimodal one.

Third, the literature's assertion that sketchnoting is about *"*ideas, not art*"* helped shift the focus from drawing ability to memory-making. Students began to see sketchnotes as functional visual structures that support understanding, rather than creative displays.

Ultimately, sketchnotes are more than a visual aid—they offer a way of thinking, reflecting, and making meaning together. This approach not only supports deeper comprehension, but also honours diverse ways of knowing, inviting both students and teachers into a more relational, reflective learning space.

Future work will explore how sketchnoting can further support students' critical reflection by breaking down and mapping practice scenarios. It will also be valuable to track responses across time and different cohorts to examine whether increased familiarity with the method changes its perceived impact.

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Contact email: Jo.perry@manukau.ac.nz

Progress in the German Language Acquisition Short Before School Enrolment: Children Acquiring German Under Unfavorable Sociodemographic Conditions vs. Other Children

Eugen Zaretsky, Marburg University Hospital, Germany
Benjamin P. Lange, IU International University of Applied Sciences, Germany
Christiane Hey, Marburg University Hospital, Germany

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Abstract

Usually, sociodemographic factors related to the limited quality and quantity of the language input as well as the presence of language impairments are associated with a comparatively slow first or second language acquisition. However, if a follow-up study design is used instead of a cross-sectional one, such negative correlations with the pace of the language acquisition can be turned into positive ones, that is, children who acquire their first or second language under unfavorable conditions can show the best progress in the language acquisition. Up to now, this phenomenon was shown only in one study. In the current follow-up study, another sample was utilized to scrutinize the same phenomenon. For this purpose, sociodemographic and medical factors associated with the improvement in four- to five-year-old kindergarten children's German language competence were analyzed. All children (N = 1,022) were tested with German language screenings KiSS.2 and SSV as well as with "quasi-universal" non-words in the first test session and re-tested with the school enrolment test at least six months later. Factors that contributed to a considerable improvement of German language skills were related to limited quality and quantity of the German language input (e.g., late age of German language acquisition onset) and to language(-related) impairments. This finding reflects the quick pace of the German language acquisition in children with weak German language skills due to the German language input and language courses in kindergartens. Short before school enrolment they were catching up with peers who had acquired German under favorable conditions earlier.

Keywords: language acquisition, language screening, language assessment, German language

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Introduction

In most studies, sociodemographic characteristics of children and their families that are related to limited quality and quantity of the language input were shown to influence negatively the pace of language acquisition. Such factors are, among other things, non-attendance of nursery schools (Ertanir et al., 2018), limited sociability (Rudasill et al., 2014), and late age of (second) language acquisition onset (Seuring & Will, 2022). However, this refers to the studies assessing language skills at a certain time point, that is, to cross-sectional studies. Zaretsky and Lange (2022) showed in a retrospective follow-up study design that the results can be reversed when changes in language competence, instead of cross-sectionally assessed children's language competence, are scrutinized. Factors that usually result in deficient language skills were shown to be significantly associated with a quick progress in language acquisition. The authors explain this finding as a statistical phenomenon that occurs when children with age-appropriate German language skills show a "ceiling effect" (language competence that cannot get much better because it had already been good to excellent in the first test session), whereas children with limited German language skills demonstrate a "floor effect", that is, lag behind in language acquisition and are in the process of catching up with their more linguistically developed peers.

Language-related impairments and disorders such as autism spectrum disorder (Naigles & Tek, 2017) or hearing disorder (Werfel et al., 2022) as well as familial predisposition for language impairments (Rice et al., 2020) clearly impede children's language acquisition. However, the study by Zaretsky and Lange (2022), again, showed that children with language(-related) impairments and disorders improved their German language skills more quickly than typically developing children due to the same statistical phenomenon as described above.

The study presented here scrutinized the influence of sociodemographic and medical factors on the improvement in children's German language competence in the last two years before the school enrolment and tried to replicate the findings of Zaretsky and Lange (2022) for another sample tested in the same country (Germany) and with the same German language test ("Kindersprachscreening"/KiSS; Holler-Zittlau et al., 2011) as well as with two other tests. Special attention was paid to the tasks assessing the phonological short-term memory (PSTM) because well-developed PSTM was shown to be linked to advanced language competence (Ertanir et al., 2018), whereas deficits in PSTM are associated with various language(-related) impairments, disorders (e.g., El-Wakil et al., 2021; Lee & Ha, 2018) or medical conditions such as pre-term birth (Gresch et al., 2018). Sociodemographic and medical variables that can be considered unfavorable for German language acquisition as well as a weak PSTM were expected to be associated with a quick progress in acquiring German. Due to very weak to non-existent associations between children's nonword repetition performance and their hearing disorders, risk or early birth, participation in speech-language therapies, late language onset, and familial predisposition for language disorders (Zaretsky & Hey, 2022), nonword repetition was not expected to be a strong predictor for children's linguistic development.

Methods

Test Subjects

In this prospective follow-up study, 1,022 four- and five-year-old kindergarten children were tested in 2017-2019 and re-tested at least six months later with the linguistic part of the school enrolment examination. The inclusion criteria were (a) age 4;0-5;11 years in the first test session and (b) informed consent signed by parents. There were no exclusion criteria. Sample characteristics can be found in Table 1.

Table 1
Sample Characteristics

	MO	**BM**
n	208	814
Male	110 (52.9%)	415 (51.0%)
Female	98 (47.1%)	399 (49.0%)
Age (in months) 1st test session: *M* ±*SD*	59.1 ±4.2	57.2 ±5.5
Age (in months) 2nd test session: *M* ±*SD*	70.0 ±4.1	72.1 ±3.5
Months between two test sessions: *M* ±*SD*	10.4 ±3.6	14.4 ±5.5
Time span between two test sessions in months	6-24	6-30

Note. MO = monolinguals, BM = bi-/multilinguals, M = mean, SD = standard deviation

All children were classified as monolingual Germans (MO) or bi-/multilinguals (BM) on the basis of KiSS questionnaires for parents (item "Languages spoken at home"). Turkish, Arabic, and Russian speaking children made out almost one half of the BM subgroup. Because no statistical comparisons of MO and BM were carried out in the current study, their comparability in terms of age, biological sex, socioeconomic status etc. was not required.

Test Materials

In the first test session (t1), all children were tested in kindergartens using two language screenings and one list of "quasi-universal" nonwords. In the second test session (t2), children were tested in public health departments with one of official German school enrolment tests. For test names, characteristics, and references, see Table 2.

Due to the prominent role of PSTM performance among predictors for children's linguistic development, three different PSTM tasks (nonword repetition tasks) were included in t1 (KiSS, SSV, QUNW) and compared with the nonword repetition subtest in SOPESS in t2. Nonword repetition tasks in t1 were either language-specific (KiSS, SSV) or language-unspecific (QUNW). For further characteristics of nonwords, see Table 3). Generally, articulation errors (e.g., rhotacism) were not considered as nonword repetition (or PSTM) errors.

Table 2
Characteristics of Tests

	KiSS.2	SSV	QUNW	SOPESS
Full test names in English	"Language Screening for Children", 2nd version	"Language Screening for the Preschool Age", 2nd version	"Quasi-universal non-words"	"Social-Pediatric Developmental Screening for School Enrolment Examinations"
Test authors	Holler-Zittlau et al. (2011)	Grimm (2017)	Chiat (2015)	Daseking et al. (2009)
Subtests	(1) speech comprehension (2) vocabulary (3) articulation (4) grammar (5) repetition of nonwords (6) repetition of sentences	(1) repetition of nonwords (2) repetition of sentences	(1) repetition of nonwords	(1) grammar (2) repetition of nonwords (3) articulation

Table 3
Characteristics of Nonwords

	KiSS.2	SSV	QUNW	SOPESS
n (nonwords)	4	18	16	6
German prefixes	2	1	0	0
German suffixes	2	8	0	2
German stems	0	2	0	0
Consonant clusters				
(a) 2 consonants	4	28	0	1
(b) 3	0	1	0	0
Phonemes /r, ʒ, ʃ, ŋ, ʔ/*	4	12	0	4
Item length				
(a) 2 syllables	1	3	4	0
(b) 3	0	6	4	3
(c) 4	3	4	4	3
(d) 5	0	5	4	0
Linguistic load	high (morphology, phonology)	high (morphology, phonology)	zero	high (morphology, phonology)
Language-specific	yes	yes	no	yes
Nonword examples	*Triser*, *Nabolira*	*Kalifeng*, *Gattwutz*	*Lumika*, *Litisaku*	Not public
Test session	1	1	1	2

Note. QUNW = quasi-universal nonwords; * German-specific phonemes

For the direct comparability of language tests in t1 and t2, (a) KiSS subtests on speech comprehension and vocabulary as well as KiSS and SSV subtests on sentence repetition were excluded from statistical analyses because there are no such subtests in t2, (b) the KiSS grammar subtest was reduced to items on plural and preposition production because SOPESS grammar subtest contains tasks on these two domains only.

Sociodemographic and medical characteristics of children and their families were documented in KiSS questionnaires for parents and kindergarten teachers. Questionnaire items refer to the quality and quantity of children's German language input, their sociability and playing behavior, their language(-related) impairments, and familial predisposition for such impairments (see Table 4). In the current study, extended versions of questionnaires with some explorative items were used (14 relevant items in the questionnaire for parents and 28 items in the questionnaire for kindergarten teachers). Among other things, the KiSS questionnaire for kindergarten teachers contains a subjective estimation of children's German language skills with German school grades on a scale from 1 (= excellent) to 6 (= inadequate). In SOPESS, there is a comparable subjective estimation of children's German language skills on a scale from 1 (= inadequate) to 5 (= excellent).

Table 4a

KiSS Questionnaire Items: Questionnaire for Kindergarten Teachers

Questionnaire items	Coding
Length of kindergarten attendance	months
Languages spoken at home	1 German, 2 more German than (an)other language(s), 3 more (an)other language(s) than German, 4 only (an)other language(s)
Kindergarten attendance for half a day or a full day	1 half a day, 2 full day
Attendance of a nursery school	1 yes, 2 no
The child likes to play with other children	1 never, 2 seldom, 3 sometimes, 4 often, 5 always
The child plays with German-speaking children	1 never … 5 always
The child speaks out when playing	1 never … 5 always
The child does not hear well	1 never … 5 always
Language(-related) disorders/impairments	1 yes, 2 no
Attendance of associations or study groups	1 yes, 2 no
Speech-language therapy (in the kindergarten or beyond)	1 yes, 2 no
Participation in German language courses (in the kindergarten or beyond)	1 yes, 2 no
The child plays with child(ren) speaking his/her non-German L1	1 never … 5 always
Child's age of the German language acquisition onset	years
Estimation of the child's current German language skills with a school grade	1 excellent, 2 good, 3 satisfactory, 4 sufficient, 5 deficient, 6 inadequate

Table 4b
KiSS Questionnaire Items: Questionnaire for Parents

Questionnaire items	Coding
Biological sex	1 male, 2 female
Languages spoken at home	1 German, 2 more German than (an)other language(s), 3 more (an)other language(s) than German, 4 only (an)other language(s)
Attendance of associations or study groups	1 yes, 2 no
Language-related impairments/disorders	1 yes, 2 no
Speech-language therapy	1 yes, 2 no
Other therapies	1 yes, 2 no
Participation in German language courses	1 yes, 2 no
Language delay in L1 (the first word after the 2nd birthday)	1 yes, 2 no
Regular medication	1 yes, 2 no
Head injuries or operations	1 yes, 2 no
Auditory processing disorder	1 yes, 2 no
Permanent hearing disorder	1 yes, 2 no
Permanent sight disorder	1 yes, 2 no
Frequent otitis media	1 yes, 2 no
Motor disorder	1 yes, 2 no
Risk or early birth (before the 28th gestation weak or weight < 1500 gr)	1 yes, 2 no
The child attends pediatricians more often than other children	1 yes, 2 no
Dyslexia in the family	1 yes, 2 no
Language disorders in the family	1 yes, 2 no
Participation in the speech-language therapy in the family	1 yes, 2 no
Language delay in the family (the first word after the 2nd birthday)	1 yes, 2 no
Father's educational level	1 no school certificate, 2 secondary school certificate, 3 intermediate school-leaving certificate, 4 Matura, 5 high school
Mother's educational level	1 no school certificate … 5 high school
Father's age of German language acquisition onset	years
Mother's age of German language acquisition onset	years
Father's German language skills (own estimation)	1 not so good, 2 good, 3 very good
Mother's German language skills (own estimation)	1 not so good … 3 very good
The child plays with German-speaking children	1 yes, 2 no

Statistical Analyses

For the direct comparability of language test results, total scores of correct answers in all subtests were *Z*-transformed (that is, standardized on the same scale, with a mean of 0.0 and a

standard deviation of 1.0). To quantify the progress in children's linguistic development, the following formula was used: "*Z*(t2) – *Z*(t1)". Positive values in the difference between *Z* values of two test sessions mean that the child's language competence improved considerably, negative values mean that the linguistic development was comparatively weak. Because nonword repetition was assessed in three tasks in t1 (KiSS, SSV, QUNW), and each of them was compared with the nonword repetition in SOPESS, the total number of *Z*-transformed total scores amounted to five: articulation (1), grammar (1), and nonword repetition (3).

Not only total scores of correct answers in language tests, but also subjective estimations of children's German language skills were compared. For a better comparability of these estimations (scale 1-6), the school grades 5 and 6 from KiSS questionnaires for kindergarten teachers were merged (because grade 6 hardly occurred), and the grades were re-coded, with 1 meaning "inadequate" and 5 meaning "excellent". Thus, there was no need to *Z*-transform subjective estimations of children's German language skills because both of them ranged from 1 to 5. Changes in estimations of children's German language competence were calculated by the formula "SOPESS scale – KiSS questionnaire scale". Again, positive values mean an improvement of the German language skills.

The statistical analysis begins with descriptive statistics on changes in the language competence between two test sessions. The most important influence factors on these changes were identified by 12 classification trees: ten with differences in *Z*-transformed total scores of correct answers and two with differences in the subjective estimations of children's German language skills on a scale from 1 to 5 as dependent variables (classification trees were calculated separately for MO and BM). Independent variables were (a) sociodemographic and medical variables from KiSS questionnaires, (b) children's age in months in t1 and t2, (c) time span in months between t1 and t2. Classification trees were chosen as the most relevant statistical method because they can demonstrate hierarchies of influence factors, with the most important ones as the highest branches.

Additionally, differences in *Z*-transformed total scores of correct answers in language tests as well as differences in the subjective estimations of German language skills between two test sessions were correlated with metrical and ordinal sociodemographic and medical characteristics of children and their families documented in KiSS questionnaires (Spearman's correlations). For dichotomous questionnaire items, point-biserial correlations were used. Also, *Z*-transformed total scores of correct answers in PSTM tasks, as possible predictors for changes in language competence, were correlated with differences in Z-transformed articulation and grammar scores as well as with differences in the subjective estimations of children's German language competence between t1 and t2 (Spearman's correlations). Again, all calculations were carried out separately for MO and BM. Only correlations ≥ .1 are reported.

The study was approved by the ethics commission of Marburg University Hospital, Germany (approval number 117/16, 06. Sept. 2016).

Results

Descriptive statistics on (a) total scores of correct answers in language tests and subjective estimations of children's German language skills in both test sessions and (b) differences in test results between two test sessions can be found in Tables 5, 6.

Table 5

Descriptive Statistics on Total Scores of Correct Answers in Language Tests and on Subjective Estimations of Children's German Language Skills

TS	Tasks		MO	BM	Max. score
1	Articulation (KiSS)	M ±SD	11.87 ±1.81	11.03 ±2.30	13
2	Articulation (SOPESS)	M ±SD	9.51 ±0.93	9.53 ±0.90	10
1	Grammar (KiSS)	M ±SD	4.95 ±1.76	1.67 ±1.90	7
2	Grammar (SOPESS)	M ±SD	11.68 ±1.72	9.63 ±2.79	13
1	Nonword repetition (KiSS)	M ±SD	2.34 ±1.17	2.16 ±1.18	4
1	Nonword repetition (SSV)	M ±SD	10.78 ±3.74	9.52 ±4.08	18
1	Nonword repetition (quasi-universal nonwords)	M ±SD	11.34 ±2.70	11.43 ±2.86	16
2	Nonword repetition (SOPESS)	M ±SD	5.19 ±1.07	5.19 ±1.04	6
1	Subjective estimation of children's German language skills (KiSS questionnaire)	Median	4.0	3.0	5
2	Subjective estimation of children's German language skills (SOPESS)	Median	5.0	4.0	5

Note. TS = test session, M = mean, SD = standard deviation, MO = monolinguals, BM = bi-/multilinguals

Table 6

Descriptive Statistics on Differences in Z-Transformed Total Scores of Correct Answers in Language Tests and (Not Transformed) Subjective Estimations of Children's German Language Skills Between Two Test Sessions

Tasks		MO	Min.	Max.	BM	Min.	Max.
Articulation	M ±SD	0.00 ±1.03	-3.81	4.31	0.00 ±1.11	-5.86	4.31
Grammar	M ±SD	0.00 ±1.04	-3.91	3.01	0.00 ±0.98	-2.38	2.09
Nonword repetition (KiSS)	M ±SD	0.00 ±1.23	-4.55	2.75	0.00 ±1.22	-4.86	2.62
Nonword repetition (SSV)	M ±SD	0.00 ±1.10	-5.97	2.30	0.00 ±1.11	-4.87	3.12
Nonword repetition (QUNW)	M ±SD	0.00 ±1.05	-4.34	3.28	0.00 ±1.07	-4.93	3.38
Subjective estimation of children's German language skills	Median	0.0	-1.0	4.0	1.0	-2.0	4.0

Note. M = mean, SD = standard deviation, MO = monolinguals, BM = bi-/multilinguals, QUNW = quasi-universal nonwords

In the classification trees, the following influence factors were identified as the highest branches and, thus, showed the highest predictive power for improvements in the children's German language competence:

- MO who had not attended nursery schools in the first three years of life improved their articulation skills ($F(1, 206) = 7.38$, $p = .007$, $n = 208$).
- BM who had never or seldom spoken out when playing with other children in the kindergarten improved their articulation skills ($F(2, 811) = 19.15$, $p < .001$, $n = 814$), nonword repetition skills (SSV: $F(1, 807) = 38.39$, $p < .001$, $n = 809$), and also got

better in the subjective estimation of their German language skills ($F(3, 607) = 28.37$, $p < .001$, $n = 611$).

- MO who had not attended any associations or study groups improved their grammar skills ($F(1, 206) = 5.50$, $p = 0.020$, $n = 208$).
- BM with a long time span between two test sessions improved their grammar skills ($F(3, 810) = 18.41$, $p < .001$, $n = 814$) and nonword repetition skills (KiSS: $F(1, 812) = 16.93$, $p = .002$, $n = 814$).
- Relatively young BM (QUNW: $F(1, 812) = 23.53$, $p < .001$, $n = 812$) and MO improved their nonword repetition skills (KiSS: $F(1, 206) = 7.38$, $p = .007$, $n = 208$; QUNW: $F(1, 206) = 11.80$, $p = .001$, $n = 208$).

For detailed results of classification trees, including lower branches, see Appendix (Figures A1-A10: https://www.researchgate.net/publication/389979232_Online_appendix). No significant influence factors were found for differences in nonword repetition skills (SSV vs. SOPESS nonwords) and for differences between subjective estimations of children's German language skills in the MO subgroup.

Correlations between changes in children's German language competence and their sociodemographic as well as medical characteristics yielded a number of significant results that can be found in Tables 7, 8.

Table 7a

Point-Biserial and Spearman's Correlations Between (a) Differences in Z-Transformed Total Scores of Correct Answers Between Two Test Sessions and (B) Sociodemographic/Medical Characteristics of Children and Their Families; Variables With at Least One

	KiSS: articulation		KiSS: grammar		KiSS: nonwords	
Questionnaire items	**MO**	**BM**	**MO**	**BM**	**MO**	**BM**
QK: attendance of a nursery school	.170*	—	—	—	—	—
QP: attendance of associations or study groups	.145*	—	.189*	—	—	—
QP: participation in German language courses	-.166*	—	—	—	—	—
QP: head injuries or operations	-.142*	—	—	—	—	—
QP: language-related impairments	—	-.116**	—	—	—	—
QP: language disorders in the family	—	-.105**	—	—	—	—
QP: The child attends pediatricians more often than other children	—	—	—	-.125**	—	-.105**
QP: frequent otitis media	—	—	-.178*	—	—	—

Table 7b
KiSS, Spearman's Correlations

	KiSS: articulation		KiSS: grammar		KiSS: nonwords	
Questionnaire items	**MO**	**BM**	**MO**	**BM**	**MO**	**BM**
QK: length of kindergarten attendance	—	-.178***	—	-.133***	—	-.105**
QK: The child likes to play with other children	—	-.110**	—	—	—	—
QK: The child plays with German-speaking children	—	-.123**	—	—	—	—
QK: The child speaks out when playing	—	-.212***	—	—	—	—
QK: The child plays with child(ren) speaking his/her non-German L1	—	.165***	—	—	—	—
QK: child's age of German language acquisition onset	—	.159***	—	—	—	—
QP: mother's age of German language acquisition onset	—	.168***	—	.109**	—	—
QP: father's age of German language acquisition onset	—	.102*	—	.112**	—	—
QP: mother's German language skills	—	-.122**	—	—	—	—
QK: languages spoken at home	—	.202***	—	—	—	—
QP: languages spoken at home	—	.177***	—	.149***	—	—
Time span between t1 and t2	.150*	.238***	—	.236***	—	.125***
Child's age in t1	—	-.218***	—	-.207***	—	-.100**

Table 7c
SSV, QUNW, Point-Biserial Correlations

	SSV: nonwords		QUNW	
Questionnaire items	**MO**	**BM**	**MO**	**BM**
QP: language delay in the family	—	—	—	-.118**
QP: The child attends pediatricians more often than other children	—	-.105**	—	—
QP: language delay in L1	—	—	—	-.105**

Table 7d
SSV, QUNW, Spearman's Correlations

	SSV: nonwords		QUNW	
Questionnaire items	**MO**	**BM**	**MO**	**BM**
QK: length of kindergarten attendance	—	-.162***	—	-.134***
QK: The child speaks out when playing	—	-.189***	—	—
QK: child's age of German language acquisition onset	—	.164***	—	—
QP: father's age of German language acquisition onset	—	.125**	—	—
QP: father's German language skills	—	-.100**	—	—
QK: languages spoken at home	—	.171***	—	—
QP: languages spoken at home	—	.156***	—	—
Time span between t1 and t2	—	.172***	—	.135***
Child's age in t1	—	-.170***	-.191**	-.153***

Note. QP = questionnaire for parents, QK = questionnaire for kindergarten teachers, MO = monolinguals, BM = bi-/multilinguals, t1 = first test session, t2 = second test session, QUNW = quasi-universal nonwords

Table 8

Point-Biserial and Spearman's Correlations Between (a) Differences in Subjective Estimations of Children's German Language Skills (Documented in KiSS Questionnaires and SOPESS) Between Two Test Sessions and (b) Sociodemographic/Medical Characteristics of Children and Their Parents (Documented in KiSS Questionnaires); Variables With at Least One Statistically Significant Result

Questionnaire items	MO	BM
Point-biserial correlations		
QK: attendance of a nursery school	—	.185***
QP: attendance of associations or study groups	—	.112**
QK: participation in German language courses	-.249*	-.113**
QP: participation in German language courses	-.336**	—
QP: language-related impairments	—	-.113**
QP: dyslexia in the family	-.216*	—
QP: language delay	-.282**	—
QP: biological sex	—	-.125**
QK: speech-language therapy	-.287**	-.106**
QP: speech-language therapy	-.270**	-.114**
QP: risk or early birth	-.330**	—
Spearman's correlations		
QK: length of kindergarten attendance	—	-.200***
QK: The child likes to play with other children	-.254*	-.192***
QK: The child plays with German-speaking children	—	-.227***
QK: The child speaks out when playing	-.227*	-.373***
QK: The child plays with child(ren) speaking his/her non-German L1	—	.124*
QK: child's age of German language acquisition onset	—	.219***
QP: mother's age of German language acquisition onset	—	.181***
QP: father's age of German language acquisition onset	—	.134**
QK: languages spoken at home	—	.235***
QP: languages spoken at home	—	.145**
Time span between t1 and t2	—	.200***
Child's age in t1	—	-.213***

Note. QP = questionnaire for parents, QK = questionnaire for kindergarten teachers, MO = monolinguals, BM = bi-/multilinguals, t1 = first test session, t2 = second test session

Among correlations between PSTM scores in t1 and differences in articulation and grammar scores between t1 and t2, following calculations yielded significant results: low scores in KiSS (ρ = -.228), SSV (ρ = -.238), and "quasi-universal" (ρ = -.207) nonwords in t1 were associated with the improvement of BM's articulation skills (all $p < .001$). Also, low scores in KiSS (ρ = -.193, $p < .001$), SSV (ρ = -.235, $p < .001$), and "quasi-universal" (ρ = -.125, p = .002) nonwords in t1 were associated with improvements in BM's German language skills according to subjective estimations. All correlations in the MO subgroup were not statistically significant.

Discussion and Conclusion

Children whose German language skills improved between two test sessions did not attend nursery schools, associations and study groups, did not speak out much when playing with other children, did not acquire German since birth, and were comparatively young in t1. In

other words, their German language input was limited in terms of quality and quantity (or length) before t1, which resulted in unsatisfactory German language skills. Their German language competence improved considerably because there was much to improve. On the contrary, children with advanced German language skills in t1 showed ceiling effects, that is, could not get much better than very good or excellent and remained on the same level in their German language competence. No contradictions between objective (language tests) and subjective (estimations) results were found in terms of predictors for changes in the children's language competence.

One more significant influence factor for language improvement was a large time span between two test sessions. Because all children tested in the study attended kindergartens, it can be assumed that the real influence factor behind the variable "time span" is the length of kindergarten attendance. From that perspective, time spent in daycare facilities contributed to the higher quantity (length) of the German language input and thus to an improvement of German language skills (cf. Stich et al., 2017). Also, most kindergartens offer German language courses or at least German language assessment.

Univariate analyses (correlations) yielded a number of additional significant results with the same common denominator, namely, children with a limited quality and quantity of German language input before t1 considerably improved their German language skills. Almost all correlations were low (< .3) and many of them had to be excluded due to correlation coefficients below .1.

Univarate calculations revealed some aspects that remained invisible in the classification trees, namely the improvement of German language skills of children with various language(-related) impairments and disorders as well as of children with a familial predisposition for language impairments. This improvement was accompanied by the children's participation in speech-language therapies and German language courses. The factor "male sex" as a predictor for the improvement in the linguistic development can be explained by a higher prevalence of language impairments in boys compared to girls (Lange et al., 2016). Again, it is to assume that this relative improvement of German language skills can be traced back to a ceiling effect among typically developing children.

Three nonword repetition tasks were compared, including language-specific and language-unspecific ones. Children's age was identified as an important influence factor for changes in all nonword repetition scores, possibly indicating the relevance of some physiological/neurological factors that were still maturing between two test sessions and were not directly assessed in questionnaires (first and foremost, PSTM). However, for German-based nonword repetition tasks, variables related to German language input were also of importance (e.g., age of German language acquisition onset), whereas for QUNW, BM's language delay in their first language yielded a significant result, probably as an indicator of some language(-related) impairments and disorders. Thus, different kinds of nonwords showed qualitatively different influence factors.

Correlations between nonword repetition scores and changes in the German language scores showed that BM with a weak PSTM were catching up with BM who had better PSTM. Generally, QUNW yielded lower correlations than German-based nonwords and therefore can be considered weaker predictors for German language acquisition compared to German-based nonwords. However, German-based nonwords also demonstrated very low

correlations, which questions the predictive power of PSTM tasks, at least in the study design presented here.

To sum up, the identified influence factors can be subdivided into (a) those that had resulted in poor German language skills in t1 (factors related to limited quality and quantity of German language input as well as to language(-related) impairments and disorders) and (b) factors that contributed to an improvement of German language skills after t1 (e.g., participation in German language courses and speech-language therapies). The current study confirmed the finding of Zaretsky & Lange (2022) that sociodemographic and medical factors usually associated with limited German language skills under certain circumstances serve as (indirect) predictors for children's linguistic development. The same statistical phenomenon was found for children (BM) with a weak PSTM who were catching up with their peers. It is to be assumed that the same phenomenon can be found in future studies for children with below-average intelligence quotient, long-term memory, attention, and other physiological/psychological characteristics that are associated with a comparatively slow linguistic development.

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Contact email: zaretsky@staff.uni-marburg.de

Teacher Support Plan: Facilitating the Transition to Competency-Based Education

Zita Neri López-Bedolla, University of Monterrey, Mexico
Teresa de Jesús Benavides-Caballero, University of Monterrey, Mexico
Luis Manuel Ocegueda-Pacheco, University of Monterrey, Mexico
Ma. Eugenia Solís-Saldívar, University of Monterrey, Mexico
Carolina Saenz-Ibarra, University of Monterrey, Mexico

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Abstract

The study adopts a quantitative and descriptive methodology, aims to evaluate the adoption of the *Plan de Seguimiento y Acompañamiento en Competencias* (SAC Plan) which was structured in five connected phases to support the faculty during their implementation process migrating to a competency-based model. In Phase 1. Teacher Preparation: 770 teachers completed the self-diagnosis instrument that measured their level of understanding of the competency-based approach, identifying key areas for improvement. Phase 2. Ongoing Support: 3,168 courses on competencies were accredited and 116 personalized advising sessions were provided throughout the three periods, which increased teachers' confidence in the application of the new approach. During Phase 3. FOCUS: Peer-to-Peer Strengthening: 1,668 teachers made peer to peer visits and participated in their respective feedback session. At the same time, 360 teachers carried out a self-evaluation of their class through a recording and under the same criteria as the peer visit. These activities promoted collaborative learning and the strengthening of good practices. In Phase 4. Sharing in Academia: during the end-of-term sessions by academies, 70 records of agreements on good practices and agreements for improvement for the following academic period were made, belonging to 26 departments. Finally, in Phase 5. Results Report: the results obtained from each phase were integrated into a report for each academic period, detailed by department. The above allowed making decisions on teacher training, at the same time it was an input to make improvement adjustments to the SAC Plan, consolidating a culture of permanent improvement.

Keywords: academic excellence, competency-based education, continuous improvement, faculty collaboration, peer observation

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Introduction

In recent decades, competency-based education has been a central axis in the transformation of educational models in higher education. The Organization for Economic Co-operation and Development (OECD) has emphasized the importance of developing skills and competencies as a key factor for individual well-being and economic growth in 21st century societies (OECD, 2017). In this context, the competency-based approach seeks not only the transmission of knowledge, but also the development of cognitive, technical and socioemotional skills that enable students to perform effectively in their professional and personal lives (OECD, 2012) (OECD, 2018).

The concept of competency has been widely analyzed in the academic literature. Tobón (2017), points out that the design of programs with didactic planning based on competencies is an essential process in teaching and a key element in curricular concretion. Similarly, Cerna (2021), argues that quality education implies not only the acquisition of knowledge, but also the development of skills and attitudes necessary for adult life. Along these lines, the Programme for International Student Assessment (PISA) has shown that educational success depends not only on the mastery of traditional content, but also on the development of transversal competencies applicable in various contexts (OECD, 2018).

Several studies have addressed the implementation of the competency-based approach in higher education. The transition from an educational model based on objectives to one based on competencies responds to the need to train professionals with skills applicable in different work contexts (Villa & Poblete, 2008; Zabalza, 2006), this means that it seeks to ensure that students acquire skills, knowledge and attitudes applicable in real contexts, allowing them a better integration in the labor market and a greater ability to adapt in dynamic and changing environments (González & Wagenaar, 2003). Thus, the competency-based model has been shown to improve the significant learning and professional performance of graduates (Zabalza, 2006).

As part of the main challenges of this process, Fullan and Quinn (2016), emphasizes the need for strategic planning to ensure proper implementation and evaluation. Salazar-Morales et al. (2020) identified the resistance to change by the faculty and the lack of alignment with institutional policies. Chulde-Zhirve et al. (2024), highlights the relevance of active methodologies and the need for teacher training for their effective implementation in Latin America. Vargas et al. (2021), supports peer observation as an effective strategy for improving teacher implementation. Along the same lines, Pavié-Nova et al. (2022), highlights the importance of having adequate tools to measure learning effectively.

Similar initiatives have been developed in other institutions, such as the National Autonomous University of Mexico and the University of Sherbrooke in Quebec, where teacher training programs have been designed to guide teachers in the development and implementation of competency-based curricula. These experiences have demonstrated the importance of offering structured support to teachers, to ensure the coherence and effectiveness of the new educational model (Coiduras et al., 2009; Organización de Estados Iberoamericanos para la Educación, la Ciencia y la Cultura, 2013).

Teacher Support Plan: Facilitating the Transition to Competency-Based Education

In the fall of 2023, with the objective of training professionals with a profile adaptable to current demands, the University of Monterrey (UDEM) defined as a Strategic Objective the transition from a model based on objectives to one based on competencies, highlighting the need for an agile, effective and sustainable transformation process. Thus, along with the work in the adaptation and updating of the curricula by each department of the Schools and Faculties, an agile team belonging to the Vice Rector's Office of Strategic Evolution and Administration (VEEA) was appointed to create a plan to support teachers due to the high importance of their participation in the implementation of the new model.

The agile team is a multidisciplinary team of 6 members, whose objective is to find solutions to complex problems of the university, adding value in an iterative way. It is based on the SCRUM framework that provides flexibility in the choice of methods, tools, techniques and instruments. Its focus is centered on the user, in this case, the teachers. The first activities of the agile team consisted of carrying out a Design Thinking process, that is, the identification of user needs through empathy and mapping of available resources in the institution. Subsequently, ideation sessions were carried out in the search for alternatives for the creation of prototypes, which were taken back to the teachers and Stakeholders to obtain valuable feedback and make the necessary adjustments.

The final result was the *Plan de Seguimiento y Acompañamiento en Competencias* (SAC Plan), consisting of a five-phase cycle. Its objective is to be an integrating and enabling system that accompanies the faculty to strengthen the implementation of competency-based courses aligned with UDEM's commitment to academic excellence.

Figure 1

SAC Plan Description of Each of the Phases



Note. Prepared by the authors

Phase 1. Teacher Preparation

Objective: Self-assessment instrument of knowledge about the UDEM Competency Model with the purpose of identifying training needs to continue teacher development. The topics included are:

- UDEM Competency Model
- Transversal Competencies
- Disciplinary Competencies
- Instructional Design
- Evaluation

To ensure content validity, the questionnaire was submitted to the judgement of experts with doctoral degrees in the field of education, who evaluated the relevance, clarity and coherence of the items.

Area responsible: Center for Academic Development (CDA). Center responsible for the pedagogical training of teachers.

Application:

- Each teacher must answer on a single occasion
- During the first 4 weeks of the semester
- The instrument is developed in QuestionPro and is sent by personalized e-mail

Procedure: The CDA identifies teachers who have not completed the Teacher Preparation Instrument, sends them an e-mail with the personalized link and the deadline for their response. New teachers are added each academic period. Follow up on the results individually as well as in the department.

Phase 2. Ongoing Support

Objective: To provide academic support to teachers by offering training courses published by the CDA and/or the Organizational Development Management of the Department of Human Capital (DICH), so that each teacher can choose the courses he/she needs according to the results of the Teacher Preparation Competency Model instrument or his/her particular needs. The above in order to strengthen the implementation of the competency-based model.

Area responsible: CDA

Implementation:

- Directed to all teachers
- During the entire academic period, on a continuous basis

Procedure: Each teacher reviews the training courses published in the institutional portal to choose the course or courses according to the needs detected, as well as the personal interests of the teachers. In addition to the above, each Department Director (DDA) may ask the CDA for a course(s) according to the needs detected in the teachers of his/her department in phase 1. The topics include academic, pedagogical, technological, training, administrative and welfare issues. Likewise, the CDA offers personalized counseling to resolve any doubts regarding the training path of each teacher and the most convenient courses to take.

Phase 3. FOCUS: Peer-to-Peer Strengthening

Objective: Promote the exchange of ideas, through peer classroom visits, to enhance teaching strengths.

The topics included in the instrument are:

- Principles
- Values
- Classroom organization
- Didactic resources
- Technological resources
- Active learning strategies
- Evaluation system
- Feedback

To ensure content validity, the instrument was submitted to the judgement of experts with doctoral degrees in the field of education, who evaluated the relevance, clarity and coherence of the items.

Area responsible: Department of Academic Effectiveness (DEAC) and the DDA.

Implementation:

- 60% of the faculty in each department must visit a peer faculty member
- Assignment of visits is determined by the DDA
- It is carried out during the 16 weeks of the academic period
- An optional self-evaluation may be carried out
- Each teacher must be visited, visit a peer and perform a self-evaluation at least once a year
- The instrument is developed in QuestionPro
- A guide was created with instructions for the observation and for filling out the instrument

Procedure: The DDA assigns visits to peer teachers, prioritizing them to be from the same subject or academy in order to have more and better elements of dialogue. Each teacher reads the FOCO Guide where the instructions are detailed, makes the peer visit, records his/her observations in the instrument and agrees with the visited teacher on a session to discuss and offer constructive feedback. The target percentage is met through the peer visits.

At the same time, all teachers in the department, optionally as a means of reflection for the continuous improvement of their teaching practice, can perform a self-evaluation by recording a class of their own and using the FOCO Guide as a reference point. The results are recorded in QuestionPro. Self-assessments are not taken into account for the achievement of the target percentage.

Phase 4. Sharing in Academia

Objective: To record good practices and improvement agreements for the implementation of the courses for the following semester.

The topics included are:

- Strengths
- Areas for improvement
- Good practices
- Agreements to be implemented in the following academic period

Area responsible: DEAC and the DDA.

Implementation:

- Each DDA convenes a meeting of all its teachers
- At the end of the academic period
- Dialogue is promoted among teachers on the topics indicated
- The information is recorded in the QuestionPro instrument

This space functions as a collaborative retrospective, which allows systematizing the information and follow-up by the DDA.

Procedure: At the end of the academic period, the DDA convenes a department meeting. The teaching dialogue between academies is promoted with the objective of sharing strengths, good practices, areas for improvement and recording them together with the agreements for the implementation of the courses of the following academic period.

Phase 5. Results Report

Objective: To summarize and make visible the results for continuous improvement.
The results of each phase of the SAC Plan are integrated by department.

Area responsible: DEAC

Implementation:

- CDA shares results of Phases 1 and 2 with DEAC
- DEAC obtains concentrated results of Phases 3 and 4
- DEAC integrates the results of each phase by department using graphs, tables and indicators
- Sends the report of results to Faculty or School Deans and DDA
- DDA makes pertinent decisions according to the results obtained by its teachers

Procedure: DEAC's Curriculum Development and Administration Management integrates the results of each phase of the SAC Plan through tables, graphs and indicators that allow the identification of progress, as well as the topics or areas in which each department needs to be strengthened with respect to the implementation of the competency-based model.

SAC Plan Communication Plan

A communication plan was designed and implemented in a strategic and coordinated manner, specifically aimed at DDA, CDA and teachers. This communication plan consisted of brief and concrete e-mails, personalized in some cases, describing the objective, the dates and an e-card with the call to action to the instrument, as a reinforcement of its relevance within the process of integration to the competency-based educational model.

Methodology

Research Question

To what extent have teachers adopted the SAC Plan as a support system, in the different phases and academic periods during the transition to the UDEM Competency-Based Model?

Objectives

General: To measure teachers' adoption of the SAC Plan as a support system during the process of transition to the competency-based model.

Specific:

- Identify teacher adoption in each phase by period
- To compare teacher adoption in each phase by period
- Identify findings and points for improvement

Type of Research

Positivist paradigm, quantitative approach, longitudinal descriptive type.

Method: Survey Method

Teaching adoption of the SAC Plan will be measured according to the objective and indicator of each phase (Objective Key Result, OKR).

Instruments and Indicators

- Phase 1. Teacher Preparation Competency Model (QuestionPro)
    - Number of teachers who completed the instrument per period
- Phase 2. Record of accredited courses and personalized counseling from CDA
    - Number of teachers who accredited course(s) by period
    - Number of accredited courses per period
    - Number of personal advising sessions carried out by CDA per period
- Phase 3. FOCUS: Peer-to-Peer Strengthening (QuestionPro)
    - Number of teachers who completed the instrument per period (peer-to-peer visit) out of the target 60% per department
    - Number of teachers who completed the instrument per period (self-evaluation)
- Phase 4. Sharing in Academia (QuestionPro)
    - Number of agreements recorded in the Academy per department per period
- Phase 5. Results Report
    - Integrated report of results of each phase per period

Population

For each period, all undergraduate teachers who taught competency-based classes were considered:

- Fall 2023: 835 teachers
- Spring 2024: 904 teachers
- Fall 2024: 986 teachers

Statistical Analysis Plan

Descriptive statistics were used, focusing on:

- Participation records by phase
- Comparison of participation between academic periods
- Identification of adoption by phases

For phases 1 and 3, a real-time results viewer was developed in Power BI, which allowed the DDA to take the pertinent actions.

Results

The main results by phase are presented below:

Phase 1. Teacher Preparation

Table 1 shows the number and percentage of teachers who answered the instrument.

Table 1

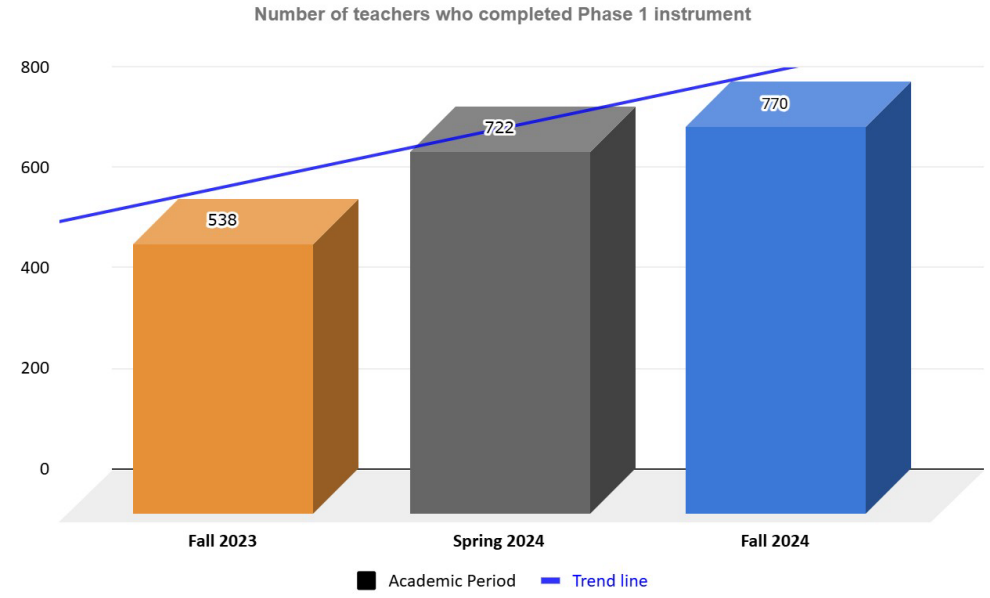
Phase 1. Teacher Preparation Number of Responses by Period

	Phase 1 Teacher Preparation		
Period	Number of emails sent to teachers	Teachers responded to the instrument	Teachers did not respond
Fall 2023	835	538	297
Spring 2024	366	184	182
Fall 2024	264	48	216

Note. Prepared by the authors with institutional information.

Figure 2

Phase 1. Teacher Preparation Accumulated Number of Teachers Who Completed the Phase 1 Instrument at the End of Each Academic Period



Note. Prepared by the authors with institutional information.

At the end of fall 2024 there were 986 active teachers of which 770 (78%) responded to the instrument. This data made it possible to prioritize courses and counseling during Phase 2.

Phase 2. Ongoing Support

Table 2 shows the number and type of accredited courses per period based on the institutional teacher training records (2023-2024).

Table 2
Phase 2. Ongoing Support Number and Type of Courses Accredited per Period

Type of course		Courses accredited by academic period			Total by course type
		OT'23	PR'24	OT'24	
Competency-based education model		150	162	140	452
Principles and values		43	200	130	373
Instructional Design	Technological resources	290	406	266	962
	Active learning strategies	96	281	104	481
	Classroom organization	35	85	54	174
	Teaching resources	41	86	43	170
Evaluation and feedback system		175	150	231	556
Accredited courses per period		**830**	**1370**	**968**	**3168**

Note. Prepared by the authors with institutional information.

It is important to mention that there were teachers who took and accredited more than one course per academic period. Table 3 shows the number of unique teachers who took and accredited courses per period.

Table 3
Phase 2. Ongoing Support Number of Unique Teachers Who Accredited Courses per Period

	OT'23	**PR'24**	**OT'24**
Unique teachers	319	365	391

Note. Prepared by the authors with institutional information.

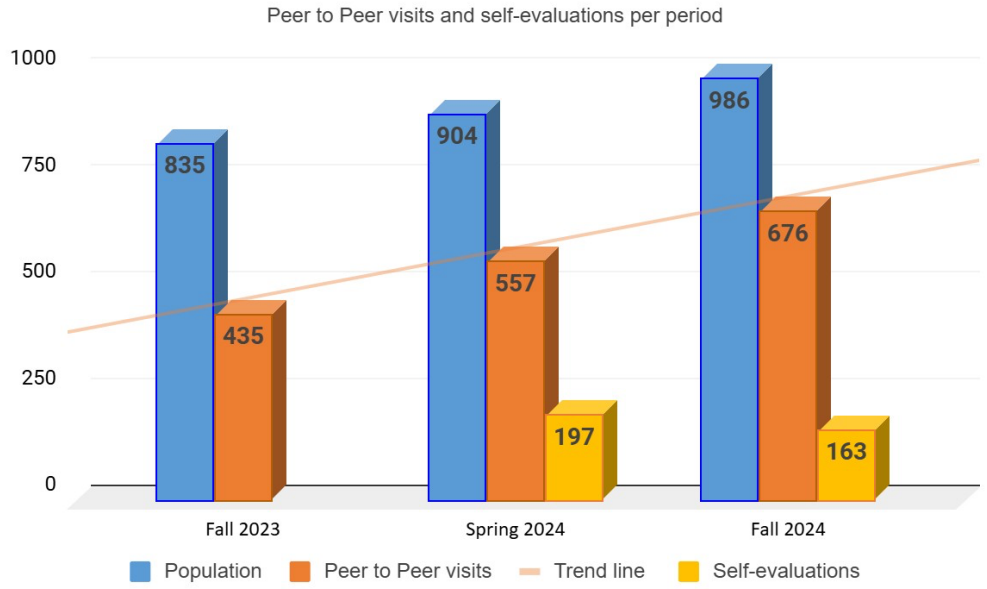
In addition, personalized counseling was provided by expert instructional designers to teachers who requested it.

- Fall 2023: 46
- Spring 2024: 35
- Fall 2024: 35

Phase 3. FOCUS: Peer-to-Peer Strengthening

Figure 3 shows the incremental trend in the number of peer to peer visits and self-evaluations performed per period.

Figure 3
Phase 3. FOCUS: Peer-to-Peer Strengthening Visits to Peer and Self-Evaluations per Period



Note. Prepared by the authors with institutional information.

Table 4 shows the number and percentage of peer to peer visits and self-evaluations with respect to the target percentage defined for each academic period.

Institutionally, 60% was determined as the target percentage of peer visits per department.

Table 4
Phase 3. FOCUS: Peer-to-Peer Strengthening Visits and Target Percentage by Academic Period

Period	Population	Target 60% of the population	Peer teacher visits n (%)	Self-evaluations
Fall 2023	835	501	435 (52%)	N/A
Spring 2024	904	542	557 (62%)	197
Fall 2024	986	592	676 (69%)	163

*In Fall 2023 there were no self-evaluations.
Note. Prepared by the authors with institutional information.

At the institutional level, the following percentage was obtained by period:

- Fall 2023: 52%
- Spring 2024: 62%
- Fall 2024: 69%

Phase 4. Sharing in Academia

Table 5 shows the number of records of agreements made by Academia in QuestionPro by department and period.

Table 5

Phase 4. Sharing in Academia Number of Agreement Registrations in Academia by Period and by Department

Period	Number of records per Academy	Participating departments
Fall 2023	24	8
Spring 2024	37	13
Fall 2024	9	5

Note. Prepared by the authors with institutional information.

Phase 5. Results Report

DEAC has made two institutional results reports, in Spring 2024 and Fall 2024. In Fall 2023 the DEAC department did not report results in an institutional manner, this was done only as a first report on the implementation of the SAC Plan within the agile team as an input to carry out the pertinent adjustments.

Conclusion

Technological advances have driven an accelerated transformation of the world, modifying the way in which various activities are carried out and facilitating immediate access to almost any type of information, including that which is naturally considered academic knowledge. Thus, education cannot be limited simply to the transmission of isolated knowledge; it must evolve at the pace of global changes and technological progress, and one way to achieve this is the competency-based educational model. This model promotes in students the comprehensive development of knowledge, skills, attitudes and, some add, values (OECD, 2012, 2018), which will enable future professionals to perform effectively in their personal and professional lives. In turn, this preparation will contribute positively to the economic growth of their country (OECD, 2017), by providing them with the ability to adapt to diverse work contexts (González & Wagenaar, 2003; Villa & Poblete, 2008; Zabalza, 2006).

Because the competency-based educational model has proven to improve the significant learning and professional performance of graduates (Zabalza, 2006), as of 2023, UDEM evolved from an educational model based on objectives to one based on competencies, for which it carried out the adaptation of all its study programs and implemented information and training sessions for all its teachers and academic staff, according to Fullan and Quinn (2016), and Salazar-Morales et al. (2020). In addition to the above, and aware of the importance of teachers' actions, Asunción (2019), highlights the value of empowering teachers through active

methodologies, which requires the support of institutional teams committed to their professional development. For this work, with the certainty of the value of applying the agility framework, the Agile Curriculum and Competencies Team was assigned the responsibility of supporting teachers throughout this process.

The SAC Plan was designed with the objective of being the integrating and enabling system that accompanies the faculty to strengthen the implementation of competency-based courses aligned to UDEM's commitment to academic excellence, because as Salazar-Morales et al. (2020), mention, it is natural for faculty to show resistance to change and lack of alignment to institutional policies.

At the end of the third application period, Fall 2024, 78% of the total active faculty completed the Phase 1 Teaching Preparation Instrument. The results obtained provided a diagnosis of how our professors began the implementation of the model, revealing as strengths the knowledge of the Competency-Based Educational Model, disciplinary competencies and transversal competencies, with less mastery of instructional design and the evaluation system. As a result of the application of this instrument, information was obtained on the degree of mastery of each subject, both individually and by department, which made it possible to identify training gaps and feed a *backlog* of professional development needs. This information was key for decision-making at both the individual level (personalized training trajectories) and the institutional level (prioritization of training strategies). The above shows the usefulness of the instrument not only as an individual diagnosis, but also as an input for institutional decision making and to guide efforts in faculty participation in Phase 2 of the SAC Plan.

Regarding Phase 2. Ongoing Support, at the end of the third application period, fall 2024, 3,168 courses were accredited and 116 personalized counseling were attended, which shows the interest and need of teachers to obtain training, especially in the area of instructional design, which accounted for 56% of the accredited courses, including technological resources, active learning strategies, class organization and didactic resources. Likewise, the topics of evaluation and feedback were in great demand.

It was evident that there were teachers who accredited more than one course per academic period, increasing the number of participating teachers in each period. This demonstrates the institutional and professional commitment of teachers to improve their pedagogical practice in light of the new educational approach. The combination of flexible formats and personalized advice worked as an adaptive *onboarding* strategy, facilitating the appropriation of the model from different levels of teaching experience, which reinforces what García and López (2020) pointed out, where personalization and teacher autonomy emerge as key conditions for the sustainable adoption of new methodologies.

With respect to Phase 3. FOCUS: Peer-to-Peer Strengthening, the institutional principles and values described in the academic program were included in the peer teacher observation guide, as it has been evidenced that a quality education should not be limited to the years of academic study, but should enable students to continue learning throughout their adult life (Repetto & Pérez-González, 2003), for this, the development of both disciplinary and transversal competencies is required (OECD, 2018).

The results evidence incremental participation in peer teacher visits. The 1,668 peer teacher visits favor the exchange of good practices and the iterative development of teaching competencies from actual practice. As mentioned by Biggs and Tang (2011), peer feedback

favors the use of active methodologies, group management and technological interaction for professional learning, and Vargas et al. (2021), who highlight peer observation as an effective strategy for teacher improvement in the implementation of the competency-based model. In the spring 2024 and fall 2024 periods, in general, 60% of peer visits were exceeded; in addition, 360 class self-evaluations were carried out, with the same guide observing the recording of a class of their own. It is worth mentioning that self-evaluations are not taken into account for the 60% compliance. However, it is pertinent to take into account that the lack of incentives and the time required for adaptation may generate resistance among the faculty (Ramírez & Torres, 2019).

Phase 4. Sharing in Academia, the lowest participation among the phases of the SAC Plan was observed. The results of these meetings showed that collective learning and the systematization of experiences are key to consolidate an active and evolving professional community. It is important to mention that it is not mandatory to hold the closing meeting of the academic period on a certain date, the meetings are carried out in different ways within each academy of each of the 38 departments of the 9 Schools and 2 Faculties of the university, in the same way, each DDA has documented these agreements as they have considered best, so in this phase there is an area of improvement for the following iterations. Despite the low participation in the Fall 2024 meeting registration, this space remains as an essential meeting point to close cycles, share effective practices and generate agreements aimed at improvement. This strategy is aligned with the principles of agile communities of practice, which foster collective intelligence, co-creation and horizontal learning (Salinas, 2012; Tobón, 2013).

Finally, Phase 5. Results Report. At the end of each academic period, the Curricular Development and Administration Management of DEAC prepares a report with the quantitative and qualitative results of each of the 4 phases of the SAC Plan. The report is made by departments grouped by Schools and Faculties. The DDA analyzes it, detects strengths, weaknesses and opportunities, both individually and as a whole, and makes decisions with concrete data. Of the three periods included in this article, only in fall 2023, the report was made by the agile team because it was still in the operation of the SAC Plan. As of spring 2024, the governance of the entire SAC Plan became the responsibility of DEAC. Comprehensively, the results of the SAC Plan reinforce the importance of sustained and structured support strategies such as the communication plan, as well as the active and coordinated participation of each of the areas involved.

Ethical implications have been considered in this article, mentioning quantities and areas and avoiding mentioning personal names, thus safeguarding personal and institutional information.

Based on the data and results obtained, it can be concluded that the SAC Plan has been fundamental in the agile transition of UDEM towards a competency-based educational model. Through continuous iterations under the user-centered approach, which in this case is the faculty, significant progress has been made in the adoption and implementation of this model. The SAC Plan was designed to offer direct value to the user (faculty), so its objective of being an integrating and enabling system that accompanies faculty to strengthen the implementation of competency-based courses aligned with the UDEM's commitment to academic excellence has been achieved.

The amount of faculty participation in the SAC Plan demonstrates a commitment to continuous improvement and adaptation to the new educational model. Phase 2 Ongoing Support and Phase 3 FOCUS: Peer-to-Peer Strengthening, have facilitated the implementation of active and

collaborative methodologies, aligned with the competency-based approach. Phase 3 FOCUS: Peer-to-Peer Strengthening and Phase 4 Sharing in Academia, have promoted the construction of communities of reflection on teaching practice, essential for innovation and educational quality. Phase 5 Results Report, has allowed for more agile and contextualized institutional decision-making based on real data.

Based on the analysis by phases and academic periods, learning and opportunities for improvement were identified. By adopting these strategies, the SAC Plan will be strengthened as a dynamic and effective tool for educational transformation, maintaining an agile and successful adaptation to the competency-based educational model.

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

The authors declare that no AI or AI-assisted technologies have been used to generate, refine, or correct the content in the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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Contact email: zita.lopez@udem.edu.mx

Drawing in Early Childhood Education and Teacher Mediation

Karla Raquel Lima Pereira, Universidade Federal de São Carlos, Brazil
Aline Sommerhalder, Universidade Federal de São Carlos, Brazil
Fernando Donizete Alves, Universidade Federal de São Carlos, Brazil

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Abstract

Drawing, as a language, is a creative act developed from the child's dialogue with the elements of reality and the people around them. In early childhood education, it is also a representation, as well as being pre-written. The research aimed to discuss teacher mediation in early childhood education during children's interaction when drawing. It was based on theorists such as Iavelberg (2013), Derdyk (2015) and Vygotsky (2000, 2006). The focus group technique was used with seven teachers from an early childhood education school in São Luís do Maranhão/Brazil. The results were analysed from a qualitative point of view and it was found that in the act of drawing, the interaction between the children influences the choice and decision of what to draw, and that they imitate their classmates' images. This event was considered by the teachers to be detrimental to learning. Other results showed teacher intervention in the act of drawing through what they reported as "making a lot of noise," during child interaction, and also the act of holding the child's hand to draw. The reproduction of the children's drawings on the blackboard and the archiving of the productions in envelopes or portfolios as documents to be given to families were other scientific findings. The study concluded that the teachers mediated the interaction between children when they were drawing, but that they stereotyped the children's actions and mechanised their drawings, inhibiting creativity and the exchange of knowledge between the children.

Keywords: children's drawing, teaching practice, early childhood education

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Introduction

In Brazil, Early Childhood Education (E.C.E.) represents the first stage of Basic Education, encompassing children from 0 to 5 years of age, and is mandatory from the age of 4. It is supported by legal documents such as the Federal Constitution (1988) – Article 208 – and the National Education Guidelines and Framework Law (Law No. 9.394/1996). There are also two essential documents that guide pedagogical work in early childhood education schools: the National Curriculum Guidelines for Early Childhood Education (2010) and the National Common Core Curriculum (2018). These documents propose a curriculum organization based on structural axes such as play and interaction, and they emphasize drawing as one of the child's expressive languages.

However, Spilere and Camargo (2018) argue that teachers often conduct drawing activities in ways that contradict these policy guidelines, treating drawing primarily as a tool for motor training (Derdyk, 2015) rather than as an expressive language. This approach supports a technical educational model, reflected by the prevalence of copying finished models and coloring photocopied worksheets in Early Childhood Education Institutions (ECEIs), which limits children's creative and expressive development.

Copying restricts children from authoring their own creations, resulting in impersonal reproduction, empty meanings and loss of individual expression (Derdyk, 2015; Vecchi, 2017). To promote meaningful engagement, drawing should transition from rote copying to imitation arising from personal experience, supporting internalization and authentic learning (Derdyk, 2015).

In this sense, drawing cannot be conceived as a form of self-expression by the child in itself, free from any social influences, developing spontaneously. As Silva (2002, apud Tsuhako, 2016) explains, "both drawing and the child are historical products that belong to a certain culture and develop within it; the role of the other in graphic activity and in the psychic life of the human being is fundamental for both to develop" (p. 31).

Therefore, drawing, as an expressive and cultural language, stands in contrast to two perspectives: free drawing and guided drawing. "Free drawing" is often maintained as a pastime in most Brazilian E.C.E. schools, where children draw "whatever they want" spontaneously. Meanwhile, "guided drawing" corresponds to a pre-established, mechanical, and instructional activity (Boriollo, 2022). Both types of drawing, whether free or guided, lack intentional teacher mediation, which compromises the quality of pedagogical work and prevents the development of children's creative, cognitive, and expressive potential.

Based on this context, this article—an excerpt from a master's research project approved by the Ethics Committee under opinion nº. 4.683.194—aims to discuss teacher mediation in early childhood education during children's interactions through drawing, considering the following research question: what are the implications of teaching practices related to drawing for children's learning?

Teacher Mediating Activity: Meaning and Sense in Pedagogical Practice Regarding Children's Drawing

There still remain, in early childhood education schools, many remnants of teaching practices based on a traditional approach (Boriollo, 2022; Tsuhako, 2016), which disregard drawing as

an expressive and cultural language. These practices often propose models of a distorted and stereotyped reality that do not correspond to the concrete world, thus emptying the possibilities for the child's drawing development due to the impoverishment of their experiences—experiences that are often limited to the use of materials such as graphite pencils, paper, colored pencils, or crayons. In this perspective, the drawing process occurs through mechanical repetition: sitting at a desk, looking at a proposed model, reproducing it in a sketchbook or on paper, and turning it in; if it does not meet the teacher's standards, the child is asked to redo it because they need to "try harder."

Another approach, often blended with the traditional one, treats drawing as the child's self-expression. In this case, the children are simply given a sheet of paper or a drawing notebook, along with a graphite pencil and/or colored pencils. They are allowed to express themselves freely, without teacher guidance, under the assumption that direction would interfere with creativity. Hence, the question arises: which approach should be used so that the child can learn and develop through drawing?

According to Vygotsky (2000), the child's main educator is the social environment; it is through their own experiences that they educate themselves. The teacher "must be like the rails along which the wagons move freely and independently, receiving from them only the direction of their movement" (p. 154, our translation). In other words, in the educational process, the teacher must both organize spaces that allow the child to experience different textures, colors, and shapes—appropriating human cultural production and expressing themselves through it—and intentionally guide these experiences. This requires knowledge of both the child and the object of orientation—in this case, drawing.

Educational intentionality, from this perspective, is linked to the concept of activity, which aims to satisfy concrete needs and is triggered by motives arising from social interaction (Leontiev, 1960). All human activity is born from the relationship that the subject establishes with the surrounding world: "[...] it is a system included in the system of social relations. [...] it also depends on one's place in society, on the conditions present, and on how it takes shape in unique individual circumstances" (Leontiev, 1978, p. 67).

In other words, teaching work is an activity driven by motives that direct one's actions toward a specific goal, emerging from an objective and concrete condition. Therefore, teaching practice only becomes an activity, in the humanizing sense, when it is motivated; otherwise, it becomes hollow and alienated.

Motives may be broad and long-lasting, persisting in human consciousness, or specific and temporary, fading quickly, or both may coexist (Leontiev, 1960). In education, both must be present and conscious, as they determine the personal sense of carrying out an activity—a sense created from subjective reality (personal experience), which in turn originates from a meaning constructed socially. Each individual interprets the meaning differently, according to their personal sense.

An activity driven by motivation leaves no room for mechanical or repetitive teaching practices, since it is composed of conscious actions directed toward a defined goal. These actions consist of operations (modes of execution, technical stages); however, if an action lacks motivation, it does not become an activity (Leontiev, 2017).

In this context, the motive behind teaching work related to drawing lies in enabling children to appropriate the teaching of drawing itself, since through this appropriation, they can develop and acquire new learning. Because of this motive, the teacher will perform actions with well-defined stages (operations) to achieve the desired goal, which depends on the given conditions (physical environment, materials, time frame, social interactions, among others).

However, teaching activity must also generate motives in the child—to prompt them to act upon what was intentionally planned, giving meaning and sense to the experience. Drawing only becomes an activity for the child if they are motivated and find personal meaning in it—if they leave traces of their own impressions (personal sense) of what was offered to them (meaning) in their composition.

When drawing, the child "reflects their attitude toward the object itself" (Mukhina, 1995, p. 173), and this attitude depends on surrounding elements, which may be external (through tools) or internal (psychic, through signs). These elements constitute the mediating activity.

For a teacher to carry out mediating activities that influence children's behavior and enhance their development, they must understand the laws governing such development and the interests characteristic of each stage of childhood. Since achieving the goals of pedagogical practice depends on this understanding. Through teacher mediation, children can reach more advanced forms of drawing by using learned techniques that enrich their expression—a poetics guided by the child as the artist (Iavelberg, 2013).

The path of graphic development thus follows what Vygotsky (2000) called the general law of child development: "[...] the child, throughout their development, begins to apply to themselves the same forms of behavior that others initially applied to them. The child assimilates the social forms of conduct and transfers them inwardly" (p. 146).

In other words, the elements of drawing arise from the child's appropriation of their interactions with peers and from teacher mediation, which—through questioning and other necessary interventions—expands the possibilities of artistic production.

To foster this development of drawing—and consequently, the child's overall development—it is essential to consider their actual developmental level (the set of experiences and knowledge already built, what they can and cannot yet do) in order to act within their zone of proximal development (ZPD). Through the ZPD, the child, in a mediating relationship with the social and natural environment, can develop what they have not yet mastered, based on imitation, since "through imitation, the child [...] can perform intellectually much more than they can in their independent activity" [translated by the authors] (Vygotsky, 2006, p. 268). The ZPD directly influences children's learning through interaction with their social environment and peers, reflecting the inherently social nature of human learning.

Thus, the child appropriates drawing as a language through word-mediated communication and interaction with peers. Children learn to draw through questioning and inquiry, by accessing human cultural knowledge, engaging in challenging and stimulating experiences, and interacting with classmates. In these mediating elements, they find ways to formulate hypotheses and build an understanding of their surroundings, correlating the meanings they acquire with their personal senses.

These learning possibilities help ensure that, during critical moments of qualitative changes and disruptions in psychic development, the child can navigate them naturally rather than through crises, which, according to Leontiev (2017), are "proof that a critical moment or change did not occur in due time. Crises will not occur if the child's psychic development does not take shape spontaneously but rather as a rationally controlled process—a controlled creation" (p. 67).

In this sense, to prevent automatism and conformism in pedagogical practices, there is a need for intentional, systematic, and guided teaching activity. By understanding the development of the child and their drawing, the teacher is driven by broad and general motives, together with specific and narrower ones, to carry out conscious actions with well-defined operations aimed at promoting a learning process. The child learns by following their natural developmental path.

Methodology

This investigation adopts a qualitative research approach, as it deals with "[...] the universe of meanings, motives, aspirations, beliefs, values, and attitudes" (Minayo, 2009, p. 121), making it impossible to quantify reality. The study was conducted in September 2023 at a preschool located in São Luís, in the state of Maranhão, northeastern Brazil. The school operates in two shifts: morning—Daycare I (2 years old), Daycare II (3 years old), Pre-I (4 years old), and Pre-II (5 years old)—and afternoon—Daycare II (3 years old), Pre-I A (4 years old), Pre-I B (4 years old), and Pre-II (5 years old).

We used the focus group technique with the teachers working in the aforementioned classes, and seven in-locus visits were conducted to gain a deeper understanding of the context and, subsequently, of the participants' statements. For data analysis, we employed content analysis based on the following stages, according to Bardin (2016): pre-analysis, material exploration, and treatment of results, inferences, and interpretation.

Children's drawing, as a form of language, develops through interaction with others. Through social interaction, the child develops both their drawing and themselves. From this perspective, the results found encompass teacher mediation in the child–child interactive process during drawing and in reproduction practices. To illustrate this, we first highlight some teachers' statements about how children interact with one another while drawing:

> PAOLA: Even when they look at a friend's drawing, some say, 'Oh, teacher, I can't draw it; I want to do it better', as if it were a competition between them.
>
> LOUISE: [...] those [children] who haven't developed much creativity and imagination yet copy or reproduce other children's drawings. For example, yesterday they had to draw professions, and one said, 'Oh, you drew a firefighter', and another said, 'I'll draw a firefighter too'. [...] I noticed that some drawings end up looking similar, following the same lines, while others are more different. So, they exchange ideas, swap materials—'Oh, I want your pen', 'Oh, I'm going to draw this too'. They always interact this way in all the drawing activities. [...] and some ask, 'Hey, draw for me; you draw better'.
>
> FRIDA: This process of interaction among them [the children], we let it happen, because, 'Oh, I like your drawing, I want to do it too' [the teacher gestures drawing]. [...] I think this interaction between them makes drawing easier, for example, because

> since we are adults, maybe our lines are harder for them to copy. [...] I believe that when they interact, it stimulates them even more, and then they go [gestures drawing].

Teachers Paola, Louise, and Frida bring to the discussion the idea that children often want to draw the same thing their peers are producing. This behavior aligns with what neuroscience studies refer to as mirror neurons—brain cells activated by the observation of manual and communicative actions (verbal or nonverbal), which are associated with the process of learning through imitation and the perception of human intentions (Lameira et al., 2006).

When a child observes another drawing, the same brain regions are activated as in the one doing the drawing, leading the observer to tend toward the same action. Mirror neurons create a natural contagion among children, fostering, according to Iavelberg (2013), "learning because the child perceives differences between their solutions and those of their peers and finds ways to improve their own drawings by observing, conversing, asking for help, or listening to comments about the drawings being made" (pp. 41–42).

Through others, children develop strategies for their own graphic production, learning procedures that better suit their way of drawing. As in the example given by teacher Louise, the two children's drawings of a firefighter share socially shaped graphic decisions, yet each child expressed their uniqueness, leaving traces of authorship. Therefore, "the immediate origin of the development of a child's individual, internal properties of personality is collaboration with other people" (Vygotsky, 2006, p. 270).

We also note in teacher Paola's remarks the presence of competition among children when drawing. Drawing activities should not become moments marked by competitive or individualistic relations where "my drawing is better" or "prettier than yours", which fosters insecurity and fear expressed in phrases such as "I don't know how to draw" or "Draw it for me, you draw better" (as mentioned by teacher Louise).

Competition rushes the time each child needs to connect with what they want to draw, provoking rivalry and a demand for "perfection" and immediacy—traits typical of capitalist and consumerist societies. Moreover, it hinders the development of aesthetic sensitivity toward one's surroundings, which requires care, empathy, attention, concentration, intensity, and listening. It is essential that children learn to cooperate with one another—if one child is struggling to draw (as described in the excerpts), another can help. In this way, the individual achievement of learning to draw is shared among all.

However, as seen in the statements from teachers Maria and Agatha below, this cooperation can sometimes be interpreted as "doing it for the other", which can be detrimental to children's learning:

> MARIA: Sometimes one wants to draw for the other—'Oh, he can't do it, I'll do it for him'. [...] Copying is still okay, but doing it for a friend is not.
>
> AGATHA: We don't allow them to do it for someone else.

What defines whether peer interactions are beneficial or harmful is the educational environment, organized and guided by the teacher. If the environment is marked by hierarchical, competitive, and authoritarian relationships, doing something "for" the other becomes highly detrimental to the child's creative process through drawing. However, if it is an environment

of connection and dialogue, with reciprocal listening (the teacher learns to speak with the child by listening; the child listens because they feel heard), then doing something for a peer becomes a learning opportunity that does not undermine the child's authorship. On the contrary, it encourages them to further develop this expressive and social language.

From this perspective, let us analyze the statements of teachers Frida and Luana below regarding mediation during children's interactions while drawing:

> FRIDA: We don't interfere. If you notice, the teaching method at our school is quite similar among all teachers. What we do in our planning meetings is precisely to find something positive— 'Oh, that worked there; let's try it here'. If you notice, the answers are almost the same. [...] Sometimes we do intervene by holding their hand to guide their line.
>
> LUANA: I don't interfere. Only when it gets noisy do we pause a bit. But I let them talk—at least I do. Especially downstairs, my Pre-II class is very large; if I let everyone talk at once, I can't handle it. But sometimes I say, 'Okay, you can talk'.

We observe uniformity in their responses regarding non-interference during peer interaction while drawing, as, according to teacher Frida, this is part of the school's teaching method. However, she reveals a practice where teachers hold children's hands to help them draw. When a child's hand is guided in this way, they are deprived of exploring their own movements. The development of their drawing becomes rushed, controlled, and devoid of original traces, as it results from automatic, passive, and unconscious action—the child's hand follows the teacher's thought.

Such practice underestimates the child's capacity to appropriate graphic elements through imitation. According to Vygotsky (2006), imitation involves "everything that a child is not yet able to do independently, but can learn through the guidance or collaboration of an adult [or other children], or with the help of guiding questions" (p. 268, emphasis added). In this sense, collaboration has an interactive dimension in which the child develops their drawing through contact with various visual, tactile, and other experiences, with peers' drawings and teacher guidance (questioning, intentional problematization). Thus, the child learns to draw by imitating what surrounds them, actively engaging in the educational process through doing, experimenting, and exploring.

Another point of note is teacher Luana's comment that she only interferes when there is "noise" associated with children's "shouting". She details her practice further in the following excerpt, describing a drawing activity:

> LUANA: I often do pair work. For example, last week, I joined two chairs together and said, 'Today's activity is in pairs. Take your books; the task is to draw your partner's house. One describes their house, and the other draws it, then you switch'. Then, 'Teacher, are we doing it together?' 'Yes, you'll form pairs'. They loved the activity because they could talk, right? So, they did it—I didn't interfere, only when there was too much shouting. 'No, no, let's tone it down, or I'll separate you'. But it went well. I let them... they spend a lot of time together.

A healthy environment with children is inevitably full of energetic, curious, and talkative interactions; hence, the importance of organizing it with appropriate, systematic guidance.

Boundaries are not overstepped when there are consistent and regular teaching practices that foster social coexistence, mutual respect, and listening. Vygotsky (2000) also emphasizes the need to educate children aesthetically so that this surge of inner energy can be directed toward something socially valuable, finding in drawing a creative outlet.

However, in the researched setting, the educational environment is predominantly characterized by pedagogical practices in which children reproduce drawings made by teachers on the board—contradicting an aesthetic education that fosters creativity and imagination through drawing. Some excerpts illustrate this:

> PAOLA: When it's a guided drawing, I like to draw on the board so they can see—'Teacher, I can't', 'Let's try,' 'so I draw it and they look.'
>
> FRANCISCA: In the toddlers' class [Daycare I], the English teacher always draws on the board. With the image, [...] they [the children] can identify 'it's a doll' and 'it's a house'. They don't draw much yet, but they recognize drawings. [...] Since mine are younger, they don't have full drawing skills yet. [...] They're just starting to hold pencils now. They're better with collage activities.
>
> LIZ: I use the board a lot; I draw there [...] I think that from one drawing, they [the children] can make others—for example, a tree here, some paint there. [...] Often, some can't really draw like the board, but they say, 'I did it, teacher'. They take a bit of that image—almost the same—but it's from the board, and for them, that's it.
>
> FRIDA: In my class, they [the children] are younger—Daycare II—and they're still in the process, so they can't reproduce what you draw on the board yet. They can't because many just started school this year. So, what we use are pre-made drawings for them to color, because at this stage, it's easier for their development. [...] This week we tried—I drew a tree and asked them to reproduce it on a blank sheet—they couldn't, but it was a stimulus, an attempt.
>
> LOUISE: Some things they [the children] don't know how to draw, so we draw on the board. If it's a book activity and they don't know how, we draw for them to reproduce. I also work with symmetry activities to complete drawings because I think it stimulates their imagination. For example, they don't know how to draw a body or a butterfly, a cow, but if I give them a half-drawing to complete, I think it helps them imagine how to draw it. So, I put the model on top for them to reproduce.
>
> AGATHA: Depending on the class, since I also work with Frida's group, I either draw or show it—sometimes I bring ready-made activities for them [the children] to reproduce. In Louise's class, I draw, and they reproduce it.

From these accounts, we see that children reproduce drawings created by teachers, and when they cannot—as in the case of the younger groups (Daycare I and II)—drawing is limited to pre-made, ready-to-color activities. This reproduction—the well-known "copying from the board"—mechanizes thinking. Children are not given creative challenges that could expand their graphic repertoire or advance their drawing development. By being conditioned to reproduce, their traces become alienated, stagnant, and stereotyped.

Conclusion

The research addressed a relevant topic in the field of early childhood education by discussing an object such as children's drawings—something so present in the school routine, yet often undervalued as a language that enhances children's learning. The results showed that teachers believe that interaction among children stimulates the drawing process; however, it is only well accepted when there is no noise among the children or when one does not "draw for the other". The findings also revealed the presence of competition for the "best drawing". which may foster perfectionism.

Moreover, the study identified teacher interference in children's drawing, such as holding the child's hand and/or completing a trace, resulting in controlled production and loss of authorship. Teachers also draw on the board for children to reproduce on paper or in their notebooks. Such practices contribute to children's drawings becoming stereotyped, since the images taken from the board, for instance, are filled with the teachers' own experiential stereotypes. Likewise, by presenting a ready-made and finished image, teachers limit children's creativity and imagination—there is no movement on the part of the child to explore the object and make the necessary connections for its materialization through graphic expression.

Therefore, this study argues for the importance of educating teachers capable of organizing and mediating an educational environment that fosters learning—one that values aesthetics as care, attention, beauty, listening, connection, and the propagation of knowledge. This stands in contrast to a capitalist system that imprisons, controls, hastens, individualizes, silences, and marginalizes people—distinguishing between so-called "precious stones", who are valued and refined, and the "gravel". whose potential is underestimated. All children have the right to experience their languages, such as drawing, by nurturing them, and, to that end, must have access to human creations and to a school environment where they can develop fully.

In light of this, we hope this research provokes reflection and curiosity about drawing as a language, unveiling its potential for children's learning in early education. It also fosters discussions that contribute to recognizing the child as a bearer of multiple languages through which they interact, appropriate, think, feel, create, and leave marks—breaking away from the dichotomous view still deeply rooted in the educational context.

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Contact emails: karlaraquellp@hotmail.com
fdalves@ufscar.br
sommeraline1@gmail.com

The Use of Virtual Reality (VR) by Future Teachers at Kuwait University

Laila Alkhayat Alazemi, Kuwait University, Kuwait

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Abstract

Virtual reality (VR) creates immersive environments but remains underused in students training at Kuwait University. A survey collected responses from 1,380 preservice teachers across the sciences, mathematics, language arts, and social studies. The questionnaire inquired about age at first VR use, methods of learning about VR, reasons for use, skill level, social setting, and the first emotional response. Results show that most students first heard about VR from friends or classmates (51%) or online videos (26%). Only 10% of students were introduced to VR in their courses. The first use occurred between the ages of 16 and 20 for 24% of participants, and 21% began using VR within the past one to five years. Twelve percent had never tried VR. Entertainment led motivations (34%), followed by fun (14%), simulations or automation (13%), and exploratory learning (11%). Skill levels were low for nearly half of the students (49%), while high skill was reported by 18%. Most students (52%) used VR with their peers, and 75% reported feeling no anxiety during their first use. These findings point to a recreational focus and low confidence in VR among future teachers. To support the use of VR in teaching, four steps are suggested. First, add hands-on VR workshops in teaching methods courses to build skills. Second, encourage group VR projects to foster collaboration. Third, incorporate VR tasks into regular lessons to bridge the gap between theory and practice. Fourth, establish support systems, such as peer mentors, online resource centers, and training tutorials. These steps can boost confidence, increase interest, and help turn VR from a leisure activity into a useful instructional tool.

Keywords: virtual reality, preservice teachers, teacher training, technology integration, Kuwait University, immersive learning

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Introduction

Virtual reality (VR) creates a computer-generated, three-dimensional world. Headsets and motion controllers allow movement and interaction with virtual objects. Past applications centered on gaming. The growth of affordable hardware and software has opened new opportunities in professional training, medical simulations, and education. In teacher preparation programs, VR can simulate a classroom of virtual students exhibiting behaviors such as distraction or collaboration. Such practice offers a risk-free opportunity for rehearsal of lesson delivery, management strategies, and engagement techniques. At Kuwait University's College of Education, courses cover learning theories, digital tools, and classroom practicum in local schools. Instruction on general educational technology appears in multiple courses. Instruction specific to VR remains minimal. There is no formal module or lab session that focuses on VR tools and techniques. Absence of data on student awareness channels, first-use timing, motivations, skill levels, and social patterns creates uncertainty for curriculum planning. To address this gap, this study uses a descriptive-analytical survey of 1,015 students in the College of Education at Kuwait University. The work aims to understand both broad factors and specific patterns of VR use among future teachers. This leads to two research questions:

- Main research question: What are the key factors that shape preservice teachers' adoption and use of VR tools at Kuwait University?
- Sub research question: How do future teachers' patterns of VR use relate to their self-rated proficiency and their social context?

In line with these questions, the study sets four objectives. First, it will identify the main sources through which future teachers learn about VR, such as friends, online tutorials, or the curriculum. Second, it will document when students first started using VR tools. Third, it will examine the primary reasons for using VR, including entertainment, education, and professional practice. Fourth, it will measure self-reported proficiency levels using VR tools ranging from no skill to high skill. These objectives guide the design of the survey and the presentation of the results.

Literature Review

In the last five years, universities worldwide have experimented with VR in education. For example, Google Expeditions, launched in 2016, offered more than 900 virtual trips to destinations such as the Great Barrier Reef and Mars (Parmaxi et al., 2021). Teacher trainees in some US colleges used these trips to develop lesson plans in geography and science. They reported more excitement in class when they used VR materials. In Asia, Singapore's Ministry of Education operates VR labs, such as the one at the University of Istanbul (IUVIRLAB), which facilitates the learning process through a three-dimensional learning strategy in a physics laboratory (Naranjo et al., 2020). Trainees utilize VR to practice classroom management in a simulated school environment (Zhang, 2025). A study found that these trainees rated their classroom as highly ready as when participating in VR sessions (Huang et al., 2021). Currently, China is in the process of integrating, artificial intelligence, Internet of Things, VR, and augmented reality into educational systems, so to improve learning experiences through interactive and personalized environments (Zhang, 2025). According to Bermejo et al. (2023), Spain, China, Australia, the UK and Germany are the countries with the highest application of AR/VR in enhancing teaching-learning experiences with Spain having the highest count on subjects taught through AR/VR. A lack of practical guidance and missing links to lesson objectives limited the transformative use. Higher education teaching staff adopt VR in various

ways, ranging from face-to-face to non-assessable tasks, and blended-mode subjects, where participants attain a higher level of self-efficacy in student-teaching placements.

Preservice teacher research shows a confidence gap with new technologies. In the Middle East, the UAE and Saudi Arabia are investing in VR for medical training; however, there is less documented work in the area of teacher education. Kuwait's Vision 2035 includes plans to improve tech in classrooms, but progress is gradual (Aishah Alenezi, 2021). In Kuwait, various obstacles exist to integrating VR technologies in teaching, including the need for a VR lab, the availability of required VR devices and equipment, the development of VR technologies that support the Arabic language, and the establishment of technical teams to design and produce educational VR technologies (Almisad, 2024). That hinders the adoption of VR by future educators. In universities, pilot projects exist, but they often depend on individual lecturers rather than a formal program.

Theoretical Framework

These facts suggest that VR is an attractive option for teacher training, but it requires clear support. Informal use, like students trying VR at home or with friends, is common, but formal curriculum integration is rare. The mixed skill levels among users necessitate that training begin with the basics. Understanding how future teachers at Kuwait University currently perceive and utilize VR can inform strategies to bridge the gap between leisure and learning. In science teaching, virtual laboratories permit safe experimentation with virtual chemicals and equipment. Students perform laboratory procedures safely, minimizing the risk of spills and injury. In history courses, virtual tours of ancient ruins allow for the exploration of inaccessible sites. Reports indicate increased student motivation and higher retention of historical facts. Language learning studies used VR scenarios to simulate real-life conversations. For example, virtual marketplaces and travel settings improved pronunciation and listening comprehension. Quantitative results showed improvements in scores on oral proficiency tests following VR interventions. Therefore, constructivist learning theory underlies many VR implementations (Marougkas et al., 2023). Learning by doing and knowledge construction through exploration align with VR experiences. Experiential learning theory also applies; concrete experience in VR, reflective observation, abstract conceptualization, and active experimentation form a cycle that supports deep learning.

Methods

The study employed a descriptive-analytical survey design to capture current practices and perceptions. The population included all students enrolled in the College of Education at Kuwait University during the spring semester. A simple random sample of 1,015 preservice teachers was drawn from the university registry. This sample included future teachers in science, mathematics, language, and social studies education, ensuring representation of elementary and secondary teaching tracks. Data collection was done through an online questionnaire. The questionnaire included six sections aligned with the study objectives:

Demographic Information

- Age groups: under 20, 20–24, 25–29, 30 and above
- Major area: science education, mathematics education, language education, social studies education
- Year of study: first year, second year, third year, fourth year, and above

Sources of VR Awareness

- Options: friends or colleagues, online videos/tutorials, websites/forums, formal coursework, media advertisements, family discussions, books

Timing of First VR Use

- Options: never used VR, more than 20 years ago, 11–15 years ago, 6–10 years ago, 1–5 years ago, between the ages of 16 and 20

Motivations for VR Use

- Options: entertainment (to kill free time), amusement/enjoyment, simulations and automation, exploration of new places, personality exploration, social VR environments, environmental interaction, other

Self-Rated VR Proficiency

- Options: none, low, medium, high

Social Context and Initial Reaction

- Use alone, with friends or colleagues, with family members, or with strangers

Emotional Reaction at First VR Use: Worried or Not Worried

A pilot test was conducted with 30 students not included in the main sample. Feedback on clarity and survey length led to slight wording edits. Reliability was tested via test-retest after one week, showing consistency above 0.85. Content validity was confirmed through expert review by two faculty members in the field of educational technology.

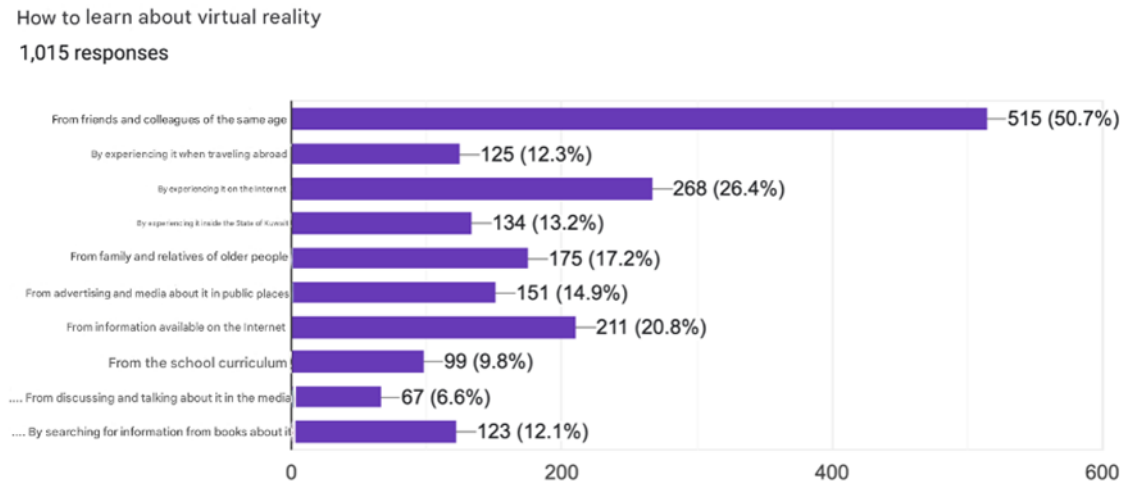
The final questionnaire was distributed via email. The survey remained open for two weeks. Reminder messages were sent at the end of week one and three days before closing. A total of 1,380 responses were received. Responses with more than two missing items were excluded, yielding 1,015 complete surveys. Data analysis involved descriptive statistics, including frequencies and percentages, for each item, calculated using standard statistical software. Results are presented in the next section without interpretation.

Results

Sources of Learning About VR

Half of the sample (50.7%) first learned about VR from friends or colleagues. Online videos and tutorials came next at 26.4%. About 20.8% cited websites or forums, while formal curriculum in class accounted for only 9.8%. Other sources, including family, media ads, and books, each fell below 15%. These figures indicate that informal peer and online channels are the primary sources of VR awareness among future teachers.

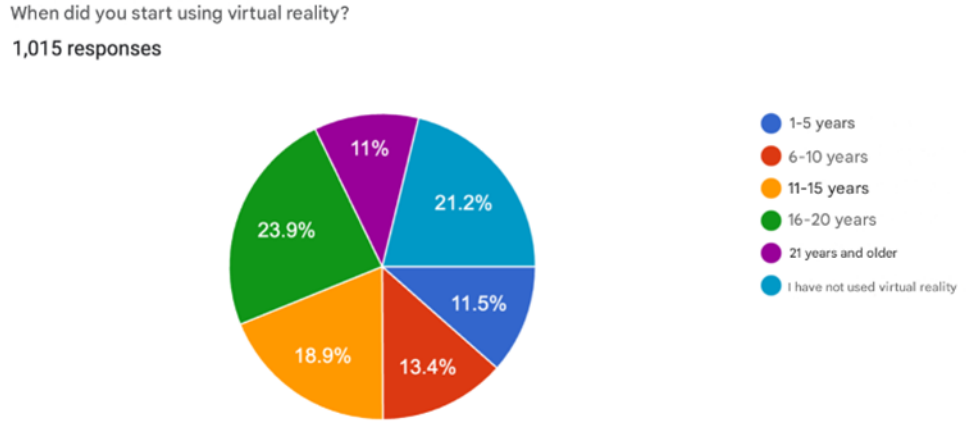
Figure 1
How to Learn About Virtual Reality?



Timing of First VR Use

When asked about the timing of first VR use, 23.9% reported starting between the ages of 16 and 20. A nearly equal share, 11.5%, began within the last 1–5 years. The next group, 18.9%, started 6–10 years ago. Fewer students began 11–15 years ago (13.4%) or more than 21 years ago (11%). Finally, 11.5% have never used VR. This spread indicates that most future teachers encountered VR in late adolescence or early adulthood.

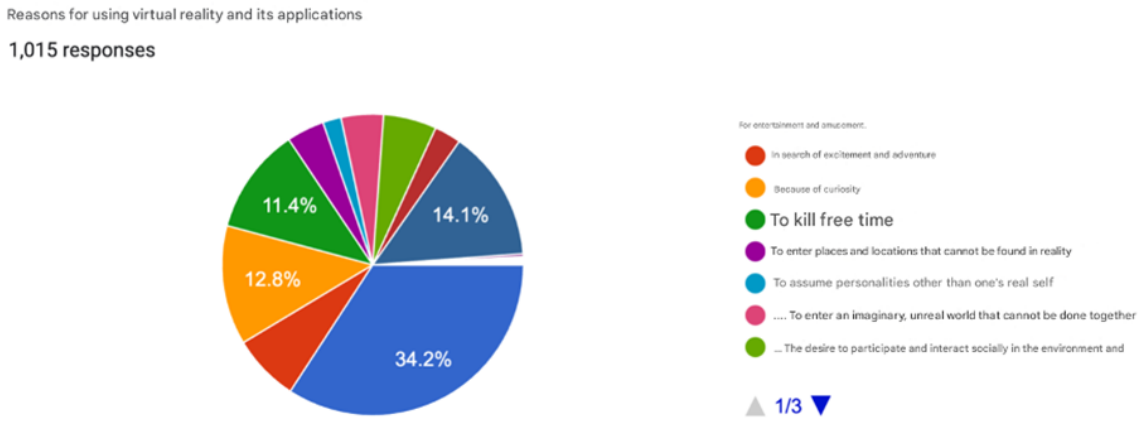
Figure 2
When Did You Start Using Virtual Reality?



Reasons for Using VR

The top reason for using VR was “to kill free time,” chosen by 34.2% of the students. “Amusement and enjoyment” followed at 14.1%, then “simulations and automation” at 12.8%. “Discovering places not found in reality” was next at 11.4%. Less common reasons, such as personality exploration, social VR spaces, and environmental interaction, each accounted for less than 10%. These data suggest that while entertainment is the main driver, a notable share of students use VR for learning and practice.

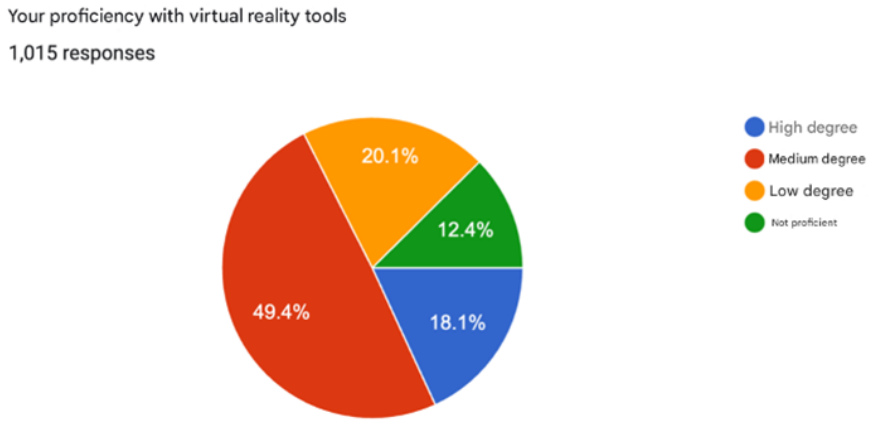
Figure 3
Reasons for Using Virtual Reality and Its Applications



Self-Rated VR Proficiency

When rating their own VR skills, 20.1% of students selected “low.” Only 18.1% reported having “high” proficiency. “Medium” proficiency was chosen by 49.4%, and 12.4% reported no proficiency at all. This shows that nearly half of preservice teachers lack confidence in using VR tools, even after initial exposure.

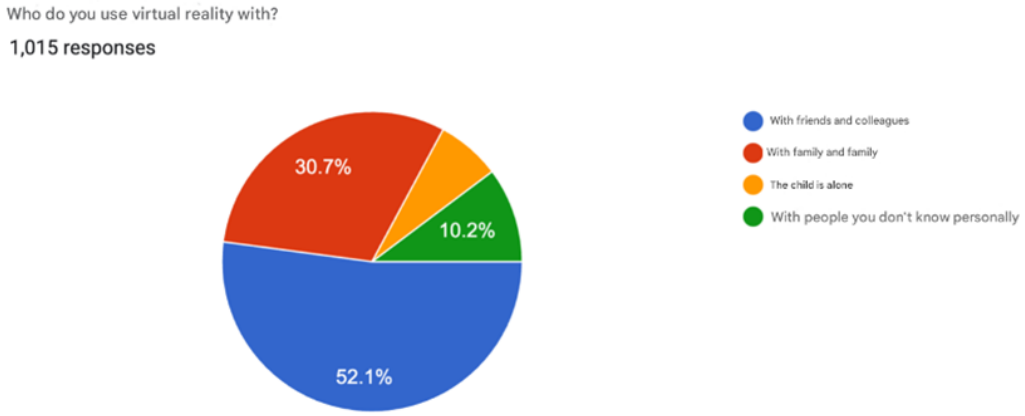
Figure 4
Your Proficiency With Virtual Reality Tools



Social Context of VR Use

Over half of students (52.1%) use VR with friends or colleagues. About 30.7% use it with family. Fewer students use VR alone (7%) while 10.2% use it with strangers. This pattern highlights the social, peer-based nature of VR use among future teachers.

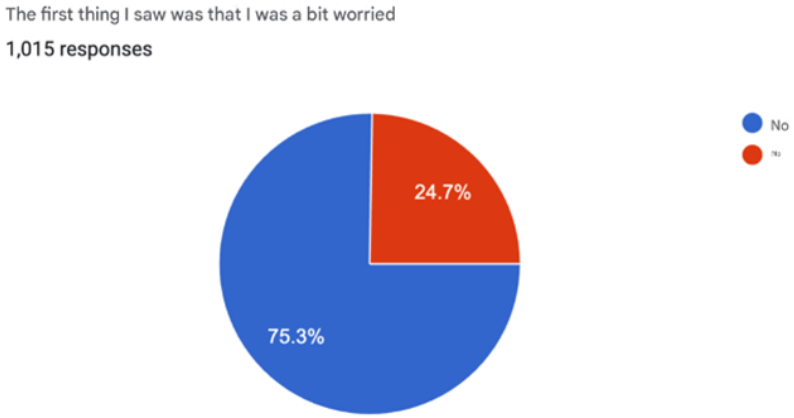
Figure 5
Who Do You Use Virtual Reality With?



Initial Worry About VR

Most students (75.3%) reported not feeling worried when they first tried VR. A smaller group (24.7%) reported some initial worry. This suggests a generally positive or curious attitude at first exposure, with a minority feeling anxiety.

Figure 6
The First Thing I Saw Was That I Was Worried



Discussion

The present study sheds light on key facets of VR adoption among preservice teachers at Kuwait University, revealing a predominantly recreational orientation, informal learning pathways, and limited self-perceived proficiency. Consistent with the Technology Acceptance Model, peer influence is identified as a critical driver of awareness, while perceived ease of use appears to be low, given the large proportion of participants rating their proficiency as low or nonexistent. The prominence of entertainment as a usage motive suggests that preservice teachers primarily engage with VR for leisure, rather than for pedagogical exploration. This finding aligns with Scurati et al.'s (2021) observation that, in the absence of structured educational frameworks, users tend to default to recreational VR experiences.

The social context data reinforce the communal nature of VR engagement: over half of the participants enjoy VR with friends and colleagues. Collaborative VR environments have

potential for group-based pedagogical activities, but the current recreational focus may limit the translation of VR skills into classroom practice. Moreover, while initial exposure rarely provokes anxiety for most, the quarter of students who experience worry signal the importance of scaffolding and a supportive orientation to ensure that all preservice teachers feel comfortable with VR tools (Address et al., 2023).

The diversity in onset ages underscores the heterogeneous technological backgrounds of the cohort. Early adopters may possess advanced familiarity, while the 11.5% who have never used VR represent a population requiring introductory experiences. Self-efficacy theory suggests that without mastery experiences, students will be unlikely to integrate VR into their future teaching. Therefore, teacher education programs must provide incremental, hands-on VR training modules to build competence and confidence.

Conclusion

Implications for Teacher Education

Given these insights, several practical steps emerge. First, embedding VR orientation workshops into the existing methods courses can bridge the gap between informal curiosity and structured learning. Short, hands-on sessions that guide students through basic navigation, troubleshooting, and pedagogical scenarios will build confidence and reduce initial anxiety (Address et al., 2023).

Second, working on VR projects in groups makes learning a more social and meaningful experience. When classmates team up to build a virtual lesson plan, run a simulated class, or tackle a classroom management scenario in VR, they exchange ideas and help one another. This mirrors real teaching, where educators often plan and solve problems together. It also builds community and lowers anxiety about trying new technology alone.

Third, incorporating VR activities into main courses demonstrates to students the value of this technology. For instance, in a science methods class, students can safely do a virtual titration and watch reactions up close (Reeves et al., 2021). In social studies methods, they can “visit” historical sites and discuss what they see, using VR to teach real content. In this way, VR stops being just a fun add-on and becomes a key tool that boosts understanding and interest.

Ultimately, students require ongoing support as they learn to use VR. A buddy system pairs experienced upper-level or graduate students with newcomers to VR. Media labs hold drop-in hours where helpers fix technical issues (Reeves et al., 2021). An online hub offers brief tutorial videos and easy-to-follow guides for quick assistance. With peer mentors, lab support, and these online tools, students build confidence, learn more quickly, and stay motivated.

These steps build a strong VR program. Workshops teach basics. Group projects spark teamwork. In-course VR makes lessons richer. Support systems enable students to experiment without fear of failure. Altogether, these changes help future teachers use VR smoothly and confidently.

Study limitations include the use of self-report data, which can be subject to bias and unreliable proficiency ratings. The descriptive-analytical design does not allow conclusions about cause and effect between how awareness develops and VR use patterns. Future research, such as observational studies or a follow-up survey of one cohort from program initiation to

completion, could reveal changes in VR skills and their integration into the classroom. Tracking confidence over time, comparing different VR systems, or testing the impact of VR lessons on real teaching performance would add value. Longitudinal designs, mixed-methods approaches, and collaboration with schools could also provide deeper insights. Conducting similar research at other Gulf universities could reveal regional trends and inform training and evaluation strategies.

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Metaphors Without Borders: Universal Grammar's Role in English-Mandarin Figurative Parallels

Yung-huei Chen, National Chung Cheng University, Taiwan

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Abstract

Speakers of different languages interpret their experiences through their physical environment, expressing events or emotions either faithfully or symbolically through idioms. These expressions are drawn from users' observations of material objects, sentiment, imagery, or cognition, and they vary across cultures due to geography, history, philosophy, or society. However, universal grammar highlights the consistency of languages, as they share traits and influence one another over time. Therefore, this study examines English and Mandarin idioms to explain the influence of universal grammar on figurative language. The analysis reveals that most idioms function at both metaphorical and linguistic levels, reinforcing shared human experiences. While metaphorical and lexical commonalities exist in both languages, they do not align perfectly; however, many of them overlap.

Keywords: figurative language, metaphor, universal grammar, idiom

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Introduction

Metaphors, as one kind of figurative language, are believed as a conscious and deliberate use of words by correlating one thing to another (Kövecses, 2010). They go beyond literal semantics and factual information to conceptual observations and intangible perceptions (Ramón-Cortés et al., 2018). They compare the likeness of two objects (Niculae & Danescu-Niculescu-Mizil, 2014) by adding emotions or images to a word or sentence. The usage of metaphor is observed in everyday language; in other words, they are not restricted to literary works, or for artistic and rhetorical purposes (Dolphin, 2016; Filipczuk, 2015; Kövecses, 2010). Metaphors are better understood by cognitive concepts (Lakoff & Johnson, 1980; Su, 2002) so that they are pervasive in thoughts (Dancygier & Sweetser, 2014). They also reflect the values of a culture (DeCapua & Wintergerst, 2016) which is central to all language and thought patterns in general (Kövecses, 2010).

Culture universal is found in every human society that this "psychic unity of mankind" cannot be overlooked (Burt & Ethel, 2015). The innate "cradle traits" of cultural behavior is inherited in all human beings which resulted in similar disposition, perception, and savoir-faire toward different issues (Burt & Ethel, 2015). Characteristics of culture in interpreting metaphorical items are alike due to the shared thinking patterns among people (Ma & Liu, 2008). Human beings have the ability to depict abstract ideas with concrete examples by observations and experiences (Lakoff & Johnson, 1980; Su, 2002) of cultural-oriented, value-related, and norm-directed languages (DeCapua & Wintergerst, 2016).

When foreign language learners do have sufficient cultural stimulus from the target language, their metaphorical competence could be elevated by using strategies of associative fluency, analogical reasoning, and image formation process (Littlemore, 2008). From Littlemore's (2008) perspective, it is beneficial for learners to make connections from their schemata to the L2 setting when they receive L2 stimulus on metaphorical usages. On the one hand, learners adapt and associate their background knowledge with the unknown one; on the other, they demonstrate their ability of translating metaphorical usages from unknown to known.

Figurative Language as a Cognitive Process

When applying metaphorical items in communication, it entails a cognitive process in which the abstract target domain connects with the concrete source domain (Lakoff & Johnson, 1980). The target domain transfers something worth triggering, such as an idea, inference, or reference, from the corresponding source domain (Kövecses, 2010); and the source domain, stemming from every-day experiences, carries out a shared idea (Su, 2002). The traits of the source domain are later highlighted and triggered from the target domain in order to complete the communication cycle (Ramón-Cortés et al., 2018). This cognitive process of reflecting ideas from abstract implications to concrete objects is necessary (Lakoff & Johnson, 1980) because it helps to metaphorically interpret and elaborate implicit concepts. Alternatively, the meanings of the target domain and its referent, the source domain, influence each other (Dolphin, 2016). With a view to this, examples or concepts from the application of metaphorical usages in the source domain can be understood and delivered properly (Lakoff & Johnson, 1980; Yalçın Arslan & Cinkara, 2016).

Metaphorical language contains denotations and connotations in referring to an object or phenomenon (Al Soudi, 2015). When a phenomenon is discussed metaphorically, embraced ideas are transformed from language domain to conceptual domain (Ma & Liu, 2008). For

example, a heart can be denoted as an organ in human body, as well as having the connotation as a symbol of love and affection from the source domain (Picken, 2007). Additionally, "human body" and "weather" are the best applied source domains than "animals," "plants," or "machines" (Picken, 2007) that the learning of them may lessen the burden of EFL instructors in teaching metaphorical expressions. For most of the time, language users tend to use more connotative than denotative meanings in communication, because these meanings create evocative comparisons in general (Littlemore, 2008).

Metaphor in Culture and EFL Learning

Merriam Webster (2018) clearly defines metaphor as: "a figure of speech in which a word or phrase literally denoting one kind of object or idea is used in place of another to suggest a likeness or analogy between them." These usages could be better applied to raise learners' awareness (DeCapua & Wintergerst, 2016) on culturally-appropriate items (Littlemore, 2008; Yalçın Arslan & Cinkara, 2016) with a view to trigger learners' metaphorical processing skills (Picken, 2007) and the ability to associate, resemble, and contrast.

In the same vein, metaphorical languages are teeming with culture so that language learning cannot be completed without the learning of culture (Yağiz & Izadpanah, 2013). Various social standards and communication strategies should be applied to language learners during the instructions (DeCapua & Wintergerst, 2016). When metaphorical languages are learned, it is beneficial to address their cultural backgrounds as to assist learning (Liu, 2008; Yağiz & Izadpanah, 2013).

DeCapua and Wintergerst (2016) pointed out "…, communication is rarely culture free" (p. 282), reinforcing that culture is intertwined, preserved, and manifested in a language. Therefore, language learners incline to use their own assumptions to render cultural contacts when learning a new language. Learners may face the dilemma of tackling cultural assimilations embedded in written or oral communication. It might be the time when misassumptions of a certain culture prevail and interferes with the learning. With a view to this learners' disposition, culture shock and cultural misunderstandings may take place in the learning phase (Yağiz & Izadpanah, 2013). To fix the embarrassment and take control of the situation, having culture awareness (DeCapua & Wintergerst, 2016) and figurative competence in language learning is as important as learning lexical or semantic items (Liu, 2008; Xiao, 2016).

Wegner and Nückles (2015) claimed that the teaching and learning of figurative language is beneficial for academic purposes. Bearing this in mind, EFL instructors and learners are suggested to have some level of metaphorical and cultural competence as to interact with the target language group (Yalçın Arslan & Cinkara, 2016). When instructions on figurative language are implemented, deep and detailed processing works and explanations are required (Picken, 2007). For example, Littlemore (2008) conducted a study on 43 post-graduate students with upper-intermediate English proficiency. This experiment intended to know if the participants would be able to understand the meaning of new vocabulary by applying metaphorical extension strategies. The results showed that associative fluency, analogical reasoning, and image formation strategies did help learners to find the meanings of a vocabulary; however, these strategies worked better when a metaphorical vehicle is concrete enough as to provoke an image. Littlemore (2008) stated that this competence may help learners to interpret novel metaphors in the first time, especially when no equivalence can be found in learners' mother tongue. She believed that applying metaphoric extension strategies

are beneficial for the learning of vocabulary, as well as elevating learners' associative fluency, analogical reasoning, and image formation skills. However, she pointed out that the strategies work well on learners with higher cognitive ability.

Universal Grammar and Metaphorical Expressions

According to Chomsky (1965), the laws of language are innate. Universal grammar is common to all languages regardless of speakers' first language. Even though the surface structures of languages are thought to be different, the deep structure of them are fundamentally universal and invariable (Chomsky, 1965). It is believed that the surface structure corresponds to the final output of the syntactic structure of a sentence (Chomsky, 1965). As each phonological component is processed and disassembled from the hearer and reader, it represents how a sentence is being read, heard or spoken. On the other hand, when deep structures are processed, they underwent several transformations from surface structures. Parts of speech and grammatical structures are decoded in order to "make sense" of surface structures with the aids of auxiliary, conjunction, conjugating verb, and other parts of speech. They indicate abstract representation of a sentence, that is, the meaning.

Languages are formed in universal patterns that they have shared concepts toward abstract ideas (Burt & Ethel, 2015; Evans & Levinson, 2009). Any given language shares similar structural properties, syntactic rules, and principles (Field, 2004). With regard to universal grammar, "some lexical categories (noun and verb), structure-dependency, phrases containing a head of the same type as the phrase, and a phrase structure consisting of Specifier, Head, and Complement" (Field, 2004, pp. 316-317) of different languages are the same. By the same token, metaphors found in different languages also follow a universal rule (Kövecses, 2010; Ma & Liu, 2008). Although metaphors are renditions of words used for artistic and rhetorical purposes; in point of fact, they are resemblances between two entities (Kövecses, 2010). Lakoff and Johnson (1980) stated that metaphors manifest shared experiences. It is the "universal bodily experience" that bridges metaphors from different language families; therefore, when an incident is described, different language users tend to use the same or similar metaphorical items because of the shared cognitive makeup (Kövecses, 2010; Su, 2002). In Kövecses' (2010) study, he pointed out that one language may share conceptual metaphors with another by using the same metaphorical items or grammar structures. Since metaphors are drawn from common sensory experiences, intuitions, or conceptual ideas possessed by human beings, they are correspondingly formed among languages with no doubts. The reason why metaphors are universal is because all human beings share a commonality in their sensory perceptions and experiences (DeCapua & Wintergerst, 2016; Kövecses, 2010).

To find cross-cultural universals in using metaphors, Ma and Liu (2008) found that English, Chinese, and Korean use the same source domain (tiger) to denote military-related heroes. For instance, English uses the "Flying Tiger" to represent a squardron, Chinese adopts the "Tiger General" to refer to a tough fighter, and Korean takes the "White Tiger Regiment" to describe a military unit. In addition to the examples on "tigers," the authors also discussed metaphorical usages drawn from other kinds of animals (e.g. birds and eagles). It is justified that the abstract level of structural organization in semantics between English and Chinese is similar because of the universality of metaphors. DeCapua and Wintergerst (2016) also provided evidences on universal values of time, wisdom, and diligence from English, Turkish, Spanish, Chinese, and Japanese idioms. They concluded that idioms speak not only for the core of a culture, but carry a sense of likeness among one another. They are convinced that cross-cultural awareness prepares language learners to "better predict probable pragmatically appropriate language use

and interactional moves used in another culture" (p. 284). As a result, metaphorical expressions are cross-linguistic and cross-cultural (Dancygier & Sweetser, 2014).

Purpose of the Study

The purpose of the study is to investigate cross-cultural evidences in figurative language on why shared knowledge structures and expressions are the standard choices of two typologically different languages. The researcher wishes to adopt Littlemore's (2008) finding on using concrete items to learn metaphors, and apply Ma and Liu's (2008) elaborations on universal metaphorical usages to analyze the interactions between English and Mandarin idioms. Furthermore, Chomsky's (1965) Universal Grammar is also embraced in this research to examine whether English and Mandarin idioms have shared deep or surface structures.

An empirical generalization from Littlemore (2008) proposed that figurative usages facilitate L2 learners' metaphorical learning. When figurative language is learned, learners' "associate fluency" could be cultivated from the help of concrete objects; and when metaphorical tenors and vehicles are concrete enough, learners demonstrate a better learning progress. The "associate fluency" skill, namely, triggers learners' schemata on L1 versus L2 cultural awareness. The learners notice cultural similarities during their learning phase when this skill is activated. Moreover, this skill scaffolds the learners to interpret and associate metaphorical idioms from L1 to L2. Based on Littlemore's (2008) concept, this present study will set out to examine concrete metaphorical expressions in English and Mandarin. An analysis on English and Mandarin idioms is carried out, hoping to discover the links between semantic entities and metaphorical items from these two languages.

Ma and Liu's (2008) research focused on ten metaphorical expressions from English, Chinese, Polish, and other languages to examine the existence of metaphorical universals. Examples from their studies showed that similar metaphorical expressions are found in different language settings. Therefore, this study adopted their concept and analyzed a total of ten metaphorical expressions between English and Mandarin in order to observe if the idioms are universally-similar or culturally-specific. In the meanwhile, Chomsky's (1965) Universal Grammar will also be adopted in this study to find if the conceptions of metaphorical expressions across languages are rooted from a shared language universal. The researcher wishes to find any similarities or differences from the metaphorical examples given in the following section, and thus explain whether human behaviors and cultural influences could reflect corresponding patterns across different language families. At the end of the study, the researcher hopes to justify that of the Lakoff's (1993) and Ma and Liu's (2008), whose findings proposed that general human character traits yield similar metaphorical expressions, are indubitable.

Cross-Cultural Evidence in Metaphors

This section intends to analyze idioms from English and Mandarin. Figurative language usages from the deep and surface structures of both languages would be examined. Whether metaphorical tenors and vehicles of the idioms are related to the source domains in natural phenomena and man-made products would be discussed. All chosen tenors and vehicles have concrete images as to echo with Littlemore's (2008) claims. A total of ten examples on figurative language usages are provided in the following orders: (1) A Mandarin idiom written in Chinese characters; (2) Mandarin phonetic transcriptions (Pin-Yin); (3) An explanation of each Mandarin character in English; (4) A similar English idiom; (5) A cross-cultural analysis on deep and surface structures. The ten examples are:

1. 空中樓閣 (kōng zhōng lóu gé), which means: sky – middle – building – attic. This Mandarin idiom is similar to "A pie in the sky" in English, suggesting that something is unlikely to happen in any sense. Instead of using "a pie" as a light and commonly-seen food as the noun connotation in English, "樓閣 (attic)" as a heavy and sheltering construction is adopted in Mandarin. These noun references symbolize unrealizable dreams, yet no similarity is found in the surface and deep structures between them. As for another noun connation - "the sky" and "空 (sky)," both languages took the expression of "sky" to illustrate the vast area above the earth and to stress the unlikeness to have something staying in it. Thus, the same surface and deep structure can be found on "the sky." With regard to the preposition "in" in English, it is applied to describe something is closed off by another thing in an enclosed space; on the other hand, Mandarin use "中 (middle)" to specify the position of something within a space. The above-mentioned prepositions share similar concepts from the prepositions of place; therefore, they have similar deep structures.
2. 良藥苦口 (liáng yào kǔ kǒu), which means: good – medicine – bitter – mouth. This Mandarin idiom is similar to "A good medicine tastes bitter" in English, indicating that one should tolerate harsh criticism as to have constructive and positive feedback. The adjectives ("good & 良" and "bitter & 苦") and nouns (medicine & 藥) have the same corresponding meaning in both languages that their deep and surface structures are the same. English uses the verb "taste" to specify the action of taking medicine, while Mandarin uses the noun "口 (mouth)" to illustrate a physical image which receives the medication. "口 (mouth)" is required to "taste" the flavour of something; therefore, the metaphorical ties between English and Mandarin demonstrate a cause-and-effect relationship. Although "taste" and "口 (mouth)" has no direct connections in the surface structure, they do have an association and correlation in the deep structure to some degree.
3. 雨後春筍 (yǔ hòu chūn sǔn), which means: rain – after – spring – bamboo shoot. This Mandarin idiom is similar to "Spring up like mushrooms" in English, implying that something grows rapidly and substantially. The word "spring" demonstrates different parts of speech and reveals diverse meanings between English and Mandarin. English uses it as a verb whereas a noun in Mandarin. "Spring" indicates "to grow" in English, whereas "春 (spring)" represents the spring season in Mandarin. In addition, the word "spring" in both languages connotes a phenomenon of being prosperous so that they bear a certain resemblance to the deep structure. If focusing on the word choice instead of the meaning, a coincidence is found that "春 (spring)" has an indistinguishable surface structure in both languages. As for the metaphorical vehicle, both languages use the edible and widely-cultivated vegetables above ground that can be found effortlessly in the West and East. "Mushroom" and "筍 (bamboo shoot)" are assigned as the staple and everyday food category as vehicles. Minor deep structure connections could be found between them. Moreover, Mandarin especially, uses an adverb clause "雨後 (after the rain)" to point out the moisture of the rain germinating the bamboo shoots. The Mandarin idiom also adopts the preposition "後 (after)" to signify a following consequence when the rain comes down to nourish the vegetation. On the contrary, no adverb clause is found in the English idiom. With reference to the propositions from the idioms, "like" is found in English so that a simile is created to make explicit comparisons; however, no preposition is found in Mandarin. Therefore, no surface and deep structures are found between English and Mandarin on the choices of prepositions.

4. 揮金如土 (huī jīn rú tǔ), which means: wave – money – like – clay. This Mandarin idiom is similar to "Spend money like water" in English. To suggest someone who disburses carelessly, both languages adopt the exact same verbs "揮金" and "spend money," and prepositions "如" and "like" to describe the behavior. Also, both languages took the advantage of using simile so that two unlike things could be explicitly compared and visualized. Even though the sole Mandarin character "揮" means to "wave," when it is combined with the noun "金 (gold)," this verb phrase becomes "spending money." Therefore, the surface and deep structures are the same from the first three characters in Mandarin and the first three words in English (e.g. the tenors). As for the vehicles, both languages use non-countable nouns ("土" and "water") to strengthen the spending concept. To make it more specific, Mandarin takes on the meaning of "土 (clay)" to pin down a nonchalant attitude and reckless spending behavior; on the other hand, English borrows the word "water" to stress that the paying action is flowing and non-stop. In consequence, no similarity in surface structure can be found, but similar deep structures can be observed.
5. 大海撈針 (dà hǎi lāo zhēn), which means: big – sea – to dredge up – needle. A similar English idiom is "To look for a needle in a haystack." This metaphor explains that it is almost impossible and extremely difficult to find something when something is lost. For the connotations of the verbs, English establishes a searching-with-effort process by using "to look for," while Mandarin draws this picture by adding a powerful action verb "撈 (to dredge up)" to indicate a hard work made. Both of them show an action of locating something within a space. Although these two verbs do not meet the same surface structures, they hold similar deep structures. With regard to the noun references, "needle" and "針 (needle)" are tagged. Since a needle is considered as a tiny and light object which may be easily neglected or lost in both languages, the surface and deep structures of them are identical. On the other hand, when referring to a huge quantity, both languages demonstrate similar deep structures as "海 (sea)" and "haystack" to show that it is difficult to find something within an uncertain huge area or within an amorphous quantity and substance. Mandarin also includes an adjective "大 (big)" to modify the noun, indicating the vastness of the sea. However, the surface structure is not the same when referring to a huge quantity in both languages.
6. 赴湯蹈火 (fù tāng dǎo huǒ), which means: go – hot water – step – fire. An English idiom which has a similar meaning is "To go through fire and water." This metaphor indicates that one has to undergo dangers and difficulties before achieving something. This Mandarin idiom contains two verbs (which is allowed in Mandarin pragmatics) to stress that someone tries his or her best to do something for other people. For example, "赴 (go)" in the Mandarin idiom has the same meaning as "to go" in the English idiom; and "蹈 (step)" finds no corresponding meaning and verb in English. Therefore, only one verb connotation ("赴" and "to go") has the same deep and surface structure. As for the noun references, both languages adopt the idea of fire (火) and water (湯) to point out the intangible and uncountable natural substances which are intrinsically connected to the lives of human beings. To be specific, Mandarin uses "湯 (hot water)" to strengthen the boiling action when the temperature is high enough as to turn liquid into gas. In order to have parallel structures in semantics and to point out that water and fire are mutually destructive, "water" and "fire" are highlighted and contrasted in both languages. From the Universal Grammar perspective, the surface and deep structures of the noun references are the same.

7. 滄海一粟 (cāng hǎi yī sù), which means: cold/green – ocean – one – grain. This Mandarin idiom is similar to "A drop in the ocean" in English, which intends to depict a relatively small amount when comparing to the total amount needed. No verbs can be found in both languages which shows a similar Universal Grammar usage. When referring to a unit or amount, Mandarin uses "一 (one)" to show "one object," while English uses "a" to specify an article; in consequence, both languages apply the same deep and surface structure in referring to a countable unit. As for the noun references, English uses a "drop" to define a small quantity of liquid; while Mandarin allocates "粟 (a grain)" as an undersized amount of a small and hard article. When a tiny amount in comparison with a larger one is defined, both languages tag similar deep structures. In signifying a huge area from a vast and uncountable amount of water, Mandarin uses "海 (ocean)" and English uses "the ocean" in the sayings. This shows that a shared surface and deep structure is found. Moreover, Mandarin adds a slight touch of sensory detail, "滄," to specify the feeling and color of the ocean as "cold and green". On the contrary, no modification is found in English.
8. 殺雞取卵 (shā jī qǔ luǎn), which means: kill – hen – take – egg. This Mandarin idiom is similar to "Kill the goose that lays golden eggs" in English. To imply any unprofitable action which results in a useless return, both languages apply identical expressions in the verbs "殺 & kill" and nouns "卵 & egg" in deep and surface structures. English especially, adds the glittering "golden" egg to reinforce the preciousness of the harvest; it also emphasizes the action to deposit and produce the egg by using the verb "lay." The adjective and verb references have no corresponding parts of speech in Mandarin. On the other hand, Mandarin uses "取 (take)" to state the process of obtaining an object; however, it does not use any explicit adjectives or action verbs to describe the progression. It has no equivalent terms in English. Since poultry are raised for their meat, eggs and feather, they are placed as the metaphorical vehicles to specify the noun reference in both languages. English uses "the goose," a flying bird, to indicate the subject; nevertheless, Mandarin uses "雞 (a hen)," a domesticated fowl instead. These two metaphorical vehicles are similar in deep structures, but different in the surface structures.
9. 樹大招風 (shù dà zhāo fēng), which means: tree – tall – catch – wind. This Mandarin idiom is similar to "Tall trees catch much wind" in English, proposing that jealousy is easily caught when someone is too outstanding, boasting, or wealthy. When referring to an eye-catching object, the "tree" and "樹 (tree)" are served as the marked target because they are "tall" and "大(tall)" enough to "catch (招) wind (風)" in both languages. English adds an adjective touch "much" to describe the velocity and strength of the wind, while no adjective is observed to describe the wind in Mandarin. To sum up, this idiom has identical deep and surface structures on the nouns (tree & wind), verb (catch), and adjective (tall) in English and Mandarin.
10. 隔牆有耳 (gé qiáng yǒu ěr), which means: next – wall – have – ear. This Mandarin proverb is similar to "Walls have ears" in English, suggesting that one should be careful as not to reveal the secret unexpectedly. The arrangement of the words in both languages has the same order: wall (牆 & wall) – have (有 & have) – ear (耳 & ear). These three words/characters represent the exact meanings from English and Mandarin that identical deep and surface structures are justified. An adjective "隔 (next)" is furnished to specify an adjacent position in Mandarin; however, no adjective is observed in English.

Conclusion

The purpose of this paper is to explore cross-cultural evidences in English and Mandarin through a comparison of figurative expressions from the inspection of Universal Grammar. Previous questions were posed that idioms are affected by specific source domains and experiential domains which can be either culture-specific or language-specific. However, observations in this research found that lexical combinations of idiom usages in English and Mandarin are similar. The analysis of metaphorical expressions from the two languages echoed with that of Lakoff's (1993) that general human character traits attribute to similar metaphorical usages.

This paper has examined the components of source domains from natural phenomena (such as tree, sky, sea, wind, and rain) to man-made products (such as needle, building, attic, medicine, and wall) from the perspective of Universal Grammar theory between English and Mandarin. Although with geographic and lexical inconsistency, both languages in expressing certain idioms demonstrated a relatively close equivalence in semantic usages. The lexical evidences from those metaphorical expressions have shown remarkable similarities between English and Mandarin. Word choices and parts of speech are of little differences in metaphorical expressions. The Universal Grammar evidences obtained in both languages share similar surface or deep structures. The cultural evidences found in the idioms are relevant to one another because they take account of the general experiences from human beings.

This study replicated some of the conclusions of previous research and came up with the following findings: (1) Semantic usages are stable with English and Mandarin, that a shared-cultural phenomenon is reflected in metaphorical items from both languages. Although one language from the West may seem diverged from another language from the East, human experiences are indispensable, compatible, and identical; (2) Universal Grammar theory can be applied in metaphorical usages in English and Mandarin. Even though Indo-European and Sino-Tibetan languages are apparently unrelated, the idioms provided in this research have demonstrated a strong link between the two. It is found that most idioms are richly manifested at metaphorical and linguistic levels in describing a phenomenon, since metaphorical usages are grounded from universally-related human experiences. The findings have demonstrated that metaphorical and lexical commonalities reside in both languages. Metaphorical usages are considered universal.

Empirical generalizations are found in both languages on metaphorical items because people usually react to the stimulus of the environment in parallel ways. The findings of this paper echo with Ma and Liu's (2008) investigations that metaphorical items are transparent and intertwined universally in which they shared similar thinking patterns. As Littlemore (2008) stressed the importance of having "associate fluency" in facilitating learning metaphors through concrete objects, the examples from this examination have justified that concrete objects trigger similar metaphorical vehicles and tenors. The findings can be also agreed upon by Lakoff (1993) that universal metaphorical usages are derived from universal human experiences to engage or deal with social and environmental interactions.

This research was just an exploratory study that still needs further investigations. Even though this paper has found significant similarities of metaphorical usages in English and Mandarin, more evidence should be provided so that a more generalized claim can be made between the two languages. Furthermore, this paper has only presented ten examples of metaphorical usages of English and Mandarin, it would be worth investigating whether samples from other source

domains would be similar. To date, cross-cultural metaphorical usages have not yet been fully studied with EFL university-level students, because figurative language arises marginal interests in EFL teaching from previous studies (Salwa, 2016). It remains to be examined how EFL adult learners respond to the learning and production of metaphorical usages.

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Negotiating Authority, Identity, and Gender: Stories of Pre-service English Teachers Challenging Stereotypes in Chilean Classrooms

Erika De la Barra, University of Santiago, Chile
Soffia Carbone, Universidad Mayor, Chile
Sylvia Veloso, University of Santiago, Chile

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Abstract

This study examines the influence of gender stereotypes on the development of teaching identity among pre-service English teachers at a public university in Chile. The main objective was to understand how entrenched stereotypes influence identity construction, self-perception, and classroom authority during the formative period and the professional teaching practice. Data were collected from two cohorts: the 2024 cohort, comprising 6 participants, and the 2025 cohort, comprising 13 participants. Two semi-structured interviews were conducted as part of a qualitative research design, during which participants shared their experiences regarding the influence of gender stereotypes on their professional identity. Data were analysed through thematic coding with the assistance of Atlas—ti software. The findings show that participants experienced significant identity shifts. Initially, they reported insecurity and challenges in asserting authority due to gender-based biases. Over time, reflective practice and classroom experience contributed to increased self- confidence and a more defined professional identity. However, challenges remain, particularly the tendency of students to respect male figures more readily than female teachers, which undermines classroom management and authority. The study contributes empirical insight into the intersection of gender, language teaching, and identity in the Chilean ELT context. It highlights the need for gender-sensitive strategies and curricular reforms to support the professional development of female English language teachers and foster more equitable teaching environments.

Keywords: pre-service teachers, gender, professional identity

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Introduction

Teacher identity is a key concept in understanding the professional life of teaching staff. Initial training, as outlined in the university curriculum, has a profound impact on the formation of this identity. However, it appears to be a process that begins long before entering higher education, with the formative experiences that teachers received during their own student years. The university provides content, humanistic training and practical opportunities that contribute to the construction of identity; however, there is an unavoidable process that every teacher must undergo, and this can be conceptualised in terms of a holistic, dynamic and situated understanding of oneself, as well as the role one is expected to play at school. Only through this process do teachers acquire a more nuanced understanding of their values and aspirations, as well as their work, which enables them to navigate the complex world of school with greater confidence (Protassova et al., 2021). Indeed, both Cole et al. (2022) and Shimony et al. (2022) highlight the relationship between deficiencies in the reflective process and teacher identity, as well as burnout and dropout from the school system. Everything seems to indicate that the greater the reflection and knowledge of one's own identity, the greater the chances of remaining in the system, providing quality teaching and achieving better student performance (Cuadra-Martínez et al., 2021).

Most authors conceptualise identity as a dynamic interrelationship between personal narratives and professional roles. It is fluid, constructed and depends on the context of each teacher, which highlights the ability of everyone to negotiate with the environment and the expectations of the institutions in which they work. It is shaped over time, a balance between vocation, formative experiences, and confrontation with the reality of the classroom, which, in some cases, can lead to crisis, especially if reality is very dissonant.

Gender is a fundamental factor in the construction of teacher identity, as social norms and stereotypes related to gender roles affect how authority is manifested in the classroom, the emotional involvement of teachers, their professional recognition, and the tension between meeting social expectations and resisting assigned roles. While the literature on teacher identity is robust, relatively few studies have systematically examined the influence of gender on the development of professional identity. Some studies, such as those by Pinzón Varilla (2017) and Gkonou and Miller (2021) demonstrate, for example, that female teachers face significantly more intense emotional challenges than their male colleagues; this is partly because they are often required to perform caregiving roles, which increases the risk of burnout. Tamayo Garza (2016) warns that, in some Latin American countries, the figure of the "sacrificial teachers" has become normalised. Generating pressures that affect self-care. In addition, Makarova et al. (2019) demonstrate how gender stereotypes influence perceptions of the professional capacity of female teachers, who, although recognised by their students, are required to demonstrate their knowledge and training constantly.

Objectives

The main objective of this study is to examine the development of professional teaching identity among English pedagogy trainees at a public university, with a particular emphasis on gender perspective.

Specific Objectives

- Characterise how teacher identity develops in teacher trainees from cohorts 2024 and 2025 from a gender perspective.
- Compare and contrast the views and perceptions about teaching identity that emerge in each of the cohorts.

Literature Review

Research findings from literature sources demonstrate that identity exists as a wide-ranging concept which encompasses multiple aspects. The concept of identity can be characterised as a dynamic, complex dimension which people construct through their life experiences, professional environments, and personal development paths. The process of identity development operates as a dynamic system, resulting from the continuous interaction between personal identity and educational practice. A person's professional self-concept represents their understanding of their professional identity.

The literature review enables us to identify and categorise five different conceptualisations of what professional identity is, as described below.

Identity as a Sociocultural and Situated Construction

According to this perspective, the social environment and cultural background of an individual determine how their teaching identity develops. According to Olsen (2008), teachers construct their identity through their work environment, which in turn helps them understand their personal identity. The analysis of personal narratives is considered the most effective method for studying teacher identity, according to Barkhuizen (2021), as it reveals how gender, social class, and institutional values influence this concept. The current conceptual framework includes Lawrence and Nagashima (2020), Chang et al. (2020), Sánchez-Martín (2022), Karimi and Mofidi (2019), Nguyen and Ngo (2023), and Ulla et al. (2024), who demonstrate how social norms, cultural expectations, and dominant ideologies shape professional identity development. The research by Aguirre-Garzón et al. (2023) examines student and teacher stories which develop because of school environment conditions and power dynamics and institutional requirements.

This conceptualisation explicitly incorporates the variable of gender because it is constructed from personal interaction, with life stories and personal experiences in relation to the environment.

Gender appears as a relational, socially constructed dimension that intersects with other factors such as race and social class. In this way, a dynamic construction emerges that has an impact on teaching and on the way teachers are perceived and experienced.

Identity as the Integration of the Personal and Professional

Another conceptualisation or theoretical system for understanding professional identity is that proposed by Izadinia (2014), Pennington and Richards (2016), and Beijaard et al. (2022). In this approach, identity is a construct that arises from the interaction between personal narratives and professional roles. This approach emphasises vocation, formative experiences, and

confrontations and tensions in the classroom. It shares with the sociocultural approach the fact that teacher identity is dynamic and evolves over time.

However, unlike the first approach, what seems to change and energise the concept of professional identity is the internal, more motivational aspect that each teacher possesses and the relationship they establish with the classroom. A fascinating study in this line is that of Wang and He (2022), who analyse how teachers integrate a new professional dimension: that of being researchers, within the framework of collaborative university-school communities. Although the gender variable is less visible than in the sociocultural conceptualisation, it is an important element, mainly because gender stereotypes and social norms have a significant impact on how teachers perceive themselves, especially female teachers, and how they view their authority in the classroom and their professional abilities.

Identity as a Metacognitive Phenomenon

A third way of conceiving and explaining professional teaching identity is through metacognition, which could be defined as the ability of individuals to monitor and control their cognitive processes or to think about thinking (Yuan & Zhang, 2020). According to these authors, metacognition is crucial for developing a teaching identity because it enables identities to be managed, regulated, and strengthened. Three key components are distinguished in this perspective: metacognitive knowledge, strategies, and metacognitive experiences. Metacognitive knowledge refers to the knowledge that teachers have about their own learning and the factors that affect it, such as the tactics that help them achieve a learning goal. For example, writing a personal journal could be a good way for some teachers to monitor their internal progress when they set themselves a goal. Personal factors such as motivation or personality, which obviously affect learning about oneself, could also be considered part of metacognitive knowledge. Likewise, judgments about one's own abilities, personal goals, and one's own disposition toward specific topics are part of metacognitive knowledge.

Identity as Perception of Role and Social Expectations

This approach focuses on how society perceives and defines the role of teachers, and how these expectations influence teachers' self-perception and performance of their duties. Unlike the first conceptualisation reviewed, which perceived identity as a dynamic, holistic, and constantly evolving process, this conceptualisation explores how identity is constructed through the internalisation of external social expectations of individuals or groups, such as family, school, community, and society in general. The main proponent of this theory is Kenea (2021), who considers professional identity to be a response to social expectations of what it means to be a teacher and to teach. In this sense, Gaete Silva et al. (2017) report on how teachers leave the profession due to a dissonance between what is expected of them and the actual conditions of teaching. Similarly, Barreto Junca (2024) points out that historically, teachers have been controlled and monitored for their political ideas or their ability to guide young people, creating tension between the roles expected of teachers and what teachers really are and want to be. Likewise, Coppe et al. (2024) show how teachers internalise and negotiate roles assigned by the education system, such as being innovative, resilient, and efficient.

Identity as Expertise and Skills

This approach defines teacher identity in terms of mastery of knowledge and the development of specific professional skills. The key areas to consider are content knowledge and pedagogy.

From this perspective, the definition of professional identity emerges through this process. A teacher who understands their subject matter and teaching methods develops a strong professional identity. The ability to create learning activities, implement them, and evaluate their effectiveness (Mosquera-Pérez & Losada-Rivas, 2022), together with classroom management skills, student motivation techniques, and conflict resolution abilities, forms the basis of a professional identity (Herrera-Espinoza et al., 2024; Pérez-Gracia et al., 2022). The integration of technology (Paz Saavedra & Gisbert Cervera, 2023; Romero Martínez et al., 2023; Verdú-Pina et al., 2023), along with leadership abilities, conflict resolution skills, empathy and self-efficacy (Llorent et al., 2020; Soria-Aldavero et al., 2023; Yataco Valdez et al., 2022) play significant roles in professional development. The quantitative scale developed by Tan et al. (2017) assesses professional identity growth through three components: professional self-image, values, and skills.

Methodology

The research employs qualitative methods because they are well-suited to studying personal interpretations of human matters and the emotional aspects of professional identity development. In fact, qualitative research provides crucial insights into the complex nature of professional identity development. Regarding the research design, this study employs phenomenological-interpretive qualitative methods, also known as narrative inquiry, which are helpful because they view the narrator as an active agent in the story and allow researchers to analyse the realities lived by participants. Narrative inquiry constructs professional history narratives of participants through interviews, which are then used as data for analysis and interpretation. The goal is to provide insight into the process of identity construction during teacher formation.

Participant Demographics

The research was conducted within the English Teacher Education programme at a public university in Chile. Two cohorts participated in the study. The 2024 cohort comprised six students out of a population of 46 5th-year trainees; all participants were female trainees undertaking their professional teaching practice. The 2025 cohort consisted of 13 participants, all of whom were 4th-year students doing their intermediate teaching practice, comprising 11 female trainees and two males out of a total of 50 students. Both cohorts shared similar socioeconomic profiles, reflecting the Chilean educational landscape and patterns of social stratification. The average age in both cohorts was 23 years old, whereas 85% of the participants attended subsidised or municipal schools, and 70% identified as working class. Participants came predominantly from working-class neighbourhoods, including la Granja, San Bernardo, and Puente Alto.

Data Collection Process

In the 2024 cohort, two semi-structured interviews were used—one at the beginning of the study to explore early professional identity formation and gender awareness. The second semi-structured interview took place in the middle of the year, with the objective of examining the evolution during the professional teaching practice. At the end of the year, a focus group session was organised to collect insights regarding professional identity and gender. In the case of the 2025 cohort, as this is a longitudinal study, only two semi-structured interviews were conducted in the first year; the remaining interviews will take place in 2026 and 2027.

Results

2024 Cohort

The thematic analysis revealed that, in the 2024 cohort, professional identity was constructed in three different ways, aligning with three of the conceptualisations described in the literature review. The first one was Identity as a sociocultural and situated construction. The participants viewed their identity as a product of their social experiences, institutional settings, and cultural norms. Narratives reveal that teaching is lived as an ethical and transformative practice rooted in situated experiences. This aligns with Olsen (2008), Barkhuizen (2021), and Aguirre-Garzón et al. (2023), who argue that identity emerges relationally and contextually. Gender is deeply embedded: Participants repeatedly narrated how stereotypes of women as soft, maternal, or caregivers influenced their legitimacy and authority.

The other conceptualisation that was relevant in this cohort was identity as integration of the personal and the professional. Many participants discussed the interplay between vocation, personal experiences, and professional growth. Insecurities at the beginning evolved into confidence and empowerment, reflecting the dynamic negotiation between personal history and professional role. Firm ethical commitments reveal how personal biographies motivate professional trajectories. This matches Izadinia (2014) and Pennington and Richards (2016), where self-image and inner motivation are central.

Finally, Identity was also conceived as role perception and social expectations in the 2024 cohort. The gender axis highlights the weight of social expectations: female teachers were positioned as maternal, caregivers, peacemakers, while authority was more easily granted to male teachers. Participants explicitly struggled with these stereotypes, showing tension between desired authority and externally imposed roles.

2025 Cohort

The 2025 fourth-year students demonstrated a predominant focus on expertise and skill management, with a strong emphasis on developing an empathetic teaching identity.

The thematic analysis revealed a professional identity with a strong emphasis on disciplinary expertise, such as English language fluency, for effective teaching and student modelling. It also emphasised pedagogical innovation, focusing on professional knowledge in planning, active methodologies, and technology for authentic language practice. These participants also stressed the importance of understanding the student context, creating psychological safety, and maintaining respectful relationships.

The second conceptualisation that was present in this cohort was identity construction based on role perception and social expectations. Gender stereotypes became important here, particularly the feminisation of teaching and maternal expectations. The 2025 participants perceived teaching as a female profession with barriers for male entry, especially in early childhood education. They also labelled and identified issues with authority when females tried to exert authority, while males faced no similar criticism. The maternal expectations were also present in the cohort because the female trainees realised they were expected to be “second mothers” with additional care burdens beyond academic responsibilities. There was also an expectation of a trust bias because they realised their students preferred to seek help from

female teachers, reinforcing caregiving stereotypes. The 2025 cohort identified the roles imposed by society and realised how challenging it was to deconstruct them.

Discussion

The study confirmed that in both cohorts, the female pre-service teachers faced limitations derived from societal stereotypes. These preconceptions often link authority and leadership primarily to masculine attributes. This is consistent with theoretical frameworks acknowledging that women frequently face implicit gender stereotypes and that gender biases can affect their perceived self-efficacy and authority.

In the Chilean context, these biases often manifest as prejudices that obstruct the consolidation of female teachers as recognised figures of reference in the classroom. The challenge requires individuals to handle external pressure while coping with their own personal sense of unease. The way society views professional achievement affects success, as research shows that women who match male academic achievements still face lower recognition rates.

Despite the difficulties, this research suggests that participants are eager to create positive changes in educational settings, which aligns with a critical pedagogy formative model, where the teacher is seen as an intellectual figure and a transformer of society, capable of confronting ideological pressures and social injustices.

Conclusions

The research provides essential knowledge about how pre-service English teachers develop their professional identities in an environment where gender stereotypes predominate. The main discovery suggests that teachers develop their professional identity through a continuous process of negotiation between their initial education, personal characteristics, and social environment.

The participants are eager to connect with their profession and show practical teaching skills. However, gender stereotypes still hinder their authority in the classroom. Research shows that students face persistent internal distress caused by frustration and vulnerability, arising from the gap between their ideal beliefs and the real political challenges they encounter, such as opposition from students and caregivers.

The analysis confirms the importance of pedagogical practices that specifically target the integration of subjective and objective knowledge. Teacher identity formation is supported when future teachers have opportunities for reflection, collaboration, and applying agency which allows them to interpret and validate their learning experiences against their desired self-image as educators. When these conditions are met, greater levels of professional identification are achieved.

Implications and Recommendations

Curriculum Reform With a Gender Perspective

The study strongly implicates the need to integrate an explicit gender perspective within initial teacher training. This requires systemic revision of curricula and policies to embed gender sensitivity in pedagogies and teaching materials, actively working to eliminate biases.

Strengthening Self-Efficacy and Emotional Support

Teacher education programs require establishing methods to address the internal distress and identity problems which future teachers may face. The process includes emotional, professional, and pedagogical support through dialogue and attentive advisors who can help students develop self-efficacy through internal reflection.

Explicitly Teaching Identity Work

Educational programs need to establish specific teaching approaches which help students discover their professional identity through active exploration of their unconscious identity development process. One of these methods can include using reflective writing techniques, such as journaling, narrative writing, and focused dialogues, to connect their life experiences with their core values and educational principles.

Promoting Agency and Dialogue

Programs should establish organised chances for pre-service teachers to take action through course development and professional growth activities, which help them experience themselves as active participants instead of passive recipients of education. The ability to facilitate reflective dialogue and negotiation skills stands as a vital requirement for managing the intricate tensions which exist within the workplace.

Future Research

Further research on this topic may require longitudinal methods to observe professional identity development as it progresses normally throughout different time periods. Researchers may continue to use qualitative and narrative methods. However, they could also incorporate some quantitative tools, which would enable the access to information from a larger number of participants. Finally, given the affective nature of teaching, continued exploration of how teachers' emotions and metacognitions intersect with identity crisis and construction should always be present.

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

The authors declare that Grammarly, an AI-assisted writing software, was used in proofreading and redefining language in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The authors further declare that, apart from Grammarly, no other AI or AI-assisted technologies have been used to generate content in writing the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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Contact email: erika.delabarra@usach.cl

From Soviet Legacy to Asian Integration: Transitioning Medical Education in Mongolia Compared to Russia and Japan

Hoang-Nam Tran, Tokushima University, Japan
Orgil Jargalsaikhan, Mongolian National University of Medical Sciences, Mongolia
Dolgorsuren Aldartsogt, Mongolian National University of Medical Sciences, Mongolia

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Abstract

Mongolia's medical education system stands at a unique crossroads, shaped by its Soviet-era foundations and increasingly influenced by modern East Asian models. This comparative study explores the evolution of Mongolia's medical education in relation to the enduring legacy of Russian pedagogical frameworks and the emerging impact of Japan's integrative, patient-centered, and internationally oriented approaches. Using a qualitative approach including policy analysis and document review, the research investigates curriculum structures, clinical training models, accreditation standards, and international cooperation strategies across the three countries. The analysis reveals how Mongolia is navigating a gradual transition from rigid, centrally planned systems toward more competency-based and globally aligned frameworks. While deep-rooted institutional legacies continue to anchor Mongolia to Russian educational philosophies, increasing regional cooperation, particularly through partnerships with Japanese institutions such as Tokushima University, signals a shift toward hybridized models. The study offers critical insights into how post-socialist education systems can modernize medical training while preserving national identity and strategic autonomy.

Keywords: medical education reform, post-Soviet transition, comparative education, East Asian integration, hybridized models, Tokushima University

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Introduction

Mongolia's medical education system exists at the intersection of historical legacy and regional transformation (Rossabi, 2005). Shaped profoundly by its socialist past and decades-long alignment with the Soviet Union, Mongolia inherited a centralized and discipline-driven model of medical training (WB, 2007). This system, modeled after the Soviet Semashko approach, emphasized theoretical instruction and state-directed planning, establishing a robust infrastructure for healthcare delivery across the nation (Bashkuev, 2023; WHO, 2014). While this system laid the foundational infrastructure for producing healthcare professionals in a low-resource setting, its rigidity and limited responsiveness to global trends have prompted increasing calls for reform (Badamdorj et al., 2024). In recent years, Mongolia has intensified its engagement with East Asian neighbors, particularly Japan, stimulating a re-evaluation of pedagogical philosophies, curriculum structures, and international benchmarks. The establishment of the Mongolia–Japan Hospital of the Mongolian National University of Medical Sciences (MNUMS) in 2019, supported by the Japan International Cooperation Agency (JICA), exemplifies this collaborative effort to modernize medical education and healthcare delivery (Montastudio.M, 2019). This transitional moment presents an opportunity to examine how Mongolia navigates the dual imperatives of modernization and continuity in its approach to medical education (Bashkuev, 2023).

A comparative analysis of Mongolia, Russia, and Japan is especially pertinent for several reasons. First, Russia represents the enduring influence of Soviet-era educational frameworks that continue to anchor many institutional norms and policies in Mongolia. The Russian model, characterized by centralized control, theoretical emphasis, and limited patient-centered training, provides a reference point for understanding what Mongolia seeks to retain or move beyond (Artman, 2022; Bashkuev, 2023). In contrast, Japan offers a strikingly different approach, one marked by integration with global standards, strong quality assurance mechanisms, and an emphasis on holistic, patient-centered care (Honda et al., 2022; Kuwabara et al., 2015). As Mongolia increasingly participates in regional partnerships and international academic exchanges, Japan's model provides both inspiration and a benchmark for reform (JICA, 2014; WHO, 2014).

This study is guided by three core research questions. First, how has Mongolia's medical education evolved from its Soviet roots? This question explores the persistence and transformation of foundational structures, including curriculum design, clinical training, and faculty governance. Second, what elements of Japanese medical education are influencing Mongolia's reform efforts? This inquiry focuses on the adoption—or adaptation—of Japan's more integrative and internationally oriented practices. Third, what policy patterns and gaps emerge in Mongolia's transition? By analyzing formal documents, accreditation standards, and intergovernmental cooperation, this study identifies both progress and friction points in the reform process.

By placing Mongolia within a triadic comparative framework, this research offers critical insights into how post-socialist education systems can adapt to new regional dynamics while preserving their national identity and strategic autonomy. It also contributes to the broader discourse on educational hybridization and cross-cultural policy borrowing in the field of global health education.

Background and Theoretical Framework

Medical education systems are shaped not only by national health priorities but also by historical, political, and cultural forces. Understanding the evolution of Mongolia's medical education, and how it contrasts with the trajectories of Russia and Japan, requires situating each within its broader institutional context. This section outlines the historical development of medical education in the three countries and introduces the theoretical lens guiding this comparative analysis.

Mongolia: Soviet-Influenced Structure Post-1945

Modern medical education in Mongolia began in earnest after World War II, when the country deepened its political and institutional alignment with the Soviet Union. The establishment of the first medical school in 1942, under strong Soviet guidance, marked the beginning of a centralized, state-controlled education model, heavily influenced by the Semashko health system (Bashkuev, 2023; WHO, 2014). This system emphasized discipline-specific knowledge, theoretical rigor, and hierarchical authority in both academic and clinical training. Medical students were trained through rigid curricula with limited exposure to interdisciplinary learning or patient-centered care. While this model allowed Mongolia to develop a functional healthcare workforce in a resource-limited context, its inflexibility and limited engagement with global innovations have increasingly posed challenges in a rapidly globalizing world (Badamdorj et al., 2024).

Russia: Continuation and Reform of Centralized Medical Curricula

Russia, as the originator of Mongolia's medical education blueprint, continues to operate under a similarly centralized model, albeit with gradual reforms. The traditional Soviet curriculum remains largely intact in many institutions, prioritizing theoretical sciences in the early years and delaying clinical exposure (Markosian et al., 2020). While accreditation systems and institutional autonomy have improved since the dissolution of the USSR, core structural features such as specialization from the undergraduate level and state-controlled planning persist. However, Russia has made notable efforts in recent decades to update its system through initiatives that promote clinical simulation, international partnerships, and modular curriculum design (Kapitonova et al., 2020). These reforms, though unevenly implemented, indicate an ongoing tension between tradition and transformation.

Japan: Flexibility, Patient-Centered Training, and Internationalization

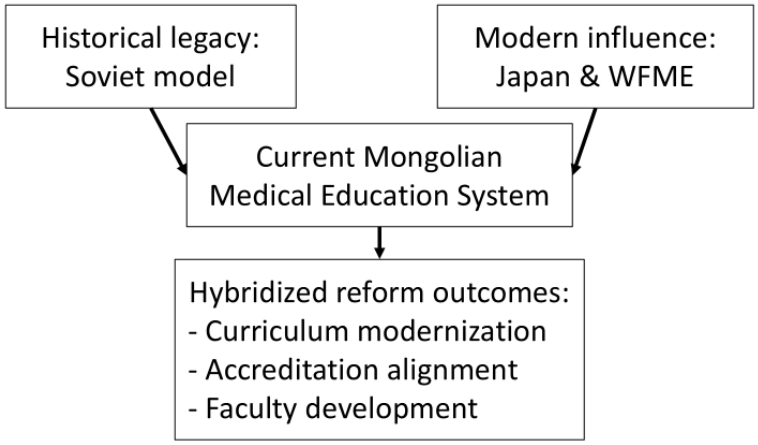
In contrast, Japan's medical education system has undergone significant modernization since the post-war U.S. occupation, evolving toward a more flexible, student-centered model. Core elements of Japan's contemporary approach include early clinical exposure, emphasis on communication and ethics, and increasing integration with global standards (Honda et al., 2022; Kuwabara et al., 2015). Japanese medical schools are also heavily involved in international collaboration, research exchange, and the implementation of accreditation systems aligned with World Federation for Medical Education (WFME) guidelines (JACME, 2021; Mori et al., 2023). The curriculum increasingly balances biomedical knowledge with soft skills, promoting a holistic understanding of patient care. Importantly, Japan's ability to incorporate global influences while maintaining cultural and institutional autonomy (CMEI, 2024) makes it a compelling model for countries like Mongolia that seek to modernize without losing national identity.

Theoretical Framework: Comparative Educational Transition

This study is grounded in the theory of policy borrowing and educational transfer (Phillips & Ochs, 2004), which explores how nations adopt, adapt, or resist educational models from other countries. In Mongolia's case, this framework helps analyze how elements of both Russian legacy and Japanese innovation are selectively integrated. The study also draws on path dependency theory, which emphasizes how historical institutional choices constrain current reforms (Pierson, 2000). In parallel, post-socialist institutional change theory emphasizes how former socialist systems undergo hybridized, non-linear transformations where imported reforms are filtered through entrenched bureaucratic norms, political legacies, and informal institutional practices (McDermott, 2002). Together, these frameworks explain how Mongolia remains anchored to its Soviet-influenced structures while also being propelled by regional trends toward East Asian modernization. The result is a hybridized model of medical education reform, simultaneously traditional and transformative, shaped by both internal legacy and external inspiration. The following conceptual framework (Figure 1) synthesizes the theoretical foundations guiding this study. It illustrates how Mongolia's medical education system is positioned at the intersection of Soviet legacies and East Asian influences, and how both external and internal forces shape its ongoing hybridization process.

Figure 1

Conceptual Framework of Mongolian Medical Education



Methodology

This study adopts a qualitative comparative approach, appropriate for analyzing the complex, historically embedded, and policy-driven nature of medical education systems across Mongolia, Russia, and Japan. The methodology is grounded in interpretive inquiry, aiming to uncover patterns, meanings, and institutional logics within the evolution of medical education reform in post-socialist and East Asian contexts.

Policy Analysis

The primary methodological tool employed is policy analysis, focused on official national and institutional-level education policies. This included a review of national medical education strategies and university accreditation standards to understand each country's overarching vision for training physicians. Special attention was paid to how these policies reflect differing

priorities such as theoretical rigor in Russia, integrative pedagogy in Japan, and transitional hybridity in Mongolia.

Official policy documents were collected from the respective Ministries of Health and Education in each country. For Mongolia, documents were sourced from the Ministry of Education and Science and the Ministry of Health, including national strategies for human resources in health. For Russia, official standards from the Ministry of Health of the Russian Federation and the Federal Service for Supervision in Education and Science (Rosobrnadzor) were examined. For Japan, policies from the Ministry of Education, Culture, Sports, Science and Technology (MEXT), as well as guidelines from the Japan Accreditation Council for Medical Education (JACME), were reviewed. These materials were analyzed thematically, with particular focus on curricular goals, accreditation logic, and reform timelines.

Document Review

To complement the policy analysis, a document review was conducted using primary and secondary sources. This included curricular frameworks and syllabi from selected medical universities in each country, specifically the Mongolian National University of Medical Sciences (MNUMS), Sechenov University in Russia, and Kyoto University in Japan. These curricula were analyzed to compare content structure, clinical exposure, emphasis on soft skills, and alignment with international standards.

In addition, guidelines issued by international organizations such as the World Health Organization (WHO), WFME, and United Nations Educational, Scientific and Cultural Organization (UNESCO) were reviewed to establish normative benchmarks in global medical education. These served as reference points to assess how closely the national systems align with globally accepted competencies, quality assurance mechanisms, and internationalization strategies.

Finally, national licensing board requirements and reform reports were analyzed to understand the mechanisms for physician certification and how reforms have responded to international pressures or domestic needs. Examples include Japan’s national medical licensing exam reforms, Mongolia’s ongoing attempts to align with ASEAN medical mobility standards, and Russia’s federal mandates for continuous professional development (CPD) and simulation-based training.

By triangulating policy texts, institutional documents, and global guidelines, this methodology enables a nuanced understanding of how each country conceptualizes, structures, and implements medical education. The analytical approach is interpretive and comparative, identifying both convergence and divergence among the three cases.

Comparative Analysis

This section presents a structured comparison of the medical education systems in Mongolia, Russia, and Japan across four key dimensions: curriculum structure, clinical training pedagogy, accreditation and regulation, and internationalization. The aim is to identify commonalities, contrasts, and emerging hybrid models that illustrate Mongolia’s ongoing transition.

Curriculum Structure and Content

At the heart of the comparative divergence lies the curriculum structure. Mongolia's medical education system, largely modeled after Soviet traditions, continues to reflect a discipline-focused, content-heavy approach. Subjects such as anatomy, physiology, and pathology are taught in isolation during the early years of training, often without contextual integration or clinical relevance. This mirrors Russia's continued adherence to a theoretical, lecture-driven model, where early exposure to the biomedical sciences is emphasized, and specialization begins at the undergraduate level (Semenova et al., 2024).

By contrast, Japan has increasingly adopted a competency-based curriculum, emphasizing outcomes such as clinical reasoning, communication, and interprofessional collaboration. Curricular reforms initiated in the 2000s, including the Model Core Curriculum and alignment with global standards, have helped shift the focus toward integrated learning and patient-centered care (Honda et al., 2022; Kuwabara et al., 2015). Mongolia has recently shown interest in these developments, piloting modular courses and beginning to revise syllabi at institutions like MNUMS. However, reform efforts remain uneven and are constrained by legacy systems and faculty training gaps.

Clinical Training and Pedagogy

In clinical training, the timing and pedagogy of patient exposure differ markedly across the three systems. In Russia and Mongolia, clinical immersion traditionally begins in the later years of medical school. Students often face limited opportunities for hands-on training early in their education, relying heavily on didactic lectures and observation. While simulation-based methods are gaining attention, especially in Russia's larger medical universities, the implementation remains inconsistent and underfunded (Sociales & Strandstrem, 2023).

Japan, on the other hand, has adopted a "early and continuous clinical exposure" model. From the third year onwards, students participate in bedside learning, clinical clerkships, and structured rotations. Moreover, Japanese pedagogy increasingly integrates active learning methods, such as problem-based learning (PBL), skills labs, and team-based clinical decision-making (Onishi, 2018). These innovations contribute to a more holistic training experience and are gradually being observed by Mongolian educators through exchange programs and faculty development workshops.

Accreditation and Regulation

Accreditation mechanisms further reveal the contrasting logics of system governance. Russia maintains a strong tradition of centralized accreditation, overseen by federal agencies such as Rosobrnadzor and the Ministry of Health. This system ensures uniformity but often lacks responsiveness to international standards, particularly those set by the WFME.

In contrast, Japan has implemented a robust national accreditation system through JACME (Japan Accreditation Council for Medical Education), which was officially recognized by WFME in 2017. JACME's accreditation criteria incorporate global best practices, including student assessment transparency, faculty qualifications, and quality improvement protocols (JACME, 2021).

Mongolia is currently in a transitional phase, seeking alignment with WFME standards in preparation for full international recognition. The country's Ministry of Education and Science, in partnership with the Ministry of Health and MNUMS, has initiated reforms in licensing and institutional accreditation. However, resource limitations and institutional inertia have slowed progress, with many universities still operating under outdated evaluation criteria (Badamdorj et al., 2024).

Internationalization and Regional Integration

Perhaps the most dynamic aspect of Mongolia's medical education reform is its increasing regional integration, particularly with Japan. In recent years, partnerships with Japanese universities—including Kyoto University and Osaka University—have enabled faculty exchanges, collaborative research, and student mobility. A key milestone was the establishment of the Mongolia–Japan Teaching Hospital in 2019, supported by JICA, which serves as both a clinical training site and a symbol of bilateral cooperation (JICA, 2022; Montastudio.M, 2019).

In terms of student mobility, Japan has positioned itself as a leader in hosting international medical trainees, although linguistic and licensing barriers remain. Russia, while traditionally a major destination for Mongolian medical students, has seen declining attractiveness due to bureaucratic and quality concerns. Meanwhile, Mongolia has begun sending students and faculty to East and Southeast Asia for training and joint degrees, reflecting a gradual pivot toward Asia-oriented educational diplomacy.

National policies regarding foreign graduate integration further illustrate system priorities. Japan has slowly opened its system to international graduates through structured pathways, while Russia continues to offer broad but rigid recognition protocols. Mongolia, still in the process of revising its licensing laws, faces challenges in evaluating foreign degrees and ensuring consistent standards.

Partnership With Tokushima University

A notable dimension of Mongolia's internationalization in medical education is its long-standing and multifaceted collaboration with Tokushima University in Japan. This partnership was first formalized through an interdepartmental academic exchange agreement in 2005, later extended to an intercollegiate agreement in 2007, laying the groundwork for comprehensive academic, clinical, and research collaboration between the two institutions (TU, 2018). The relationship has evolved into a flagship model of bilateral cooperation, with wide-ranging impacts on Mongolia's medical education reform and healthcare infrastructure.

One of the most tangible outcomes of this collaboration is Tokushima University's role in supporting the establishment and capacity-building of the Mongolia–Japan Teaching Hospital (MJTH), the first university-affiliated teaching hospital in Mongolia. Opened in 2019 with technical and financial support from JICA, MJTH is a cornerstone of Mongolia's efforts to integrate modern, patient-centered care into clinical training (JICA, 2022). Tokushima University provided expert consultation in hospital planning, departmental design, and operational protocols, ensuring that MJTH could reflect Japanese standards while adapting to the Mongolian context (JICA, 2022).

Beyond infrastructure development, the collaboration has significantly contributed to human resource development. Tokushima University has conducted specialized training programs for

Mongolian physicians, nurses, and administrative personnel in key areas such as emergency medicine, infection control, nursing care, hospital administration, and medical education pedagogy (JICA, 2022; TU Hospital, 2017). These programs, implemented through both on-site training and technical cooperation missions, introduced Japanese models of interdisciplinary teamwork, ethical patient communication, and efficient hospital workflow—features still underdeveloped in Mongolia's Soviet-legacy system.

Importantly, the collaboration also encompasses student and faculty exchange, including clinical observation, joint seminars, and mutual visits. Although temporarily suspended due to the COVID-19 pandemic, these exchanges resumed in an online format in 2024, with continued plans for in-person engagement in the near future (TU, 2024). The educational interaction has also involved joint research projects, particularly in areas such as medical simulation, community health, and geriatric care, fields in which Japan's expertise provides valuable guidance for Mongolia's reform efforts.

This partnership exemplifies the policy borrowing and educational transfer process in action: Mongolia selectively adopts Japanese best practices—not as wholesale imports but as models to be contextually adapted through trusted partnerships. It also illustrates the post-socialist institutional change paradigm, where reform is less about immediate transformation and more about sustained, incremental capacity building grounded in regional trust and shared educational values. As such, the Tokushima–Mongolia collaboration stands as a critical case of how regional academic diplomacy can drive both systemic modernization and localized adaptation in medical education.

Discussion

The comparative analysis of medical education systems in Mongolia, Russia, and Japan reveals both structural contrasts and converging trends, particularly in the evolving trajectory of Mongolian medical education. This section synthesizes the findings through the lens of hybridization, policy reform gaps, cultural-system alignment, and broader implications for national health outcomes.

Hybridization in Mongolian Medical Education

Mongolia's medical education is undergoing a hybridization process, shaped by the legacy of Soviet-era structures and the growing influence of East Asian, particularly Japanese, models. While the foundational architecture—such as discipline-based curricula and delayed clinical immersion—remains aligned with the Russian model, Mongolia has incrementally incorporated components of competency-based education, early patient exposure, and soft-skill development. The involvement of Japanese institutions, especially through partnerships with Tokushima University and the Mongolia–Japan Teaching Hospital, has facilitated the selective transfer of pedagogical innovations like problem-based learning, skills labs, and quality assurance mechanisms. This hybrid model, though still in transition, reflects a pragmatic approach to reform—balancing modernization with institutional memory and resource constraints.

Policy Gaps and Opportunities for Reform

Despite this progress, several policy gaps persist that hinder the pace and depth of reform. Mongolia lacks a cohesive national strategy that clearly articulates the competencies expected

of medical graduates in line with global standards such as those set by the WFME. Accreditation processes remain uneven, and licensing reforms have not yet fully addressed issues of international recognition and workforce mobility. Moreover, simulation-based education and faculty development programs remain underfunded or absent at many institutions. However, these gaps also represent opportunities for reform—particularly in aligning Mongolia's national medical education strategy with ASEAN frameworks, expanding regional partnerships, and investing in digital and blended learning tools to overcome geographic disparities.

Cultural Compatibility vs. System Efficiency

One of the critical tensions in Mongolia's reform journey is the trade-off between cultural compatibility and system efficiency. Soviet-influenced models are deeply embedded in faculty training, institutional hierarchy, and societal expectations. Reform efforts that overlook these cultural dimensions risk resistance or superficial adoption (Amgalan et al., 2020). For example, Japan's emphasis on holistic care and teamwork may conflict with the traditionally hierarchical, discipline-bound structure inherited from the Soviet system. Therefore, successful reform depends not only on importing technically superior models but also on adapting them to the Mongolian sociocultural context. This highlights the importance of "deep contextualization" in policy borrowing (Phillips & Ochs, 2004), where foreign innovations must be localized to take root effectively.

Implications for Health Outcomes and Workforce Quality

The quality of medical education is directly linked to national health outcomes and the performance of the healthcare workforce. In Mongolia, where rural health disparities and workforce shortages persist, the need for competent, adaptable, and patient-centered medical professionals is especially urgent. The hybrid model emerging in Mongolian medical education holds promise in improving clinical competencies, communication skills, and ethical decision-making among future practitioners. However, without sustained policy coherence, investment in teaching infrastructure, and alignment with workforce needs, these gains may remain fragmented. A forward-looking reform strategy that addresses both educational quality and workforce deployment—especially in underserved regions—will be key to maximizing the impact of medical education on Mongolia's broader health system.

Conclusion

This manuscript has examined the evolution of Mongolia's medical education system through a comparative lens, juxtaposing it with the enduring Soviet-influenced model in Russia and the increasingly internationalized, patient-centered system in Japan. The findings reveal that Mongolia stands at a critical juncture, engaging in a complex process of hybridization—retaining core features of its historical structure while selectively integrating reforms inspired by East Asian pedagogical innovation.

Comparative analysis underscores several key takeaways. First, curriculum design in Mongolia still reflects a discipline-focused, content-heavy structure akin to the Russian model, but efforts are underway to introduce modularity, soft skills training, and integrated learning, following the Japanese example. Second, in clinical pedagogy, Mongolia continues to rely on late-stage patient immersion, though partnerships with Japanese institutions like Tokushima University are introducing earlier and more structured clinical experiences. Third, while accreditation and

quality assurance remain fragmented in Mongolia, initiatives to align with WFME standards mark a step toward global benchmarking. Finally, in terms of internationalization, Mongolia has shown clear momentum, expanding academic and institutional collaborations—particularly with Japan—as part of a broader strategy to modernize without sacrificing cultural identity or system autonomy.

To move forward effectively, Mongolian policymakers must develop a cohesive national roadmap for medical education that articulates graduate competencies aligned with WFME and ASEAN frameworks, while remaining grounded in local healthcare needs. Strengthening accreditation and licensing infrastructure through standardized evaluation, independent review, and continuous quality improvement will also be essential. Investment in faculty development and simulation-based training, particularly for rural and under-resourced medical schools, can help bridge quality gaps in clinical pedagogy. Additionally, international partnerships should be strategically leveraged to support reform, curriculum design, and hospital governance, while maintaining institutional autonomy. Finally, all reforms must be embedded within Mongolia's sociocultural context. This means promoting gradual change, supporting reform-minded faculty leaders, and ensuring that innovation is introduced in ways that are culturally resonant and institutionally feasible.

Ultimately, Mongolia's path forward lies not in wholesale transplantation of foreign models, but in the deliberate and context-sensitive integration of global best practices. By navigating this path strategically, Mongolia has the potential to build a resilient, equitable, and forward-looking medical education system capable of producing physicians who meet both national demands and international expectations for quality and professionalism.

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Contact email: tran@tokushima-u.ac.jp

Psychological Literacy and Cognitive Dispositions in Pre-service Teachers

Eva Ballová Mikušková, Constantine the Philosopher University in Nitra, Slovakia
Marcela Verešová, Constantine the Philosopher University in Nitra, Slovakia

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Abstract

The study examines the relationships between psychological literacy (critical thinking dispositions, psychological and pedagogical misinformation, trust in science, integrity) and cognitive dispositions (thinking styles and conspiracy beliefs) in 164 pre-service teachers from Slovakia (n = 90) and the Czech Republic (n = 74). Participants completed a series of psychological scales measuring dispositions to critical thinking, psychological and pedagogical misinformation, trust in science, integrity, thinking styles, and endorsement of conspiracy beliefs. Results showed that psychological and pedagogical misinformation were positively correlated with conspiracy mentality (r = .196), while higher trust in science was negatively associated with both conspiracy beliefs (r = -.361) and conspiracy mentality (r = -.271). In addition, critical thinking dispositions and the thinking style "preference for effortful thinking" showed a complex interaction (r = .230 and r = .301), and trust in science and integrity of pre-service teachers were associated with the thinking styles "actively open-minded thinking" (r = .408 and r = .249) and "preference for effortful thinking" (r = .226 and r = .206). These results suggest that fostering thinking styles such as actively open-minded thinking and preference for effortful thinking may promote prospective teachers' psychological literacy (and vice versa) and that supporting and developing trust in science may serve as a protective factor against conspiracy thinking.

Keywords: psychological literacy, critical thinking, trust in science, thinking style, conspiracy beliefs

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Introduction

Education in the 21st century is characterized by rapid social, technological, and cultural changes that place new demands on teachers, requiring not only pedagogical expertise but also socio-psychological competencies (Rapsová, 2021). Teachers are expected not only to be professionally prepared, but also to think critically, adapt to changing conditions, and promote both their own and their students' well-being (Collie & Martin, 2017). These competencies are essential for managing complex challenges such as classroom diversity, digital transformation, and the development of 21st-century skills in students (Voogt & Roblin, 2012).

Teachers play a significant role in students' development and in creating inclusive, supportive learning environments. In this context, psychological literacy—the ability to apply psychological knowledge in personal, social, and professional settings—has become increasingly important (Cranney & Dunn, 2011; McGovern et al., 2010). For teachers, psychological literacy is a key competence that affects teaching quality, classroom interaction, stress management, and overall professional functioning. Teachers with high psychological literacy are better able to understand learning, motivation, and behaviour processes, enabling them to respond more effectively to students' needs and create inclusive environments that support well-being (Cranney et al., 2022). Psychological literacy also encompasses critical thinking, ethical decision-making, and scientific literacy, all of which are essential for professional reflection and innovative practice.

In educational contexts, psychological literacy encompasses understanding psychological concepts, interpreting assessments, applying social psychology in classroom management, respecting ethics, and addressing individual and cultural differences (Nutbeam, 2000; Rapsová, 2024). It also involves stress management, conflict resolution, critical evaluation of information, and the rejection of pseudoscience. Measurement approaches vary, but multidimensional models are recommended. This study adopts the framework by Chester et al. (2013) and Roberts et al. (2015), assessing psychological literacy through components proposed by McGovern et al. (2010): psychological misconceptions, critical thinking, trust in science, and ethical integrity. Psychological misconceptions—beliefs that contradict scientific evidence—are widespread among teachers and can impair reflective reasoning (Lilienfeld et al., 2009; Tulis, 2022). Similarly, trust in science is crucial for accepting evidence-based practices, yet teachers often rely on peers or media rather than scientific sources, reinforcing misconceptions (Hendriks et al., 2021; Rosman & Merk, 2021). Critical thinking, which includes cognitive skills and dispositions, supports informed decision-making and reduces cognitive bias (Facione, 2011; Halpern, 2014). Ethical integrity ensures accountability and moral responsibility, which are essential for teachers as role models (Schlenker, 2008).

Alongside psychological literacy, cognitive dispositions such as critical thinking, openness, and cognitive flexibility play a significant role. Research shows that these dispositions relate to adaptability and the ability to solve complex problems (Facione et al., 1995; Orakcı & Khalili, 2024). Teachers with well-developed cognitive dispositions can respond effectively to new pedagogical approaches, technological innovations, and changing student needs, thereby enhancing the quality of teaching and their professional well-being (Fuchs et al., 2024).

Gatial et al. (2023) evaluated selected cognitive factors, specifically scientific thinking and cognitive reflection, in teachers undergoing pre-graduate training and those in practice, in relation to their professional competencies. They found that scientific thinking is a significant predictor of the application of didactic competencies, particularly those related to building

classroom climate and discipline, as well as teacher self-reflection. However, they did not confirm a significant predictive relationship between cognitive reflection and teachers' didactic competencies.

The cognitive components of psychological literacy, such as critical thinking and trust in science, are closely linked to thinking styles and susceptibility to unfounded beliefs. Research on thinking styles identifies dimensions such as Actively Open-Minded Thinking (AOT), Critical Thinking Mindset (CMT), Personal Integrity Thinking (PIT), and Preference for Evidence-Based Thinking (PET) as predictors of rational judgement (Ballová Mikušková et al., 2024; Baron, 2019; Bayrak et al., 2023; Newton et al., 2024). Individuals high in AOT and PET are more likely to evaluate evidence objectively and less likely to endorse pseudoscientific or conspiratorial beliefs (Pennycook et al., 2020). Conversely, low AOT and reliance on intuitive reasoning correlate with higher acceptance of conspiracy theories and misinformation (Swami et al., 2014). These findings suggest that strengthening the cognitive dimensions of psychological literacy could reduce vulnerability to conspiratorial mentality, which undermines trust in institutions and evidence-based education. For teachers, this is particularly critical, as their epistemic beliefs influence classroom practices and students' attitudes towards science.

Integrating psychological literacy and cognitive dispositions into the preparation of future teachers is therefore a strategic priority. Empirical knowledge about the relationship between these constructs can foster the development of curricula that prepare teachers for the dynamic and complex environment of contemporary education. This research thus addresses the need to develop competencies in future teachers that underpin high-quality, inclusive, and adaptive pedagogical practice.

Current Study

Although psychological literacy and cognitive dispositions have largely been studied separately, their combination could significantly contribute to teachers' professional success. The integration of psychological literacy and cognitive dispositions could provide a foundation for teachers capable of managing complex challenges such as technological change, diversity, and inclusion in the classroom. Teachers with these qualities not only their own well-being but also that of their students, thereby fostering a positive and supportive learning environment (Collie & Martin, 2017). Moreover, such teachers are able to develop key 21st-century skills in students, such as critical thinking, collaboration, and adaptability, which aligns with global trends in education (Voogt & Roblin, 2012). Therefore, the main aim of the study was an examination of the relationships between psychological literacy (critical thinking dispositions, psychological and pedagogical misinformation, trust in science, integrity) and cognitive dispositions (thinking styles and conspiracy beliefs) in pre-service teachers from Slovakia and the Czech Republic.

Methods

Participants and Design

Undergraduate teaching students were invited to participate in the study. Data collection was conducted through an online survey (hosted on the Survio platform) as part of a wider project focusing on psychological literacy and professional competencies of teachers, approved by the Ethics Committee of Constantine the Philosopher University in Nitra.

A total of 164 pre-service teachers (90 students from Slovakia and 74 from the Czech Republic), aged 19–50 years (M = 21.40, SD = 3.35), participated in the study. Regarding their study domain, there were 39 students of preschool and elementary education, 25 students of primary school teaching, and 100 students of secondary school teaching.

Measurements

After providing informed consent, participants completed the survey. In the present study, psychological literacy (critical thinking dispositions, psychological and pedagogical misinformation, trust in science, integrity) and cognitive dispositions (thinking styles and conspiracy beliefs) were included in the analysis.

Psychological Literacy

Psychological and Pedagogical Misinformation. To measure psychological and pedagogical misinformation, we administered 25 statements from psychology and pedagogy related to teaching practice, drawn from the Psychological Misconceptions Scale (Tulis, 2013) and the General Psychology Misconceptions and Neuromyths Based on Educational Concepts Scale (McAfee & Hoffman, 2021). Participants rated how strongly they believed each statement to be true on a five-point scale (1 = not true at all; 5 = definitely true). A higher score indicates greater misinformation.

Critical Thinking. Critical thinking disposition was measured using the Critical Thinking Disposition Scale (Sosu, 2013). Participants rated 11 items on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree); items assess two dimensions: critical openness and reflective scepticism. A higher average score indicates a stronger disposition towards critical thinking.

Trust in Science. The Credibility of Science Scale (Hartman et al., 2017) , a six-item instrument in which participants rated their agreement with statements on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree), was used to assess trust in science. A higher average score indicates greater trust in science.

Integrity. Using the Integrity Scale (Schlenker, 2008), we measured the integrity of participants. Participants rated 18 statements on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree), and a higher average score indicates a stronger commitment to ethical principles.

Cognitive Dispositions

Thinking Styles. We measured thinking styles using the 4-Component Thinking Styles Questionnaire – Balanced version (Ballová Mikušková et al., 2024): actively open-minded thinking, close-minded thinking, preference for effortful thinking and preference for intuitive thinking. Participants rated 24 statements (six for each dimension) on a five-point scale (1 = strongly disagree; 5 = strongly agree). A higher average score was used as an indicator of thinking style preference.

Conspiracy Beliefs. Conspiracy beliefs were measured using 13 items from the Epistemologically Unfounded Beliefs Scale (Halama, 2019) and 7 items from the Slovak Conspiracy Belief Scale (Ballová Mikušková, 2021). Participants assessed their agreement

with each item on a six-point scale (0 = I cannot say; 1 = strongly disagree; 5 = completely agree). An average score was computed from items where participants indicated agreement, and a higher score indicates stronger conspiracy beliefs.

Conspiracy Mentality. Using the Conspiracy Mentality Questionnaire (Bruder et al., 2013), the conspiracy mentality of participants was measured. Participants assessed how much they agreed with each of five statements (1 = strongly disagree; 5 = strongly agree). A higher average score was used as an indicator of a stronger conspiracy mentality.

Results

Descriptive statistics for all variables are reported in Table 1. The results of the correlation analysis are presented in Table 2. Actively open-minded thinking was positively related to trust in science and integrity, and preference for effortful thinking correlated positively with critical thinking dispositions (critical openness and reflective scepticism), trust in science and integrity. Conspiracy beliefs and conspiracy mentality were negatively associated with trust in science, and conspiracy mentality positively related to psychological and pedagogical misinformation. A weak positive correlation was found between preference for intuitive thinking and integrity.

Table 1
Descriptive Statistics

	Mean	Median	SD	Minimum	Maximum
age	21.398	21	3.351	19	50
Psych. and Pedag. Misinformation	3.148	3.14	0.285	2.250	3.92
Critical Openness	4.230	4.29	0.507	2.860	5.00
Reflective Scepticism	4.163	4.25	0.577	2.750	5.00
Trust in Science	3.438	3.33	0.841	1.000	5.00
Integrity	3.516	3.50	0.461	2.530	4.80
Actively Open-Minded Thinking	3.431	3.33	0.629	2.000	5.00
Closed Minded Thinking	2.805	2.83	0.391	1.330	4.33
Preference for Intuitive Thinking	3.593	3.67	0.667	1.000	5.00
Preference for Effortful Thinking	3.555	3.67	0.713	1.500	5.00
Conspiracy Beliefs	1.906	1.79	0.647	1.000	3.93
Conspiracy Mentality	3.190	3.20	0.845	1.000	5.00

Table 2
Correlation Analysis

	Psych. and Pedag. Misinformation	Critical Openness	Reflective Scepticism	Trust in Science	Integrity
Actively Open-Minded Thinking	.043	.112	.146	.408***	.226**
Closed Minded Thinking	-.061	-.151	.009	-.094	-.002
Preference for Intuitive Thinking	.086	.138	.111	-.130	.163*
Preference for Effortful Thinking	.015	.301***	.230**	.249**	.206**
Conspiracy Beliefs	.107	-.035	-.106	-.361***	-.148
Conspiracy Mentality	.196*	.081	.044	-.271***	-.044

Note. * p < .05, * p < .01, *** p < .001

Discussion

The present study explored the relationships between psychological literacy components (critical thinking dispositions, psychological and pedagogical misinformation, trust in science, integrity) and cognitive dispositions (thinking styles and conspiracy beliefs) among pre-service teachers in Slovakia and the Czech Republic.

From a theoretical perspective, this research makes two key contributions. Present study extends the concept of psychological literacy by incorporating cognitive dispositions, offering a more holistic framework for understanding teacher competencies. Moreover, the findings provide the basis for a proposed model of relationships linking psychological literacy, cognitive dispositions, and professional outcomes. This model can guide future empirical research and inform theoretical development in the field of teacher education.

The findings provide several important insights into how psychological literacy and cognitive dispositions interact. First, the results confirmed that trust in science could play a protective role against epistemically unfounded beliefs. Both conspiracy beliefs and conspiracy mentality were negatively associated with trust in science, supporting previous research indicating that scientific trust reduces susceptibility to misinformation and conspiratorial thinking (Pennycook et al., 2020; Swami et al., 2014). This suggests that fostering trust in science during teacher preparation may be critical for promoting evidence-based practice and reducing vulnerability to pseudoscientific ideas.

Second, thinking styles emerged as significant correlates of psychological literacy. Actively open-minded thinking and preference for effortful thinking were positively related to trust in science and integrity, while preference for effortful thinking also correlated with critical thinking dispositions. These findings align with theoretical models emphasizing the role of cognitive flexibility and analytical thinking in rational judgment (Baron, 2019; Newton et al., 2024). Encouraging these thinking styles in teacher education could therefore strengthen psychological literacy and enhance professional decision-making.

Interestingly, psychological and pedagogical misinformation showed only a weak positive association with conspiracy mentality, suggesting that while misinformation and conspiratorial thinking share common cognitive roots, they may represent distinct challenges requiring targeted interventions. Moreover, the absence of strong correlations between misinformation and critical thinking dispositions indicates that reducing misconceptions may require more than fostering critical openness and scepticism, it may also involve explicit instruction and corrective feedback.

Overall, these findings underscore the importance of integrating psychological literacy and cognitive dispositions into teacher education curricula. Programs that promote actively open-minded thinking, effortful cognitive engagement, and trust in science could not only improve teachers' professional competencies but also serve as a buffer against misinformation and conspiracy beliefs. Future research should examine causal pathways and test interventions aimed at strengthening these dispositions, as well as explore cross-cultural differences and longitudinal effects.

Limitations and Future Directions

Several limitations should be acknowledged. First, the cross-sectional design precludes causal inferences; longitudinal studies are needed to examine developmental trajectories. Next, reliance on self-report measures may introduce social desirability bias, so future research should incorporate behavioral assessments and experimental designs. And finally, the sample was limited to Slovak and Czech pre-service teachers, which may restrict generalizability. We recommend cross-cultural studies that could provide broader insights. Future research should also explore intervention studies aimed at enhancing psychological literacy and cognitive dispositions, as well as examine their direct impact on teaching practices and student outcomes.

Conclusion

Curricular innovations are essential to strengthen both psychological literacy and cognitive dispositions in pre-service teachers. Teacher preparation programs should incorporate targeted modules that promote actively open-minded thinking and encourage effortful cognitive engagement. These modules should include activities designed to build trust in science and reduce reliance on pseudoscientific sources, as well as explicit instruction aimed at correcting psychological and pedagogical misconceptions through evidence-based content.

The study supports policy recommendations that prioritize the development of 21st-century skills, such as critical thinking, adaptability, and scientific literacy, among teachers. These competencies are crucial for ensuring high-quality, inclusive education and for preparing teachers to meet the demands of contemporary classrooms. Specifically, fostering thinking styles such as actively open-minded thinking and preference for effortful thinking may promote prospective teachers' psychological literacy (and vice versa) and that supporting and developing trust in science may serve as a protective factor against conspiracy thinking.

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

The author declares that Instatext and Copilot, an AI softwares, were used in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The author further declares that, apart from Instatext and Copilot, no other AI or AI-assisted technologies have been used to generate content in writing the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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Contact email: ebmikuskova@ukf.sk

The Dark Tetrad in Relation to Psychological Literacy of Future Teachers

Andrea Juhásová, Constantine the Philosopher University in Nitra, Slovakia
Viktor Gatial, Constantine the Philosopher University in Nitra, Slovakia

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Abstract

The dark tetrad, encompassing narcissism, Machiavellianism, psychopathy and sadism, has been explored within a variety of professional and educational settings. However, its relations with the psychological literacy of preservice teachers remains under-researched. This article examines the relations between the individual traits of the dark tetrad and psychological literacy in teacher education, which consists of psychological misconceptions, critical openness, reflective skepticism, trust in science, and integrity. The measures were administered to a sample of psychology teacher education students (N = 164) using the Dark Tetrad Questionnaire SD4 (Neumann et al., 2021), a questionnaire measuring psychological and pedagogical misconceptions, developed on the basis of the Psychological Misconceptions Scale (Tulis, 2013) and the General Psychology Misconceptions and Neuromyths questionnaire based on Educational Concepts Scale (McAfee & Hoffman, 2021), The Critical Thinking Disposition Scale (Sosu, 2013), The Credibility of Science Scale (Hartman, 2017) and The Integrity Scale (Schlenker, 2008). The following relations between the variables under study were found: The Dark Tetrad dimension Sadism was negatively correlated with Critical Openness, Reflective Skepticism, and Integrity, and weakly positively correlated with Trust in Science. The Dark Tetrad dimension Psychopathy correlated negatively with Reflective Skepticism and Integrity. The Dark Tetrad dimensions of Narcissism and Machiavellianism correlated negatively with Reflective Skepticism. On the basis of the above results, it is possible to recommend targeted selection of candidates for the teaching profession and systematic improvement of their psychological literacy in the sense of prevention of the occurrence of individual dimensions of the dark tetrad in the personality of future teachers.

Keywords: the dark tetrad, psychological literacy, teacher education

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Introduction

The dark tetrad is a term used in psychology to describe a group of four personality traits that are considered socially aversive - meaning they involve a tendency to harm, manipulate, or exploit others. It includes four distinct but interrelated traits: narcissism, characterized by grandiosity, entitlement, and a need for admiration (Raskin & Terry, 1988); Machiavellianism, defined by manipulation, strategic deception, and a lack of morality (Christie & Geis, 1970); psychopathy, associated with impulsivity, low empathy, and antisocial tendencies (Hare, 2003), and sadism, characterized by deriving pleasure from the suffering of others (Buckels et al., 2013).

Psychological literacy - the ability to apply psychological principles to personal and professional life is a crucial competency for future educators. Important components of psychological literacy are: psychological misconceptions, critical openness, reflective skepticism, trust in science, and integrity. It enables teachers to foster positive classroom environments, effectively manage student behavior, and engage in reflective teaching practices (McGovern et al., 2010).

However, certain maladaptive personality traits, such as those encapsulated in the dark tetrad (Paulhus, 2014), may undermine the development and application of psychological literacy in pre-service teachers. This study explores the intersection between the dark tetrad and psychological literacy, aiming to identify potential risks and areas for intervention in teacher education.

Literature Review

Research indicates that individuals with high dark tetrad traits may struggle with interpersonal relationships, ethical decision-making, and emotional regulation—essential qualities for effective teaching (Jonason et al., 2015). Teachers with high levels of narcissism may seek admiration from students rather than fostering genuine connections, potentially leading to a lack of constructive feedback and collaboration in the classroom. Machiavellian individuals, with their manipulative tendencies, may engage in strategic behaviors that prioritize personal success over student well-being, potentially affecting fairness in grading and discipline.

Psychopathy, characterized by impulsivity and low empathy, can hinder the ability to form positive relationships with students, reducing emotional support and sensitivity to their needs. Additionally, sadistic tendencies, although less prevalent, can manifest as excessive authoritarianism, leading to an intimidating and unsupportive learning environment. These maladaptive traits, if not properly managed, can negatively influence classroom dynamics, student performance, and overall teacher effectiveness.

Moreover, educators exhibiting dark tetrad traits may struggle with emotional regulation, making it difficult to manage classroom stressors and conflicts effectively. The ability to remain calm, exercise patience, and handle challenging student behaviors with empathy is crucial for fostering a positive educational environment. A lack of these qualities could contribute to increased teacher burnout, job dissatisfaction, and high turnover rates in the profession.

Since psychological literacy involves knowledge of psychological concepts, critical thinking, self-awareness, and the ethical application of psychology in real-life situations (Cranney &

Dunn, 2011), teachers with high psychological literacy demonstrate better classroom management, conflict resolution, and student-centered teaching skills. Psychological literacy enables teachers to understand student behavior, recognize learning difficulties, and implement effective interventions to support academic success and well-being (Dunn et al., 2013).

Furthermore, psychological literacy involves the development of self-reflection, allowing educators to assess their biases, emotional responses, and decision-making processes (McGovern et al., 2010). Teachers with higher levels of psychological literacy are better equipped to foster inclusive and supportive learning environments, where students feel safe and motivated to engage in the learning process.

However, educators exhibiting dark tetrad traits may lack the empathy and ethical reasoning necessary to apply psychological principles effectively in educational contexts. Machiavellian and psychopathic tendencies, for instance, may lead to manipulative teaching practices or an inability to address students' emotional needs appropriately (Jonason & Krause, 2013). Sadistic traits may manifest in rigid disciplinary approaches or the failure to create a nurturing classroom atmosphere. Therefore, it is essential for teacher training programs to integrate psychological literacy education to mitigate these potential risks and promote ethical, empathetic teaching practices.

Educational institutions should incorporate evidence-based interventions, such as mindfulness training, ethical decision-making workshops, and interpersonal skills development, to enhance psychological literacy among future educators (Taylor & Neimeyer, 2015). These initiatives can help mitigate the negative impact of dark tetrad traits and cultivate emotionally intelligent, self-aware, and ethically responsible teachers who can positively influence student learning and development.

Methodology

Based on the findings, the research problem could be formulated as follows: Is there a negative relationship between the dimensions of the dark tetrad (Machiavellianism, Psychopathy, Narcissism and Sadism) and the dimensions of psychological literacy (Psychological Misconceptions, Critical Openness, Reflective Skepticism, Science Trustworthiness, Integrity).

The research goals stemming from the above could then be formulated as follows:

- To identify the relationship between the dimension of the dark tetrad Machiavellianism and the dimensions of psychological literacy (Psychological Misconceptions, Critical Openness, Reflective Skepticism, Science Trustworthiness, Integrity) of future teachers.
- To identify the relationship between the dimension of the dark tetrad Psychopathy and the dimensions of psychological literacy (Psychological Misconceptions, Critical Openness, Reflective Skepticism, Science Trustworthiness, Integrity) of future teachers.
- To identify the relationship between the dimension of the dark tetrad Narcissism and the dimensions of psychological literacy (Psychological Misconceptions, Critical Openness, Reflective Skepticism, Science Trustworthiness, Integrity) of future teachers.
- To identify the relationship between the dimension of the dark tetrad Sadism and the dimensions of psychological literacy (Psychological Misconceptions, Critical

Openness, Reflective Skepticism, Science Trustworthiness, Integrity) of future teachers.

Research Hypotheses

Within the study at hand, we verified the following hypotheses:

H1: We suppose that between the dimension of the dark tetrad Machiavellianism and the dimension of psychological literacy

H1.1 psychological misconceptions,
H1.2 critical openness,
H1.3 reflective skepticism,
H1.4 science trustworthiness,
H1.5 integrity there is a negative relationship.

H2: We suppose that between the dimension of the dark tetrad Psychopathy and the dimension of psychological literacy

H2.1 psychological misconceptions,
H2.2 critical openness,
H2.3 reflective skepticism,
H2.4 science trustworthiness,
H2.5 integrity there is a negative relationship.

H3: We suppose that between the dimension of the dark tetrad Narcissism and the dimension of psychological literacy

H3.1 psychological misconceptions,
H3.2 critical openness,
H3.3 reflective skepticism,
H3.4 science trustworthiness,
H3.5 integrity there is a negative relationship.

H4: We suppose that between the dimension of the dark tetrad Sadism and the dimension of psychological literacy

H4.1 psychological misconceptions,
H4.2 critical openness,
H4.3 reflective skepticism,
H4.4 science trustworthiness,
H4.5 integrity there is a negative relationship.

Sample

The structure of the research sample as regards gender and profession is stated in Table 1. The age range of the sample was from 19 to 50 years old.

Table 1
Structure of Research Sample

	Research sample	N	%
Sex	Men	16	9,8
	Women	147	89,6
	Did not indicate	1	0,6
Country	Students from Slovakia	90	54,9
	Students from Czech Republic	74	45,1
Study programme	Primary school teaching	25	15,2
	Secondary school teaching	100	61,0

Note. N - count

Measurements

The battery of questionnaires used contained demographic questions at the start, concerning age, sex, country and study programme (preschool and elementary education, primary school teaching, secondary school teaching). To measure the presence of the so-called dark tetrad in the personality of the participants we used the Short dark tetrad (SD4) questionnaire (Neumann, et al., 2021). A cross-sectional study was conducted with 250 pre-service teachers enrolled in education programs across multiple universities. The authors created a questionnaire consisting of 28 elements. As an element example, there is People perceive me as a natural leader. The questionnaire is four-dimensional, the individual dimensions measure machiavellianism, psychopathy, narcissism and sadism. We translated the questionnaire into Slovak. Our version instructed the participants as follows: To which level do you agree with the following statements? The participants answered the individual questions of the questionnaire on a five point scale, where 1 meant do not agree at all and 5 meant agree completely. The following questionnaires were used to measure the psychological literacy of future teachers:

To measure psychological and pedagogical misinformation, we administered 25 statements from psychology and pedagogy related to teaching practice, drawn from the Psychological Misconceptions Scale (Tulis, 2013) and the General Psychology Misconceptions and Neuromyths Based on Educational Concepts Scale (McAfee & Hoffman, 2021). Participants rated how strongly they believed each statement to be true on a five-point scale (1 = not true at all; 5 = definitely true). A higher score indicates greater misinformation.

Critical Thinking Disposition Scale (CTDS). The scale was developed by Sosu (2013), who based it on the assumption that every individual has a tendency towards critical thinking, but may not necessarily use this disposition. The author understands critical thinking disposition as the ability to use critical thinking when it is necessary to justify, argue, and make decisions. According to Sosu (2013), critical thinking dispositions represent an individual's attitudes, intellectual capabilities, and habits of mind. The scale contains 11 items – statements that participants rate on a 5-point scale (1 = strongly disagree, 2 = disagree, 3 = no opinion, 4 = agree, 5 = strongly agree). They rate each statement in relation to themselves and their behavior. The questionnaire measures two dimensions of critical thinking dispositions – critical openness (7 items) and reflective skepticism (4 items). The author explains reflective skepticism as an individual's ability to critically view information, question evidence, and learn from past experiences. He understands critical openness as the ability to modify one's own

opinions and thinking as a result of convincing evidence. The questionnaire is easy to administer and takes approximately 2-3 minutes to complete.

Credibility of Science Scale (CSS). The author of the modified Credibility of Science Scale we used is Hartman (2017). The scale consists of six statements, in relation to which participants express their level of agreement or disagreement on a 5-point scale (1 = strongly disagree, 2 = disagree, 3 = no opinion, 4 = agree, 5 = strongly agree). The modification of the tool consists in reducing the 7-point scale to a 5-point scale, which is considered more effective (Hartman, 2017). The advantages of the scale are its short length, quick administration (approximately 3 minutes), convincing validity, and wide range of uses.

Integrity Scale (IS). The Integrity Scale was developed by Schlenker (2008). The scale consists of 18 items formulated as statements. Participants express their level of agreement or disagreement with the statements on a 5-point scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). The integrity scale focuses on identifying attitudes and personality traits that predict desired ethical behavior and thus lead to greater psychological well-being, stress management, and effective functioning in the social system. The advantage of the questionnaire is that it is quick to administer (taking approximately 3–5 minutes) and easy to evaluate.

To process the data obtained, statistical procedures were used – descriptive statistic (arithmetic mean, standard deviation, median, minimum, maximum) and inferential statistics (Pearson´s correlation coefficient) to discover the relationships among variables.

Results

In the following text and tables we state the descriptive data of individual dimensions of psychological literacy first (Psychological Misconceptions, Critical Openness, Reflective Skepticism, Science Trustworthiness, Integrity), and the dimensions of dark tetrad, of the participants of our research sample (Table 2), which were obtained using the Short dark tetrad SD4 questionnaire, Psychological Misconceptions Scale, General Psychology Misconceptions and Neuromyths based on Educational Concepts Scale, Critical Thinking Disposition Scale, Credibility of Science Scale and The integrity scale. The results are stated as average gross score, minimum, maximum, median and standard deviation of measured variables, as in, the psychological literacy – Psychological Misconceptions, Critical Openness, Reflective Skepticism, Science Trustworthiness, Integrity and the dimensions of the dark tetrad (Machiavellianism, Psychopathy, Narcissism and Sadism) of participants.

Table 2
Descriptive Data on Psychological Literacy and Dark Tetrad in Participants

	N	AM	Median	SD	Min	Max
Psychological Misconceptions	164	3.148	3.14	0.285	2.250	3.92
Critical Openness		4.230	4.29	0.507	2.860	5.00
Reflective Skepticism		4.163	4.25	0.577	2.750	5.00
Science Trustworthiness		3.438	3.33	0.841	1.000	5.00
Integrity		3.516	3.50	0.461	2.530	4.80
Machiavellianism		3.191	3.29	0.637	1.430	4.86
Narcissism		2.509	2.43	0.694	1.140	4.71
Psychopathy		1.793	1.71	0.573	1.000	4.14
Sadism		1.660	1.43	0.629	1.000	4.14

Note. N – count, AM – arithmetic mean, SD – standard deviation, Min – minimum value, Max – maximum value

Participants in our research sample (N = 164) achieved an average gross score of 3.148 points in the Psychological Misconceptions dimension, with a standard deviation of 0.285, a median of 3.14, the lowest value was 2.25, and the highest was 3.92 points. In the Critical Openness dimension, they achieved an average raw score of 4.23 points, with a standard deviation of 0.507, a median of 4.29, the lowest value being 2.86 and the highest 5 points. In the Reflective Skepticism dimension of psychological literacy, they achieved an average raw score of 4.163 points, with a standard deviation of 0.577, a median of 4.25, the lowest value reaching 2.75, and the highest 5 points. In the Science Trustworthiness dimension, they achieved an average raw score of 3.438 points, with a standard deviation of 0.841, a median of 3.33, the lowest value being one and the highest being 5 points. In the Integrity dimension, participants achieved an average raw score of 3.516 points, with a standard deviation of 0.461, a median of 3.5, the lowest value being 2.53 and the highest 4.8 points. In the Machiavellianism dimension of the dark tetrad, participants in our research sample achieved an average raw score of 3.191 points, with a standard deviation of 0.637, a median of 3.29, a minimum value of 1.43, and a maximum value of 4.86 points. In the Narcissism dimension, participants achieved an average raw score of 2.509 points, with a standard deviation of 0.694, a median of 2.43, the lowest value reaching 1.14 and the highest 4.71 points. In the Psychopathy dimension, participants achieved an average raw score of 1.793 points, with a standard deviation of 0.573, a median of 1.71, the lowest value being one and the highest 4.14 points. In the Sadism dimension, participants achieved an average raw score of 1.660 points, with a standard deviation of 0.629, a median of 1.43, the lowest value being one and the highest 4.14 points.

In our research, we looked at the mutual relationship (the strength and polarity) of the individual dimesions of future teachers psychological literacy and the dimensions of the dark tetrad. The results of the correlation analysis are listed in Table 3.

Table 3
Results of Correlation Analysis of Psychological Literacy Levels and Dark Tetrad in Research Sample Participants (N = 164)

Psychological Literacy		Dark Triad			
		Machiavellianism	Psychopathy	Narcissism	Sadism
Psychological Misconceptions	r	0.004	-0.001	-0.029	-0.050
Critical Openness		-0.148	-0.044	-0.003	-0.262***
Reflective Skepticism		-0.164*	-0.259***	-0.212**	-0.372***
Science Trustworthiness		-0.048	-0.079	-0.028	0.160*
Integrity		-0.147	-0.259***	-0.144	-0.210**

Note. r – Pearson´s correlation coefficient, *** correlation is significant at the 0.001 level (2-tailed), ** correlation is significant at the 0.01 level (2-tailed), * correlation is significant at the 0.05 level (2-tailed)

A strong negative relationship was found between the dark tetrad dimension of sadism and reflective skepticism. A moderately strong negative relationship was found between the dark tetrad dimension of sadism and critical openness, trust in science (inverse questionnaire items), and integrity. A moderately strong negative relationship was also found between the dark tetrad dimension of psychopathy and reflective skepticism and integrity, between the dark tetrad dimension of narcissism and reflective skepticism, and between the dark tetrad dimension of Machiavellianism and reflective skepticism.

Discussion

The present study explored how the four dimensions of the Dark Tetrad—sadism, psychopathy, narcissism, and Machiavellianism—relate to epistemic and ethical-personality dispositions, namely reflective scepticism, critical openness, trust in science (via inverse items), and integrity. In summary: a strong negative association emerged between the sadism dimension and reflective scepticism; further, sadism showed a moderately strong negative relationship with critical openness, trust in science, and integrity. In addition, psychopathy was moderately negatively associated with reflective scepticism and integrity; narcissism was moderately negatively associated with reflective scepticism; and Machiavellianism was moderately negatively associated with reflective scepticism.

Sadism and Reflective Scepticism

The particularly strong negative relationship between sadism and reflective scepticism suggests that individuals higher in sadistic disposition are markedly less inclined to engage in reflective, critical thinking about underlying assumptions and to entertain doubt or meta-cognitive reflection of their own beliefs. One plausible interpretation is that the sadistic disposition—characterised by deriving pleasure from another's suffering or ignorance (e.g., Buckels et al., 2013) may diminish the motivation to question or revisit one's views, perhaps because the individual takes comfort in dominating or remaining unchallenged. This aligns with evidence indicating that sadism adds a unique component beyond the Dark Triad and is empirically distinct from psychopathy (Johnson et al., 2019). Thus, our results extend this literature by showing how sadism relates not only to aggression or interpersonal dominance, but also to lowered epistemic virtue - specifically reflective skepticism.

Psychopathy, Narcissism, Machiavellianism, and Epistemic/Ethical Dispositions

The observed moderate negative associations between psychopathy (and to a lesser extent narcissism and Machiavellianism) and reflective scepticism and integrity suggest that individuals higher in these dark traits are less likely to adopt a stance of intellectual humility, self-questioning, or moral self-consistency. For psychopathy, this is consistent with prior findings that higher psychopathy is tied to lower integrity and greater unethical behaviour: for instance, in the study by Rassin et al. (2024) showing that high scores on the Short Dark Tetrad predicted deceptive responses on integrity tasks. Similarly, the negative link between dark traits and trust in institutions finds parallel in research by Jonason et al. (2015): Machiavellianism and psychopathy, for example, have been shown to associate with lower political trust and greater conspiracy belief endorsement, which in turn may reflect generalized epistemic mistrust or cynical worldview. Although our study did not measure conspiracy beliefs directly, the pattern of reduced trust in science among individuals higher in sadism suggests a similar underlying logic: a dark-trait profile marked by antagonism, suspicion, callousness, and exploitativeness may undermine the readiness to trust scientific authority or evidence.

With regard to narcissism, the moderate negative association with reflective scepticism indicates that grandiose self-views and entitlement may impair one's willingness to question one's own beliefs or assumptions. While narcissism has sometimes been linked to higher confidence or boldness, this may come at the cost of lower reflective doubt or epistemic humility.

Critical Openness and Trust in Science

Our finding that sadism in particular was moderately negatively related to critical openness underscores that this trait may hamper not only scepticism (i.e., questioning) but also the disposition to engage with alternative viewpoints or new evidence. This echoes broader personality research linking openness to experience with cognitive curiosity, intellectual breadth and reflective thinking (e.g. Kaufman et al., 2016). Indeed, given that openness is positively associated with reflective learning styles and elaborative processing, it is plausible that individuals higher in dark traits, by virtue of lower openness, might show reduced critical openness. Moreover, the negative relationship between dark traits and trust in science in our study aligns with work showing that dark personality traits predict lower compliance with public health measures (e. g. COVID-19 vaccination uptake) and lower institutional trust (see Blasco-Belled et al., 2024, about meta-analysis on Dark Triad and well-being).

Integrity

Integrity, operationalised here as self-reported adherence to ethical and moral consistency, was negatively related in our data to sadism and psychopathy. This finding dovetails with previous research showing that dark traits are predictive of immoral, unethical or exploitative behaviours in organisational settings, and can serve as screening tools for integrity violations. For example, the study by Rassin et al. (2024) found that individuals lying on a matrix task had elevated scores on all four dark traits. Thus, our results linking dark traits to lower integrity further position epistemic and ethical dispositions (scepticism, openness, trust) within the broader nomological network of dark personality.

Conclusion

In summary, the present research demonstrates that individuals higher in dark personality traits—particularly sadism and psychopathy—tend to display lower levels of reflective scepticism, lower critical openness, less trust in science and lower integrity. These findings broaden the conceptual reach of dark traits into the domain of epistemic and ethical dispositions, highlighting the importance of personality for how people think about knowledge, evidence, science and morality. Future work should explore longitudinal pathways, interventional possibilities, and the interplay of dark traits with cognitive, educational and cultural factors.

Implications

The findings have practical implications. In the context of education, organizational, or scientific communication, it may be useful to consider how individuals with high levels of dark traits (particularly sadism and psychopathy) may respond differently to efforts to promote critical thinking, scientific literacy, or ethical integrity. For example, initiatives that rely on promoting reflective skepticism or trust in science may require tailored approaches if certain personality dispositions predispose individuals to resistance or distrust of such processes. When assessing integrity (e.g., in organizations or in employee recruitment), measurements of dark traits may signal not only the risk of unethical behavior but also epistemic resistance (a reduced willingness to reflect or trust evidence), which could hinder evidence-based decision-making.

Limitations

Several limitations must be acknowledged. First, the cross-sectional design prevents strong causal inference: while we interpret dark traits as antecedents of lower scepticism, openness, trust and integrity, it is also plausible that lower integrity or lower critical openness might foster or reinforce dark tendencies over time. Longitudinal designs would help clarify directionality. Second, measurement constraints: though the Short Dark Tetrad and related scales have acceptable psychometric properties, some research points to overlap among the dark traits (especially sadism and psychopathy) and to measurement issues (Johnson et al., 2019).

Recommendations

Future studies could include assessments using multiple methods (e.g., informant reports, behavioral tasks) to enhance their reliability. Reflective skepticism, critical openness, trust in science, integrity—although theoretically important, are relatively new to the dark traits literature; further research is needed to validate these constructs and explore potential mediators (e.g., moral detachment, epistemic curiosity, cynicism) or moderators (e.g., education, cognitive ability, cultural context) is needed to verify these constructs and explore potential mediators (e.g., moral detachment, epistemic curiosity, cynicism) or moderators (e.g., education, cognitive ability, cultural context). Finally, generalizability may be limited by the sample (e.g., students, one country), and replication in different cultural contexts would strengthen the credibility of the findings.

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

The authors declare that generative artificial intelligence (AI) and AI-assisted technologies were used in the preparation of this manuscript solely for language proofreading and the formulation of professional and domain-specific phrasing. All ideas, interpretations, and conclusions presented in the text are the original work of the authors. The AI tools did not contribute to the generation of scientific content, data analysis, or interpretation of results.

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Contact email: ajuhasova@ukf.sk

The Limits and Potentials of AI in Culturally Mediated Psychological Counseling: Insights From the PASSI@Unito Project

Lei Huang, University of Turin, Italy

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Abstract

Artificial intelligence (AI) has become increasingly central to mental health services, offering scalable, accessible, and data-driven forms of psychological support. Yet, as algorithms enter spaces of human vulnerability and care, fundamental questions arise about their cultural adequacy, emotional authenticity, and ethical implications. This working paper outlines the framework for an ongoing clinical ethnographic study developed within the PASSI@Unito project at the University of Turin, a program providing intercultural psychological counselling for international students. The study investigates how AI-based counselling tools, such as chatbots and mood-tracking applications, shape experiences of distress, empathy, and belonging, and how culturally mediated human counselling restores meaning where algorithmic understanding fails. Drawing on preliminary case material and established theoretical traditions in anthropology, psychology, and ethics of care, the project proposes a hybrid model of counselling in which digital systems facilitate access while human mediation sustains interpretation and relational depth. The research aims to contribute both conceptually and practically to the development of culturally responsive, ethically grounded digital mental-health infrastructures.

Keywords: artificial intelligence, intercultural counseling, international students, clinical ethnography

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Prefatory Note and Purpose of This Paper

This paper serves as a working document accompanying the BCE 2025 conference presentation. It introduces the conceptual foundation, empirical context, and methodological design of an ongoing research project investigating the role of artificial intelligence (AI) in intercultural psychological counselling for international students. Rather than reporting final results, the paper presents a research framework through which the emerging fieldwork within the University of Turin's PASSI@Unito initiative can be interpreted and extended. It clarifies the problem space, delineates the theoretical and ethical stakes, and synthesizes preliminary insights from early observations in culturally mediated counselling contexts. By situating the study within current debates on digital mental health, empathy, and transcultural psychology, the paper outlines how the project will be conducted and what it aims to achieve.

Introduction

Over the past decade, AI technologies have become deeply embedded in psychological and counselling services. Conversational agents, sentiment-analysis applications, and automated cognitive–behavioural therapy (CBT) platforms have been promoted as low-cost and scalable solutions to address the global mental-health gap (Thakkar et al., 2024). In university contexts, where demand for support continues to outstrip human capacity, such systems have been welcomed for their immediacy, privacy, and accessibility. For international students, who often navigate stressors linked to migration, language, and cultural adaptation, AI-enabled tools appear to offer a form of neutral companionship unbounded by time, stigma, or geography (Fu & Liu, 2024).

However, optimism surrounding AI-mediated counselling conceals significant epistemic and ethical challenges. Many AI systems operate on datasets derived primarily from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) populations, embedding within their design culturally partial assumptions about emotion, selfhood, and mental well-being (Shen et al., 2024). As Kleinman (1988) and Good (1994) remind us, expressions of suffering are not universal but rooted in local moral and linguistic worlds. When such expressions are translated into algorithmic categories such as "anxiety" or "sadness," their cultural logic—and with it, their moral and relational substance—tends to disappear.

Recent empirical research underscores this dissonance. Adolescents in India and Latin American users of AI chatbots report that automated responses often feel "generic" and "culturally irrelevant," suggesting that the algorithm's structure of understanding does not align with their lived idioms of distress (Lanfer et al., 2024; Sehgal et al., 2025). Such misrecognition raises questions not only about representational accuracy but about the redefinition of empathy itself. As Halpern (2024) and Ferrario et al. (2024) argue, machines are increasingly able to mimic the language of care without participating in the affective labour that makes care meaningful. The danger, as Crawford (2021) cautions, is that artificial empathy risks mimicking understanding while erasing the moral labor that gives care its human meaning—producing the illusion of connection without its ethical substance.

These issues are not simply technical limitations but moral and cultural transformations in the meaning of care. They challenge the assumption that mental health can be universally standardized and instead call for methods capable of capturing the subtle interplay between technology, culture, and emotion. The current project responds to this challenge by using clinical ethnography—a methodology situated at the intersection of anthropology and mental

health—to interpret what AI can and cannot apprehend in human experience. The study situates its fieldwork within the PASSI@Unito program at the University of Turin, an initiative combining psychological counselling with intercultural mediation for international students.

The first author's dual role as cultural mediator and counsellor offers a unique position from which to examine these dynamics. This professional proximity enables a reflexive exploration of how digital systems intersect with the embodied, moral, and linguistic dimensions of counselling practice. The project seeks to understand both the potentials and the limits of AI in cross-cultural psychological support and to articulate how technology and human mediation can coexist without diminishing the ethical depth of care.

Theoretical and Conceptual Framework

Empathy, culture, and mediation form the conceptual pillars of this study. Each is being reshaped by the growing influence of algorithmic systems in clinical and educational settings.

Empathy, traditionally considered the moral and affective foundation of counselling, is not merely a cognitive recognition of another's state but a relational process of resonance, vulnerability, and shared temporality (Hollan & Throop, 2008; Ratcliffe, 2022). In digital contexts, empathy is redefined as linguistic pattern recognition. AI-driven counsellors produce textual approximations of compassion without participating in embodied interaction. This distinction between simulation and experience is not trivial: it marks a shift from moral reciprocity to functional mimicry, where emotional responsiveness is treated as a computational output rather than a human commitment.

Culture, likewise, mediates the experience and expression of distress. Anthropological and transcultural psychiatric research has demonstrated that emotional suffering is articulated through idioms, metaphors, and moral vocabularies specific to cultural worlds (Kirmayer, 2020). AI systems, however, tend to universalize affective states through algorithmic models trained on Western linguistic corpora. The result is what Chavarro and Evans (2024) describe as emotional coloniality—a process by which diverse emotional grammars are flattened into standardized categories legible to machines but alien to many users.

Algorithmic mediation thus extends beyond communication to the constitution of care itself. Algorithms define what counts as an appropriate expression of distress and what falls outside the bounds of recognizability (Seaver, 2022). When they fail to respond meaningfully to culturally embedded forms of suffering, responsibility becomes diffuse, shared among designers, clinicians, and institutions (Benjamin, 2019). As Tronto (1993) and Held (2006) argue, care depends on moral attentiveness and accountability—qualities that no system of probabilistic prediction can replace.

In this theoretical light, the project does not seek to oppose technology and humanity but to interrogate their intersection. It asks how AI might function as an entry point to care without eroding the relational and cultural depth that sustains healing.

Research Context and Approach

The study is grounded in the PASSI@Unito program (Psychological Assistance for International Students and Scholars at the University of Turin), founded in 2019 to support the psychological well-being of international students through culturally mediated counselling.

The program's structure pairs professional psychologists with intercultural mediators, enabling a form of dialogue in which linguistic translation becomes an ethical and relational act. This collaboration acknowledges that emotional distress among internationally mobile students is rarely reducible to individual pathology; rather, it often reflects the moral and symbolic dislocations inherent in migration (Huang, 2022; Lagomarsino & Cino, 2023).

Within this institutional framework, the present research adopts clinical ethnography (Good & Good, 2020; Kirmayer, 2020) as its methodological foundation. Clinical ethnography emphasizes participation, reflexivity, and interpretive depth. It involves the reconstruction of lived experiences within their social and cultural contexts, attending to how meaning is performed not only in words but in gestures, silences, and metaphors.

The ongoing fieldwork focuses on international students who have engaged with AI-based counselling tools—such as chatbots, generative dialogue systems, and mood-tracking applications—prior to or alongside human counselling. Through narrative interviews and participant observation, the research examines how these students negotiate emotional expression, cultural belonging, and help-seeking in technologically mediated environments. The analysis attends to both the content of narratives and their affective form: the pacing, hesitation, and tone that reveal how emotion is socially enacted.

The researcher's dual role as intercultural mediator and ethnographer introduces both privilege and risk. It enables an intimate understanding of relational dynamics but demands continuous reflexivity regarding empathy, interpretation, and power. Ethical practice in this study follows the principles of relational accountability and care (Held, 2006; Tronto, 1993), treating informed consent as an ongoing dialogue rather than a single procedural act.

Preliminary Observations and Analytical Orientation

Preliminary case narratives illustrate the ambivalent role of AI in mental health support. Students describe AI tools as simultaneously comforting and alienating. For some, chatbots provided a safe entry point into emotional disclosure, particularly when cultural stigma discouraged open discussion of mental health. Yet these same systems often failed to grasp cultural idioms, producing responses perceived as superficial or misaligned. Users reported feelings of being "heard but not understood," and in some instances, the mechanized consistency of AI dialogue intensified self-doubt and rumination.

By contrast, human counselling sessions, especially those involving cultural mediation, restored a sense of moral and relational recognition. Students found relief not only in being understood linguistically but in having their emotions contextualized within shared cultural logics. Mediators played a critical role in translating metaphors, clarifying cultural references, and reintroducing interpretive ambiguity where algorithms had imposed closure. These early findings confirm that while AI can facilitate access and initial engagement, it cannot substitute the emotional reciprocity that defines therapeutic alliance.

Framework and Future Directions

The research moving forward will deepen and formalize these preliminary observations. It seeks to examine systematically how AI-assisted counselling reshapes emotional self-narration among international students and how intercultural mediation rehumanizes this process. The

analysis will proceed through iterative hermeneutic cycles, connecting narrative interpretation with theoretical reflection on empathy, culture, and technology.

The expected outcomes of the study are threefold. Conceptually, it aims to clarify the distinction between simulated and relational empathy, positioning "algorithmic empathy" as an operational metaphor rather than an ethical reality. Methodologically, it demonstrates the value of clinical ethnography for studying digital care, offering a framework for understanding not only how digital systems function, but how they reshape the human experience of care, empathy, and healing. Practically, it aspires to contribute to the design of hybrid counselling ecosystems, where AI systems facilitate access while human mediators preserve interpretive and moral depth.

Ultimately, the research challenges the assumption that the efficiency of digital tools equates to the adequacy of care. It argues instead that genuine psychological support requires not merely information exchange but recognition—a process rooted in culture, dialogue, and shared vulnerability. The PASSI@Unito project thus provides both a field and a metaphor for this inquiry: a space where machines can assist, but only humans can truly listen.

Conclusion

This working paper outlines the conceptual architecture and methodological design of a study exploring the intersection of AI, empathy, and cultural mediation in mental-health counselling. Positioned within the PASSI@Unito initiative, the project seeks to understand how international students navigate between technological and human forms of support, and what these trajectories reveal about the moral and cultural limits of digital care.

The forthcoming research will continue to elaborate this framework through extended fieldwork, interdisciplinary collaboration, and critical dialogue with practitioners and designers. Its broader objective is to inform both the scholarly discourse on AI and mental health and the institutional practice of counselling in multicultural universities. The paper thus represents a step toward a more reflexive and culturally grounded understanding of how technology can coexist with, rather than replace, the human ethics of care.

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

The author declares that Grammarly, an AI-assisted writing software, was used in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The author further declares that, apart from Grammarly, no other AI or AI-assisted technologies have been used to generate content in writing the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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Contact email: lei.huang@unito.it

Ranking Pressures and Research Quality: Internationalisation Challenges in the Azerbaijani Higher Education System

Leyla Jabbarzade, University of Sheffield, United Kingdom

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Abstract

This paper examines how ranking-driven internationalisation policies shape research capacity and quality in Azerbaijani higher education. In resource-constrained systems like Azerbaijan, internationalisation often prioritises visibility in global rankings over long-term investment in staff, infrastructure and academic development. Drawing on policy analysis (1992–2023) and ten semi-structured interviews with academic and administrative staff at two public universities, the study applies Steiner-Khamsi's (2014) policy borrowing framework and Vogel's (2012) model of research capacity building to explore the tension between global aspirations and local capabilities. Findings reveal a persistent mismatch between national ambitions for global recognition and institutional realities of limited funding, training and autonomy. Ranking-linked incentives have sometimes encouraged superficial compliance and ethically sensitive practices, such as publication outsourcing, honorary authorship and reliance on predatory journals. These dynamics may shift attention away from teaching quality and research integrity, echoing concerns raised across other Global South systems where borrowed reforms outpace institutional capacity (Altbach & Knight, 2007; Chankseliani, 2023). The paper argues for more context-sensitive approaches to internationalisation that align global engagement with local realities. It recommends three priorities: establishing dedicated research funding and staff development programmes; reforming incentive systems to reward quality over quantity; and promoting equitable international partnerships that build sustainable capacity. These findings contribute to broader debates on how metric-based policies reshape academic values and governance in developing higher education systems.

Keywords: internationalisation, higher education, research capacity, Azerbaijan, Global South

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Introduction

The internationalisation of higher education is often linked with collaboration, innovation and global visibility. However, as Altbach and Knight (2007) and Knight (2008) argue, the process is also shaped by unequal flows of knowledge and power between systems with differing resources. In the Global South, Chankseliani (2023) highlights that the pursuit of international visibility through global rankings often clashes with limited institutional capacity.

Since independence, Azerbaijan has strived to align its higher education system with international standards. After joining the Bologna Process in 2005, successive state programs promoted global integration through student mobility, international partnerships and performance indicators linked to global rankings. However, as Abbasov and Jafarli (2022) observe, many of these reforms were borrowed from global models without adequate consideration of the local institutional context, creating tension between ambition and feasibility. This study explores how ranking-based internationalisation affects research quality and ethical practice in Azerbaijani higher education institutions (HEIs). It focuses on the ways in which imported metrics interact with domestic capacity constraints, shaping how universities define and measure academic excellence.

Policy Context

Azerbaijan's policy trajectory reflects an evolving yet fragmented approach to internationalisation. The Law on Education (1992) was a turning point as the country shifted from the Soviet model to a system encouraging autonomy and diversification. Later, the 2007–2015 State Program for Education Abroad aimed to strengthen research capacity by funding international study, requiring graduates to return and contribute domestically. However, the program lacked mechanisms for reintegration, leaving many returnees without institutional pathways to apply their expertise.

The 2009 revised Law on Education and the 2016 Law on Science formally recognised universities as research institutions but offered limited financial or structural support. The 2019–2023 State Program on Enhancing International Competitiveness further intensified ranking pressures, mandating universities to align performance indicators with global ranking systems and prioritising publication in Scopus-indexed journals. These initiatives demonstrate a clear intention to increase global recognition but have also produced a dependency on external benchmarks rather than locally grounded measures of quality. As Hazelkorn (2015, 2018) argues, ranking-driven policies tend to reshape institutional behaviour by encouraging short-term performance and output-based incentives. In Azerbaijan, these pressures have manifested as a focus on quantity over quality in research production and have diverted attention from broader missions of capacity building, ethical scholarship and teaching enhancement.

Theoretical Framework and Methodological Overview

The study adopts Steiner-Khamsi's (2014) framework of policy borrowing, which explains how global education models are transferred across contexts and often reinterpreted to serve national or political goals. This framework helps illuminate how Azerbaijan's reforms adopt international practices without adapting them with its institutional structures. In parallel, Vogel's (2012) model of research capacity building provides a complementary perspective, emphasising that sustainable research development depends on coordinated investment in human, institutional and systemic resources. The interaction between these frameworks allows

the analysis to capture both the symbolic and structural dimensions of Azerbaijan's internationalisation process.

Empirically, the study draws on qualitative analysis of policy documents and ten semi-structured interviews with academic and administrative staff across two public universities. The interview data are used illustratively to reflect policy reception and institutional experience, triangulated with documentary analysis to ensure validity while preserving detailed data for ongoing doctoral research.

Preliminary Findings and Discussion

Analysis of policy documents and early interview data suggests that current internationalisation reforms of Azerbaijan have evolved at the intersection of global aspirations and local constraints. The following three key themes illustrate both progress and ongoing challenges.

The Gap Between National Ambition and Institutional Capacity

Azerbaijan's higher education policies, particularly the 2019–2023 State Program on Enhancing International Competitiveness, mainly deliver an ambitious message to support the local universities to become globally ranked, research-intensive universities. However, a lack of funding and institutional capacity prevents the implementation of these ambitious goals. This mirrors how Steiner-Khamsi (2014) describes policy borrowing without contextual translation, where global models are adopted symbolically rather than through sustained adaptation. Other post-Soviet systems also faced similar challenges, as the aspiration to become "research universities" (Abbasov & Jafarli, 2022) is not always matched by the institutional and financial support required for the necessary transformation.

Metric-Driven Incentives and Changing Academic Values

Ranking-linked incentives play a key role in institutional performance. The emphasis on Scopus-indexed publications, citation counts and international visibility has reshaped academic behaviour, which prioritises measurable numbers over long-term research development. Hazelkorn (2015, 2018) emphasises how these ranking pressures redefine quality by narrowing academic priorities. Despite the drive for increased productivity in Azerbaijan, this effort led to tension in balancing international visibility against the need to maintain research integrity and relevance to national priorities. This tension, as noted by Stein (2017), results in a paradox of internationalisation where efforts to achieve greater global prestige may unintentionally restrict local autonomy and the freedom of critical thought.

Systemic Barriers to Sustainable Capacity-Building

Despite formal recognition of research universities in the Law on Science (2016), the absence of stable funding and administrative support continues to constrain research development. Vogel's (2012) framework on capacity building emphasises that genuine research growth depends on coordinated investment at the individual, institutional and system levels. Furthermore, interviewees described persistent bureaucratic procedures, limited access to international grants and heavy administrative workloads. These issues align with Chankseliani's (2023) observation that much of the Global South's visible research output relies on external donors rather than national systems, which underscores the importance of strengthening domestic research ecosystems.

These patterns, when considered together, reveal the difficult trade-off between ambition and capability. Azerbaijan's commitment to international engagement is clear, yet its internationalisation efforts are met with inherent difficulties within a resource-limited setting. As Altbach and Knight (2007) and Hudzik (2015) argue, internationalisation must be viewed as a process of situated adjustment rather than mere replication. By illustrating how ranking-focused strategies can both promote and obstruct institutional growth, the Azerbaijani experience offers a valuable data point for the wider discussion on developing more responsive and capacity-aligned internationalisation models.

Implications and Conclusion

These preliminary findings underline the need for a shift from symbolic compliance toward meaningful capacity building. Policymakers should establish coherent strategies that align international aspirations with domestic realities, setting realistic timelines and designing ethical incentive structures that reward research quality rather than output volume. Universities require dedicated funding, training in academic writing and ethics and support for developing English proficiency and research infrastructure. International partners, in turn, should focus on collaborative models that strengthen local ecosystems rather than reproduce dependency.

The Azerbaijani case illustrates a broader dilemma across the Global South, where borrowed reforms risk overshadowing context-specific needs. By grounding internationalisation in sustainable institutional development rather than in ranking performance, higher education systems can pursue global engagement that is both ethical and equitable. These early findings contribute to ongoing debates on the future of internationalisation and set the stage for a more extensive doctoral analysis that will explore these dynamics across multiple institutional and policy levels.

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

The author declares that Grammarly AI was used to assist with language editing and proofreading. The use was limited to improving clarity and consistency. All ideas, analyses and interpretations are original and derived from the author’s own research.

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Contact email: ljabbarzade2@sheffield.ac.uk

"How Did This Weed Get Into Our Garden?" Explorations and Connections Between Nature and Digital

Camilla Maria Aviles, University of Modena and Reggio Emilia, Italy
Eléna Sofia Paoli, Reggio Children Foundation, Italy

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Abstract

In outdoor learning, children have the opportunity to make visible their curiosities, interests, glances, but also to demonstrate specific skills and creativity in providing hypotheses and finding solutions. Nevertheless, education in nature is not to be considered in opposition to media education, as both are characterised by their "ecological" aims in promoting balance and awareness, both in the biosphere and in culture, triggering a possible dialogue between technology and nature. This contribution highlights the results of a didactic and educational pathway, aimed at the study of spontaneous plants in a school garden, with the objective of problematising the concept of "nature," co-designed with the Reggio Children Foundation and the teachers of the primary school "M.M. Boiardo, I.C. Einstein" in Reggio Emilia, Italy. Qualitative analysis of the collected data shows how direct experiences with the natural environment and the use of digital technologies offer possibilities for meaningful learning, which can facilitate, support and promote understanding and knowledge construction. The experience also returns an image of a competent, capable, curious child, who asks legitimate questions, seeks answers, makes attempts, exercises the right to make mistakes. The research offers reflective insights to promote a critical and aware approach to technology, combining it with a projectual and effective use of outdoor and indoor environments, in order to create a continuous connection between contexts and knowledge that encourages different modes, tools and languages in learning processes.

Keywords: outdoor education, media education, Reggio Emilia approach, learning environment, media ecology

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Introduction

In recent years, pedagogical reflection has increasingly raised the urgent question of integrating direct experience with the natural environment and the conscious use of digital technologies in educational contexts. On the one hand, outdoor education experiences have promoted active teaching as opposed to traditional, frontal, and factual teaching methods; on the other hand, school is seen as the main educational setting where media education can be implemented with the aim of promoting conscious, critical, and responsible use of new media. Often, experiences in nature and the use and exploration of digital technologies are kept separate in children's daily lives because they are interpreted as opposites, with different codes and languages. However, it is believed that dialogue between media and outdoor education, according to an ecological approach, can create a potential synergy capable of promoting meaningful learning, the development of cognitive and relational skills, and the construction of knowledge through the intertwining and multiplication of languages. Within this framework, the educational experience discussed in this paper is situated. The aim of this study is to analyze how outdoor experiences in unstructured school spaces, the use of digital tools, and analog practices, working in synergy, can contribute to the construction of knowledge about the natural world, support collaborative dynamics, and promote an active and competent role for both adults and children in learning processes. Furthermore, the study examines how these practices can create a dialogue between external and internal learning environments, encouraging the use of diverse methods, tools, and languages to explore and understand the world.

Theoretical Framework

The Reggio Emilia approach is the project's primary theoretical reference point. This educational philosophy, developed from the thought of Loris Malaguzzi in Reggio Emilia (Italy), is based on the idea of the child as rich in potential, strong, powerful and competent. The Reggio pedagogy places the child at the centre—someone confident in building relationships, aware of their own values, respectful of others, and driven by curiosity and openness toward all possibilities. Children are encouraged to develop their own theories about the world and to explore them collaboratively. Through dialogue and discussion, self-confidence and self-image are nurtured, while creativity "emerges from multiple experiences, coupled with the well-supported development of personal resources, including a sense of freedom to venture beyond the known" (Edwards et al., 2012).

Two central ideas emerged within the Reggio approach: the *hundred languages* of children and the *atelier*, deeply interconnected, these concepts capture the essence of Reggio philosophy. Through the notion of the hundred languages, Malaguzzi acknowledged the countless ways children understand the world and express their thoughts and theories and he urged adults to appreciate and give equal importance to all forms of expression and communication. The *atelier*, often referred to as the studio, workshop, or laboratory, is described as "the place of what is possible," the place for creative thinking, research and discovery (Vecchi, 2012). Within the atelier, children explore a wide range of skills and techniques, such as drawing, painting, clay modeling, using information and communications technology, and musical expression, it is here that they develop theories and re-present their ideas through symbolic, expressive, and communicative languages. For adults, the atelier serves as a space to observe and understand the many ways children express themselves, where educators create and reflect on documentation that makes children's learning processes visible, supporting both teaching and ongoing inquiry. *Documentation* is not seen as a final summary of a completed project, but rather as a continuous record of the learning process and a tool for anticipating and planning

future learning experiences. Reflecting on and sharing documentation with colleagues allows educators to gain multiple perspectives and interpretations, enriching their understanding and supporting the collective process of knowledge building.

The Reggio Emilia philosophy is grounded in reciprocal relationships that value the opinions, perspectives, and interpretations of others, emphasizing the importance of adults and children learning together. The collaboration between educators, pedagogist, *atelierista*, parents, and children is highly valued and actively supported, with the concept of the learning group playing a key role in the approach (Giudici et al., 2001). The concept of relationship extends beyond human interaction to include relationships with the environment, materials, and the wider community. The environment is so significant that it is often described as “the third educator” along with the team of two teachers. Classrooms are filled with natural and recycled materials designed to provoke exploration, imagination, and creativity. These materials encourage inquiry and discovery rather than predetermined activities, highlighting the dynamic interaction between children, their surroundings, and the resources they engage with.

In the Reggio approach, the affordances of digital media (Forman, 2012) are explored in terms of how technology can enhance a children’s ability to document, reflect on, and communicate their "visible learning." Rather than viewing technology as a predetermined tool, digital media's capabilities are seen as enabling children to construct dynamic mental representations of their different ideas and experiences, connecting them to both the real and the possible.

A further remarkable trait of Reggio Emilia educators is their approach to the natural world, which provides children with an integration of self and nature. The outdoor space encourages interaction with the plurality of languages used by children and adults, offering them specific ways to explore and learn about themselves. The relationship with the natural environment intertwines opportunities for research and discovery of new meanings inside and outside the school, making teachers and children more attentive and sensitive to an ecological perspective that connects the micro to the macro, promoting intertwining and connections between children, their society and all living creatures.

Outdoor education (hereinafter also referred to as OE) is, in fact, the second theoretical axis on which the design of this experience is based. Practising active outdoor teaching is an important pedagogical choice that many schools have decided to adopt in order to counteract the traditional, predominantly frontal and notional teaching method, which suffers from “nature deficit disorder” (Louv, 2005) and it can be considered an obstacle in moving towards a more sustainable future. OE therefore presents itself as a concrete response to the growing phenomenon of “indoorisation,” understood as an increase in the amount of time children spend indoors (Bortolotti, 2019).

OE is based on the idea that exposure to the outdoor environment promotes learning about oneself, others and one’s relationship with nature. This approach can become an important vehicle for sustainability education, recognising its potential in developing environmental awareness and citizenship. As Priest (1986) states, through direct outdoor experience, individuals learn “their relationship with the natural environment, the relationships between various concepts of natural ecosystems, and personal relationships with others and with their inner selves.” This approach therefore allows for integral growth that intertwines cognitive, social, and emotional dimensions. OE also stimulates practical and multisensory learning that values children’s different cognitive styles, promoting motivation, involvement and autonomy in decision-making related to environmental issues. According to Johnson & Johnson (2002),

the OE context promotes "positive social interactions and social skills" through the use of active methodologies, such as cooperative learning and the sharing of personal experiences, which generate social interdependence and common goals. International research confirms the positive effects of outdoor learning: Jordan and Chawla (2019) highlight that contact with nature improves students' cognitive, social and emotional skills, with benefits varying according to age, gender, background or socio-economic disadvantage. Numerous studies also emphasise the role of OE in promoting the inclusion of all pupils, including those with special educational needs and migrant backgrounds (Schenetti, 2022). Experiential outdoor learning promotes the co-construction of knowledge, placing students and teachers in a dialogical and equal relationship, where the child takes on an active and participatory role, in line with the Reggio Emilia approach.

Education in nature is often perceived as an increasingly pressing need in contemporary society due to the spread of the media and, therefore, as a need to re-establish a direct relationship with nature in order to counteract the pervasiveness and increasingly frequent and early use of media in the world of childhood. However, digital technologies cannot be considered the main cause of this "nature deficit disorder"; rather, it is necessary to analyse the uses and habits promoted within society. In this sense, media education (hereinafter ME) is proposed as an educational and teaching activity aimed at developing a critical and creative understanding of the media, based on a theoretical-practical and an operational-integrated level (Cambi, 2023). ME is therefore seen as: "education *with* the media, considered as tools to be used in general educational processes; education *about* the media, which refers to a critical understanding of the media, understood not only as tools but also as language and culture; education *for* the media, aimed at training professionals" (https://www.medmediaeducation.it/). Schools cannot and must not shy away from this additional educational task as privileged places of education and training.

Ravanelli and Ceretti (2017) link Freire's pedagogical thinking with the new educational challenges posed by the digital age and emphasize the importance of adequate media literacy for the emancipation of the "digitally oppressed," understood as those who, despite living in a hyper-connected society, do not possess the cultural and critical tools to exploit the opportunities offered by the digital world, remaining excluded from processes of emancipation and participation. Therefore, media literacy is not limited to teaching technical skills, but must promote multidimensional competence that includes cognitive, ethical, and social aspects. Teachers must therefore become mediators and facilitators, capable of sharing students' digital environments and guiding them in a process of critical awareness. In this sense, Freire inspires us to see digital technology as an opportunity to design a more equitable, participatory, and dialogical "media humanity."

As Cambi (2023) argues, every medium is a cognitive, emotional, and communicative resource and, consequently, an educational one. It structures languages, promotes forms of experience, and reveals forms of the world. However, considering these tools as a value/resource and as a risk are two parallel and necessary options in the critical consciousness of the educator, who must know the medium, its power, and the consequences of its overexposure. Through an analysis of their content and forms, it becomes possible to master the risks and enhance the opportunities. This dual attentive and critical perspective promotes "ecology," therefore both the ME approach and that of media ecology (recalling the thinking of Postman, 1981) prove to be valuable. The concept of ecology leads us to reflect on the pluralism of media that inhabit a rich and diverse environment of languages that intertwine with other languages and other mindsets, in which it is necessary to strive for balance and dialogue between them. Postman's

thinking suggests a possible dialogue between ME and OE in attributing a homeostatic function to schools in order to find that altered balance within today's culture, in which technologies seem to play a predominant role to which purely human functions and actions are delegated. Reflecting on the relationship between technology and nature in teaching means promoting a more careful and conscious use of technologies and thus reinforcing critical thinking and divergent thinking in children. But it also means promoting greater mastery, in which the machine becomes a tool whose structure and functions children learn about and which becomes useful for achieving educational and training objectives (Di Bari, 2023).

A Case Study

The experience analyzed involved the "Boairdo" primary school, part of the "Einstein" comprehensive institute, located in a semi-peripheral area of the city of Reggio Emilia, close to the countryside, in a recently constructed building with large indoor and outdoor learning spaces. From an educational point of view, the school adopts a predominantly traditional methodology and does not formally adhere to the Reggio Emilia approach. The multicultural context is a significant factor, as the school welcomes pupils from migrant families, with a variety of languages, histories, and cultural references. The project involved 32 fourth-grade students, divided into two class groups, including one child with special educational needs. The teaching team consisted of three teachers and one educator, who worked in parallel classes, sharing lesson planning and some activities. The wealth of international backgrounds (Croatia, Poland, Ukraine, Albania, Romania, Germany, Egypt, Morocco, India) provided fertile ground for listening and intercultural enrichment in the project activities and in experimenting with inclusive forms of communication and collaboration. The initiative was designed by the Reggio Children Foundation as part of the ministerial program "Scuola Futura," dedicated to educational innovation and training for Italian school staff. The "Boiardo" school took part in a joint project with four other primary schools in the city of Reggio Emilia, which shared the same methodological framework and research topic. The meetings were co-designed by a multidisciplinary team of teachers, workshop leaders and PhD students who differentiated the research focus, practices and contexts related to the specific architectural characteristics and spatial possibilities of each school. The overall objective of the project is to help develop a critical ecological awareness in children and teachers, moving beyond an anthropocentric perspective in favour of a systemic approach, focusing on the importance of caring for the ecosystem and recognising its crucial role for the future of all forms of life, not just humanity. The specific educational and teaching objectives are: to develop STEM skills through interaction with complex natural systems; to use digital technologies to explore the relational networks among living organisms and understand their dynamics and interconnections; to build a collaborative environment based on listening, cooperation, and inclusion. The project included a total of twenty hours of activities, distributed and organized into two weekly sessions over the course of one month.

Building on the students' questions and curiosities, the project focused on the study of the plants in the school courtyard, with particular attention to the origin, provenance, and distribution of the species that had grown spontaneously in the outdoor environment. Each session began with an introductory assembly aimed at revisiting the insights and outcomes of the previous meeting and at presenting the day's objectives, guided by the children's interests, prior knowledge, and proposed activities. Following this initial phase of dialogue and exchange, the students were divided into small groups to conduct explorations and research activities. Upon completion, each group shared and presented their findings and experiences to the entire class, fostering collective reflection and discussion. The project was structured to

alternate and integrate outdoor and indoor observation activities, employing both digital and traditional tools for documentation, data collection, hypothesis formulation, and verification.

The *atelieriste* involved in the project set up three distinct learning environments in the area adjacent to the classrooms, each designed to support different phases and objectives of the work. The first environment was organized to facilitate exploration through both analog and digital tools, including graphic materials, open-ended and natural materials for initial discussions, illustrated books and botanical sheets, photographs and evocative images, as well as documentation instruments. The second environment was designed to support dialogue and the presentation of materials to the larger group. This space, in addition to offering soft seating and flexible furniture arrangements, included a documentation wall created by the children—a space where they could leave useful notes for the progress of their research, such as drawings, keywords, questions, curiosities, observations, hypotheses, and suggestions for the neighboring class. The third environment was dedicated to the archiving and display of materials produced by the small groups. Within this space, each group could independently access the resources and artifacts they had collected and developed, enabling them to continue their research work in an autonomous and organized manner.

Methodology

The study employed an action research case study methodology, providing a descriptive and interpretative analysis of the educational project implemented within the specific school context previously outlined, aimed at assessing the possibility of introducing changes that promote improvement. This methodological approach is grounded in qualitative research principles, seeking to analyze and comprehend a specific phenomenon in its full complexity and to trace the developmental processes that characterize it. The phenomenon is examined holistically within its natural context, incorporating not only an observational phase but also the implementation of an intervention designed to foster reflective practice and transformation (Ricchiardi, 2022).

To collect data, self-assessment questionnaires for students and teachers were used, along with the children's analog and digital artifacts and the adults' documentation, which included written observations, photographs, and video recordings. The self-assessment questionnaire was administered in written form at the conclusion of the project and included the following six open-ended questions: what have you learned during this "path"? What and who helped you learn? What was most enjoyable? What was most difficult? What worked best and what worked least in your group? Write down one thing you discovered about plants that particularly surprised you.

Subsequently, the collected data were analyzed and organized into three main thematic areas: tools that facilitate the construction of knowledge; collaboration within the group; the role of the adult.

Results

The notes taken during the dialogues with the children, together with the observation of their initial work on the topic under investigation, allowed the team of educators to identify a noticeable discrepancy between the students' mnemonic learning of prestructured content and their actual understanding of basic concepts related to natural elements familiar to their everyday experiences. The introduction of multiple expressive languages—textual, symbolic,

video-photographic, digital applications for creating audio and video content, spatial arrangements, oral exchanges, and others—highlighted the need to dedicate specific moments for reflection. These reflective phases aimed first to identify the children's initial questions and uncertainties, and later to support the formalization of new knowledge. This process of formalization, carried out through diverse media and transdisciplinary communicative forms, enabled the children to maintain a meaningful connection between the content and its representation. The children's effort to make their learning visible and shareable fostered the creation of new images, imaginaries, and concepts linked to their lived experiences, thereby disrupting repetitive and compartmentalized ways of organizing knowledge.

First Thematic Area: Tools That Facilitate the Construction of Knowledge

Regarding the factors that contributed to their learning, the children highlighted the importance of "going outside": direct experience, exploring, and closely observing plants were actions that supported the generation of questions and the formulation of hypotheses. Another element that facilitated learning was the use of digital tools, which allowed the children to deepen their scientific knowledge and organize multimedia forms of communication to convey what they had learned. These tools included plant identification apps, a digital microscope for close observation of plants, tablets for photographing and filming natural elements, as well as for creating and editing videos to represent plant movements. Traditional and digital whiteboards, projectors, and light tables were also employed to support the representation and communication of knowledge.

At the same time, it emerged that analog tools—such as books, magnifying glasses, experiments, drawings, and written materials—also provided significant support. These tools were selected by the children to accompany and guide their research and to construct their work products. Below are some excerpts from the students' responses to the self-assessment questionnaires:

"It helped me learn through technological tools, books, and the fact that we could go outside."

"I learned by looking at books, doing research on the tablet, and also from my groupmates."

"The tablet and its apps helped me a lot, but of course also Elena, Francesca, and Camilla."

"I learned thanks to the flying leaf experiments."

"An app called PlantNet helped me learn."

"Learning was helped by using the computer and the digital pen."

"The tools provided to us, such as the microscope, magnifying glass, and other equipment, were also very helpful."

"Books, the tablet, and the projects we carried out helped me learn."

"Books, Google, and apps helped me learn."

Second Thematic Area: Collaboration Within the Group

The children's responses clearly highlight the importance of small-group work in facilitating and promoting the exchange of knowledge. Collaboration was identified as a key factor in the effectiveness of group work, enabling the successful achievement of the project's objectives.

"Collaboration within the group helped me. The most enjoyable part was being in a group that supported me when I made mistakes and helped me learn."

An additional positive aspect identified was the sense of well-being, enjoyment, and satisfaction derived from collaborating and being together during the work process.

"It was enjoyable to be all together and also to work in a group."

"Collaboration and having fun worked best."

"The most enjoyable part was working with my group and then sharing everything with the others at the end."

"It was enjoyable to collaborate with the group."

Some students highlighted that even in the presence of conflicts, the group was still able to reach agreements. There was a clear awareness of the challenges in task division and of the importance of teacher mediation. This underscores that group organization needs to be actively developed and that the group's actions and decisions require continuous practice and guidance from an adult.

"Collaboration worked well, while dividing the tasks worked less well."

"Organization worked less well, and collaboration worked better."

"Collaboration worked well. Deciding who would do certain tasks did not work very well."

"In my group, the most difficult part was deciding how to make the posters because one person said it wasn't right and another said it was. The thing that worked best was collaboration, because even when we argued, we were still in agreement."

The teachers also positively highlighted the importance of the group in carrying out the activities, while acknowledging the challenges mentioned above, which they learn to manage together with the children. The teachers mentioned:

> Initially, it was not easy to coordinate the children within the group. Over time, however, I noticed that both the children and I learned to listen to each other and to divide the work calmly and collaboratively. Adult guidance remained necessary. I observed that the children were able to collaborate effectively and to use tools that they had never previously employed in a group for educational purposes. They demonstrated proficiency in using tablets correctly and also improved their presentation skills during whole-group discussions.

> There is not a specific new skill I learned, but I feel that I have improved in observing children while they work in groups, particularly in supporting them to reach agreements and make decisions about their tasks.
>
> I also learned that groups can accomplish tasks that initially seem very difficult. The children continually surprise, providing a wealth of ideas and energy. It initially seemed challenging to see the children work in a large group without pre-assigned roles from the teachers. Yet, each child contributed their skills and potential, feeling like an important part of the group's work.

Third Thematic Area: The Role of the Adult

In their responses, the children highlighted how adults serve as a point of reference when they encounter difficulties during activities or in organizing the group. Adults are recognized as facilitators of learning, helping the children to better understand the subject-specific content and to resolve conflicts or mediate within the group.

"The group worked well thanks to all the help from the teachers and specialists; they helped us a lot to get organized."

"Francesca, Elena, and Camilla helped me learn; they helped me a lot."

"The specialists who knew more about plants helped me, as did the digital pen along with the tablet and computer."

From the adults' observations and documentation throughout the project, it emerged that the children needed support and guidance during their initial interactions with technology (tablet, computer, digital microscope, apps). In particular, the adults provided groups with the type of digital tools most appropriate to the specific projects and to support the different characteristics of the ongoing research. There was never a case of complete autonomous use of technology; rather, it was evident that the children required the presence of an adult as a facilitator at various stages of creating their work products. When technical difficulties arose, the adult encouraged the children to explore alternative ways of using the tools to achieve the different project objectives.

Discussion

As educators and teachers, we are aware that providing quality media education does not mean denying the use of digital tools, but rather promoting alternation, self-regulation, and guided support, as suggested by Tisseron (2016). At the same time, engaging in outdoor education does not mean ignoring indoor spaces or undervaluing indoor practices; rather, it represents an approach aimed at establishing a fruitful dialogue between what happens indoors and what can take place outdoors. Our experience shows that bringing nature into the classroom enables exploratory research practices to occur even in indoor spaces through the use of technology. Similarly, bringing digital tools outdoors can be an effective choice to support and facilitate children's explorations and research. In their indoor and outdoor research activities, students exchange thoughts and knowledge about the plants they observe, formulate questions, and collaboratively construct hypotheses, which they then attempt to verify using various tools and methods. By alternating between digital and analog tools, they demonstrate that both are important and necessary for building their competencies. One form of tool or representation

does not exclude the other; rather, they complement each other and enhance learning potential during the knowledge construction process.

It can also be argued that multimediality is not an exclusive prerogative of digital technologies, but rather a possible approach to engaging with the complexity of experiencing the world. Multisensory exploration of a natural environment activates communicative and sensory stimuli, promoting the intertwining of different disciplinary areas that are otherwise formally and conceptually separated in the classroom. In this context, digital tools allow us to collect and capture materials, images, sounds, and other environmental cues, transforming them into resources available for further investigation and study within the school environment. Various applications and tools enable groups to formulate initial questions that guide their research and to develop and shape preliminary theories and hypotheses about what they have observed and collected. The adult's role is to identify these elements and connections, document them, and propose follow-up activities, promoting moments of joint reflection with the children in which materials and observations become opportunities for co-constructing knowledge and designing study and research pathways. Maintaining a systemic and heuristic approach in observational practice naturally leads to perceiving the indoor and outdoor environments as complementary and interdependent elements in the learning process, continuously interacting and in dialogue with one another. This perspective cannot exclude the planning of connections between indoor and outdoor spaces, between analog and digital tools, allowing the "outside" to be brought into the classroom and vice versa, while encouraging the use of different methods, tools, and languages to explore and understand the world. The role of the adult in accompanying children is fundamental for several reasons. On one hand, there is a need for a competent adult who accompanies the children in their explorations, engaging in research alongside them and being aware of the opportunities and affordances that the environment offers. On the other hand, it is essential that the adult is also skilled in using the tools and, above all, in their role as an educator, guiding children in the use of media while listening and supporting them. Physical presence alone does not necessarily translate into an educational stance. True accompaniment consists of the educational presence of the adult—a presence that provides opportunities for reflection, includes active listening, and maintains focused attention. To truly accompany, one must be fully present; merely being there is not enough (Gallese et al., 2025).

Last but not least, the dialogue between media education and outdoor education can also be analyzed from an ecological perspective, with the aim of educating children to care for themselves, others, and the planet, thereby fostering a sense of "global citizenship." Integrating media education with nature-based education promotes a more conscious, critical, and creative use of technology while encouraging an authentic relationship with nature. This educational dialogue contributes to the development of practices of reflection, collaboration, listening, and sharing, which can translate into a broader care for the world, oriented toward respect for the planet and all its inhabitants. From this perspective, it aligns with the objectives of the 2030 Agenda for Sustainable Development, where the concepts of cultivating humanity and promoting global citizenship emphasize the importance of environmental respect and the construction of authentic human relationships.

Conclusion

The experience described demonstrates that the integration of outdoor education and media education within an ecological and systemic approach represents a fruitful pedagogical perspective for promoting meaningful, cooperative, and sustainable learning. The interplay between direct experiences in the natural environment, digital tools, and analog practices

fostered the creation of a pluralistic and dialogic learning environment, where different languages connect and mutually enhance one another, generating processes of shared and participatory knowledge. The findings highlight that the relationships among children, adults, the environment, and technologies are never neutral, but are strongly influenced by educational choices, the quality of mediation, and the pedagogical awareness of teachers. In this sense, the adult assumes the role of a reflective and competent mediator, capable of supporting children's exploration, autonomy, and collaboration, promoting a critical, creative, and responsible use of digital media, while simultaneously providing opportunities to explore and utilize diverse expressive and communicative languages.

From a theoretical and methodological standpoint, the research confirms the need to overcome traditional dichotomies—between indoor and outdoor spaces, nature and technology, analog and digital tools—in order to outline an educational paradigm based on interconnection, balance, and complementarity, working with emergent phenomena through a continuous dialectic of reflection and extension. This perspective values the ecological dimension of learning and recognizes the importance of educating for conscious citizenship, fostering care for oneself, others, and the environment. Although the study is grounded in a specific context, the experience provides practical insights and reflections for contemporary educational design, suggesting the potential for a continuous dialogue between media education and outdoor education as a privileged pathway for developing innovative, inclusive, and sustainability-oriented teaching practices. Nevertheless, further empirical and comparative research is needed to systematically explore the effects of such integrations across different school levels and socio-cultural contexts, as well as to investigate the professional competencies required of teachers to effectively support this dialogue.

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

The authors declare that no AI or AI-assisted technologies have been used to generate, refine, or correct the content in the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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Contact emails: camillamaria.aviles@unimore.it
e.paoli@frchildren.org

Appraising the Use of Organisational "Soft Skills" in the Application of Method and Process Techniques: An Educational Case Study Approach

Stephen G. Barker, Cranfield University, United Kingdom
Kieran Holling, Cranfield University, United Kingdom

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Abstract

The application of new ideas, methods and process techniques to product and service development projects can be challenging for a number of reasons. These include the inherent complexity of the problem situation, the assumptions being made, the level of resource available, an over-reliance on past experience and knowledge, and a difficulty in scaling application of the concept in question to the problem situation or project construct. These difficulties can then hinder the effectiveness of the application, leading to either undesirable emergent properties or even in extreme cases, project failure. Research has indicated that a possible contributory factor in experiencing such difficulties is that organisational "soft skills" are not taken into account sufficiently when planning and implementing the use of concepts. Such skills include knowledge and experience of participants in applying the concepts, the involvement of necessary stakeholders, the "psychological safety" of project participants and the creation of an organisational culture conducive to supporting the use of new and more exploratory techniques. This paper considers ongoing research into this area and provides a case study approach demonstrating the application of an example method to gauge the potential effectiveness of considering organisational "soft skill" factors upon improving application and implementation of concepts. Conclusions will be drawn, and the andragogical implications will then be considered in order to identify a means of enhancing existing educational practice in the teaching of methods, techniques and processes. Recommendations will be made suggesting how these improvements can be realised in an educational context.

Keywords: soft skills, andragogy, organisational practice

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Introduction

As organisational behaviour and practice has grown in complexity, so the focus on organisational "soft skills" and the benefits which they may offer in terms of improvements in knowledge, expertise, and application of ideas and approaches to business situations has increased significantly. Factors such as increases in capability, or introduction of new technologies such as Artificial Intelligence (AI) have led to the need for enhanced abilities in areas such as more in-depth reflective thinking about problems and potential resolutions, better and clearer communication between colleagues and stakeholders, the ability to hold "tough conversations" between individuals, cross-domain working, and providing effective leadership and management to others. This requires a well-thought-out strategy encompassing a broad understanding of issues and problem situations. It requires tact, diplomacy, an understanding of how to motivate others and how to communicate, lead and manage in challenging organisational environments.

"Soft Skills" are defined as "people's abilities to communicate with each other and work well together" (Cambridge Online Dictionary, 2025a) or "personal attributes that enable someone to interact effectively and harmoniously with other people" (Google Dictionary, 2025). These ideas revolve around notions of good inter-personal skills, treating people fairly and equitably, being able to work well in groups and across different organisational boundaries, and to be able to provide clear and incisive leadership. Skills core to the aforementioned factors include the ability to perceive the nature of problems and communicate the essence of the situation alongside a clear and credible way toward a meaningful and viable solution. There are various categorisations of "soft skills"; The National Careers Service, for example, lists communication and work with others, make decisions, organise yourself at work, and adapt to difficult situations (National Careers Service, 2025) as being core soft skills, whilst VirtualSpeech lists "Communication, teamwork, adaptability, problem-solving, leadership, work ethic, and time management" (VirtualSpeech, 2025) as the seven key soft skills valued by employers. The job search service Indeed list 10 valuable soft skills as being "Communication, teamwork, problem-solving, dependability, critical thinking, positive attitude, organization, creativity, adaptability, conflict resolution" (Indeed, 2025), and a search of Wikipedia reveals "critical thinking, problem solving, public speaking, professional writing, teamwork, digital literacy, leadership, professional attitude, work ethic, career management and intercultural fluency" listed as soft skills (Wikipedia, 2025). The above brief search identifies a degree of variance amongst sources as to the definition of important soft skills, but there are noticeable commonalities in definition, with adaptability, communication, decision-making, leadership, problem-solving, and teamwork being amongst their number. For the purposes of defining "soft skills" for this paper, a consolidated list taken from the above and other anecdotal sources is listed at table 1. These skills will be examined to judge their importance and how they have been applied within the organisational context, and this paper will then consider how an andragogical praxeology can be developed to both demonstrate the importance of "soft skills" in improving practice within the workplace, and how such skills can be taught and successfully inculcated. This will be demonstrated through the use of an education case study which illustrates how students can assimilate and apply soft skills, considering factors such as learning style (Barker, 2014, 2021), educational outcomes (Armstrong, 2010), and educational track (IfATE, 2024; UK Government, 2025). Finally, conclusions will be drawn as to the key lessons learned from this study.

Table 1
Organisational "Soft Skills"

	Organisational "Soft Skill"	Definition
1.	Facilitating Others	- Empowering and motivating others - Providing management of situations - Encouraging and advising
2.	Team-working	- Valuing the contribution, perspectives and views of others - Contributing to a team ethic - Collaborating in a fair and equitable manner with others
3.	Communication and Leadership	- Imparting knowledge and experience to help others - Decision-making - Providing direction - Defining goals and targets - Adapting to change - Providing equitable resolutions to conflict - Managing expectations of stakeholders
4.	Critical Thinking	- Problem-solving - Understanding all aspects of a situation - Providing justification and rationale - Underpinning leadership decisions
5.	Psychological Safety	- Creating a safe space for others to air views - Making others feel valued and included - Instilling a culture positively and "without fear"

The Importance of "Soft Skills"

If the content of table 1 is examined, it can be seen that much of "soft skills" is dependent upon how we communicate with others. This will affect how others perceive and experience information being generated by a wider team, or being provided to them in a facilitation, management and/or leadership context. As such the mode of communication – verbal, written – will have effect on how information is understood and processed. Moreover, the way in which information is communicated can have a significant bearing on how information is understood and perceived. Research has shown that factors such as body language, tone of voice, and choice of wording – either oral or written – can affect how an individual will react to communication from others. Body language has been shown to play a major part in how people impart and receive information (Patel, 2014), and that where body language is perceived to be hostile can affect how information is perceived emotionally (Uzun, 2020) and this can lead to information not being fully comprehended. Likewise, the tone of language has been demonstrated to affect how people react to information (Roche et al., 2015), insofar that well-phrased encouragement can lead to confidence and empowerment, whilst negatively phrased information can intimidate individuals (Lepore & Stone, 2018). In a similar way, choice of words either verbal or written can affect how information is delivered and perceived (Wheeler, 2011), with well-chosen wording having a beneficial effect on comprehension and understanding (Long, 2024) and perhaps even on the willingness of an individual to participate more effectively in necessary project activities. Effective communication can therefore be seen to play a major part in the ability to lead, manage, facilitate, and work in teams.

A further important "soft skill" is critical thinking. This is defined as: "the process of thinking carefully about a subject or idea, without allowing feelings or opinions to affect you" (Cambridge Online Dictionary, 2025a) and is held to encompass "the art of making clear, reasoned judgements based on interpreting, understanding, applying and synthesising evidence gathered from observation, reading and experimentation" (Burns & Sinfield, 2016). This by necessity includes the ability to perceive the totality of a problem situation or need, reason as to any issues, constraints, conflicts and/or risks, and move to the identification of a well evaluated solution whilst being able to provide associated justification and rationale. The benefits of being able to think critically include control over one's own knowledge, and possibly also empathy for the viewpoints of other people (Raj et al., 2022). This can be seen as being essential to the ability to fully grasp the nature of a task or problem, and when combined with the qualities of good communication explored above is an important "soft skill" in conveying the essence of what needs to be done to individuals in a way which is readily comprehensible and achievable.

Whilst activities such as voicing new ideas, contributing to continuous improvement, and contributing to organizational learning generally may be increasingly encouraged by organisations, Newman et al. (2017) point out that such activities might carry a risk to individuals. New ideas might not be well received, or might turn out not to work. This might in turn lead to a fear of negative consequences for speaking out. Thus the idea of psychological safety, sensitively introduced and managed, is important in that if individuals feel that they are free to suggest ideas without consequence they are likely to feel more encouraged to participate, engage and innovate, and trust in leadership is likely to be increased (Siyal, 2023).

"Soft Skills" and Organisational Context

Many of the ideas discussed in the previous section can be applied directly into the context of organisational business, process and activity. Table 2 highlights some key organisational activities and how they align to the "soft skills" discussed above. It can be seen that these skills will need to be applied across the length and breadth of an organisation, from high-level executive strategic planning entailing holistic understanding of the marketplace, potential business opportunities and current and future organisational problem situations, to the planning and participation in functional teams and project-based activities. It is worth noting that the "soft skills" required will be essentially similar in name, but different in detail as different situations and circumstances will occur across teams, domains and projects at different times; Even projects concerned with developing similar products or services are likely to be resourced, structured, financed and led in different ways dependent on factors such as urgency, customer, and budget. As such the "soft skills" needed will have to be carefully thought about and tailored to suit the circumstances.

In addition, careful thought must be given to how people are managed as individuals. Different people respond better to individual leadership styles (Dulewicz & Higgs, 2005; Kesting et al., 2015) and each have their own preferred learning style (Fry et al., 2009; Honey & Mumford, 1982). Careful consideration must therefore be given to how people can be motivated (Kanfer, 1990; Maslow, 1943), and thought must be given to the best method of training or education within the work organisation (Goldstein, 1980) to allow people to prosper both as individuals and team members. An essential part of this is the notion of psychological safety, as if people do not feel comfortable and safe/secure in the workplace then they are unlikely to thrive and produce of their best work (Frazier & Tupper, 2018; Xu et al., 2022).

Table 2
Organisational Activities and Relevant "Soft Skills"

	Organisational activity	Relevant "Soft Skill"
1.	Executive-level decision-making	- Critical thinking - Communication and Leadership
2.	Project Management	- Critical thinking - Communication and Leadership - Team-working - Facilitating others
3.	Systems Engineering	- Critical thinking - Communication and Leadership - Team-working - Facilitating others
4.	Requirements Engineering/Management	- Communication and Leadership - Team-working - Facilitating others
5.	Lifecycle Management	- Critical thinking - Communication and Leadership
6.	Testing and Acceptance	- Critical thinking - Communication and Leadership - Team-working
7.	Team Management	- Critical thinking - Communication and Leadership - Team-working - Facilitating others - Psychological Safety
8.	Hierarchical and Domain-level leadership	- Critical thinking - Communication and Leadership - Team-working - Facilitating others - Psychological Safety
9.	Personal Development	- Critical thinking - Communication and Leadership - Facilitating others - Psychological Safety
10.	Identifying new business opportunities	- Critical thinking - Communication and Leadership

Andragogical Aspects of "Soft Skills": Towards a Teaching and Learning Strategy

From an andragogical perspective, there are several factors which need to be considered when creating a strategy to facilitate understanding and utilisation of "soft skills" in a project or organisational context and some of these are listed below:

1. The essence of "soft skills" and how they lend themselves to being taught
2. The educational track of students, either apprenticeship or taught MSc
3. The learning preferences of students, both individually and as a cohort
4. The various teaching methods and techniques available to demonstrate and inculcate the worth and benefits of "soft skills" within organisational practice
5. The structure of the course or module in which "soft skills" are to be covered

These factors will now be discussed in turn so that an initial strategy can be suggested.

The Essence of "Soft Skills"

The nature of "Soft Skills" is that they can be defined, but need to be adapted and tailored to suit the circumstance in which they are intended for use. As such, although "soft skills" can be described and case studies can be provided to demonstrate their use in context, careful thought and critical thinking skills are necessary to understand how and when they should be used because every instance of organisational practice within context is at least subtly different. It is therefore necessary to first explain with examples the nature of "soft skills" before demonstrating how critical thinking approaches – themselves a "soft skill" – can be used to understand and determine how those skills can be applied. This must be combined with practical exercises and/or group workshops to allow students to test different ideas in realistic contexts to gain experience of using "soft skills" and comprehend the benefits which such skills offer.

The Educational Track of Students

Cranfield University's Systems Engineering MSc course has accepted two kinds of student; taught MSc students, and level 7 apprentices. Taught students study is guided by course and module structure and assessment plan, which is in turn guided by the course's intended learning outcomes (ILOs). These need to be appropriately worded in order to facilitate learning progression at a rate that fully supports comprehension (Armstrong, 2010) of potentially complex ideas such as "soft skills". Apprentices' study encompasses both the taught MSc and accumulation of evidence to meet the knowledge, skills and behaviour (KSB) criteria set out by the relevant apprenticeship standard (Skills England, 2022). The andragogical strategy adopted must therefore cater to both ILOs and KSBs, and the teaching methods selected must meet the learning needs of both students and apprentices.

The Learning Preferences of Students

Every individual tends to learn in different ways (Barker, 2014; Honey & Mumford, 1982). Some people prefer individual study whilst others thrive in a team atmosphere. Certain individuals like well-structured slides to act as a handrail to their understanding, whilst others get more out of open discussion and/or group workshops. In most cases, a combination of different teaching methods and techniques is best to stimulate learning. As such it is extremely important that the correct combination of learning strategies and teaching methods is employed to allow full understanding of the intricacies of "soft skills" whilst giving students the best opportunity to practice their application.

Teaching Methods and Techniques

There are a great variety of teaching methods available (Fry et al., 2009). These range from formal lectures, case studies, individual and group exercises, workshops, to formative and summative assessment by means of techniques such as individual and group presentations, portfolios, and reflective assignments. The nature of "soft skills" is such that a means must be devised to explain what they are perhaps through lecture and case study, and then demonstrate their application through example, before allowing practice of practical application via first individual exercise, then group workshop, and reflective assignment.

The Structure of the Course

In order to facilitate the above ideas, it is essential that the course and module structure should facilitate the understanding and facilitation of "soft skills". This is perhaps best done via a cross-cutting "theme" running through each of the modules comprising the course. Early modules can explain the concept of "soft skills" before later modules introduce case studies and gradually notions of "soft skills" are considered "automatically", being embedded within the wider learning approach. Later modules should then focus on allowing opportunity for practical application within a variety of organisational contexts to inculcate knowledge and experience of how "soft skills" can be beneficial to organisational practice.

The following section will now describe an educational case study which takes the above points into consideration and evaluates how students were able to apply "soft skills" in a simulated organisational practice scenario.

Appraising the Use of "Soft Skills": An Educational Case Study

Following a review of the structure and content of Cranfield University's Systems Engineering MSc and Apprenticeship, the course team concluded that the addition of a capstone practical module at the end of the taught phase of the course would be beneficial in that it would allow students to put into practice the skills and knowledge learned during their studies. The intent was to provide a realistic real-world problem and form the students into project teams to analyse the situation, understand the nature of problem, clarify the need, and implement a lifecycle development process to craft requirements – both user and system – and derive logical and physical architecture against them. This would allow each project team to recommend solution options, down select to a preferred option, and then demonstrate how it would fulfil requirements, and be tested and accepted into use.

This task required the application of systems engineering knowledge and expertise, but would also serve to demonstrate the extent to which the student project teams would be able – or not – to apply "soft skills" to improve cohesion and direction at a team level whilst allowing individuals to get the most out of the experience.

The teaching of "soft skills" was included across the course modules in a manner aligned to suggestions in the previous section, with the initial modules discussing system concepts such as holism, viability, hierarchy and abstraction, and entropy as an aid to critical thinking, with demonstrations as to how this would benefit systems engineering in the organisational workplace. Subsequent modules focused upon multi-analyst problem solving and team working through group exercises and workshops, whilst assessments, both individual and group, encouraged reflective thinking focusing on analysis, evaluation, and the provision of justification and rationale. Modelling techniques were taught to accurately represent organisational problem situations and potential solutions, and how this benefitted communication and stakeholder understanding was demonstrated through case studies, group working and reflective discussion. Ideas around leadership and motivation were introduced across the course, and the need for psychological safety was emphasised in order to bring about a sense of inclusion and high-quality analytical decision making.

This was followed by the capstone module at the culmination of the second year of taught study. The module was structured such that the student project teams were briefed on the nature of the problem situation and given lists of assumptions and constraints which would apply to

their work. They were provided with a handrail in the form of a set of structured tasks and suggested timings, but for the duration of the module, the work was self-directed by the student project teams. Each team was advised to think about how they organised themselves with regard to undertaking of the specified tasks. Staff members then role-played the parts of customer, supplier and project advisor, and could be called upon by the student project teams as they thought necessary.

The students were requested to keep a reflective journal in which they were asked to consider progress, communication, team ethic, and to note any issues which they perceived with the project team they were assigned to. The summative assessment was via portfolio focusing on practice and work produced with a wrap-around narrative describing decision-making, iteration of practice, and use of "soft skills" along with the perceived benefit of doing so. At the end of the module, feedback was sought to judge how students believed they had succeeded at the tasks, and whether or not they had enjoyed – and could see benefit in – the experience.

Case Study Feedback

The outcome of the capstone module demonstrated that students had understood the need for clarity of leadership in a constructive way, and there was agreement within the project teams that all members were working effectively together. Encouragingly, most teams tried using different techniques throughout the module to evaluate which was best for communication of ideas and fostering understanding across different stakeholder groups. Most of the teams were able to justify their decision making and demonstrate how they had used ideas and techniques collaboratively to improve teamwork. In particular, several students commented directly that attempts had been made to create "safe working environments" in terms of freedom of discussion and respect of each other's views, and that this had benefited team ethic and made the experience more inclusive and enjoyable. Although some degree of guidance was necessary, students appeared to have conceptualised the need for soft skills and had developed an instinct and understanding of how they should be used.

The overall student feedback from the simulated team-work project in the capstone module was encouraging in that it was highly positive. Students reported that:

1. The experience was valuable in implementing ideas
2. It was enjoyable and productive
3. There were clear takeaways in terms of behavioural knowledge

When asked to comment specifically on the use of "soft skills" in their work, any of the students noted that the combination of "soft" and "hard" skills was clearly important and helped with aspects such as:

1. Communicating ideas and decisions
2. Improving "togetherness" as a team….
3. ….and it made people "feel more positive"

When asked about any issues or problems which might have occurred, responses suggested that initially application of "soft skills" had been a matter of trial and error, and that there had been difficult moments with people suppressing their natural tendencies to allow others to air their views and perspectives, and to respect the right of others to hold different views. The feedback suggested that this had been a very iterative step-by-step process, but most students indicated that it had been worthwhile and had benefitted totality of understanding and had aided inter-team communication greatly.

Conclusions and Further Work

The main conclusions that can be taken from this approach to understanding how "soft skills" can be educated via a mix of taught and practical andragogical means were as follows:

1. The case study, taken from wider course planning, demonstrated that facets of knowledge which promote "soft skills" can be taught and demonstrated through various andragogical means
2. However, this must be augmented by experience and practice in "real world" context in order to successfully utilise soft skills
3. The capstone module gave students a view into how this might work, but this was limited due to the nature of the educational construct

The embedding of teaching about "soft skills" as a cross-cutting theme appeared to successfully raise student awareness of the importance of the topic, and use of workshops throughout the modules gave the ability to practice and hone techniques. This served as good preparation for capstone module, where student feedback illustrated that they perceived significant benefit in focusing upon such ideas and techniques. Students suggested that the keeping of a reflective journal had helped them to understand their own practice as well as providing insight into team ethics and group work.

On the whole, outcomes from this approach are very encouraging, but they can be continually developed, and ideas for further work are listed below:

1. Continue to develop the ideas to explore further ways of educating people in the concept of "soft skills"
2. Potentially offering a "reinforcement event" six months after students return to their workspace to discuss application of "soft skills"

The Systems Engineering MSc course team at Cranfield University will include these ideas in subsequent course reviews to continue to develop and improve the course offering, and assess the feasibility of new ideas to improve the understanding and education of "soft skills".

Author's Note

DAS: No new data was created or analysed in this study. Data sharing is not applicable to this article.

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From Textbook to Talkbot: A Case Study of a Greek-Language RAG-Based Chatbot in Higher Education

Maria Eleni Koutsiaki, International Hellenic University, Greece
Marina Delianidi, International Hellenic University, Greece
Chaido Mizeli, International Hellenic University, Greece
Konstantinos Diamantaras, International Hellenic University, Greece
Iraklis Grigoropoulos, International Hellenic University, Greece
Nikolaos Koutlianos, Aristotle University of Thessaloniki, Greece

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Abstract

The integration of AI chatbots into educational settings has opened new pathways for transforming teaching and learning, offering enhanced support to both educators and learners. This study investigates the design and application of an AI chatbot as an educational tool in higher education. The chatbot was developed utilizing instructional materials from the course Family Psychology offered by the Department of Early Childhood Education and Care at the International Hellenic University, in conjunction with curricular resources from Sports Medicine courses by the School of Physical Education and Sport Science at the Aristotle University of Thessaloniki. Designed to operate in the Greek language, the chatbot addresses linguistic challenges unique to Greek while delivering accurate, context-grounded support aligned with the curriculum. The AI chatbot is built on the Retrieval Augmented Generation (RAG) framework by grounding its responses in specific course content. RAG architecture significantly enhances the chatbot's reliability by providing accurate, context-aware responses while mitigating common challenges associated with large language models (LLMs), such as hallucinations and misinformation. The AI chatbot serves a dual purpose: it enables students to access accurate, on-demand academic support, and assists educators in the rapid creation of relevant educational materials. This dual functionality promotes learner autonomy and streamlines the instructional design process. The study aims to evaluate the effectiveness, reliability, and perceived usability of RAG-based chatbots in higher education, exploring their potential to enhance educational practices and outcomes as well as supporting the broader adoption of AI technologies in language-specific educational contexts. Findings from this research are expected to contribute to the emerging field of AI-driven education by demonstrating how intelligent systems can be effectively aligned with pedagogical goals.

Keywords: artificial intelligence, Large Language Models (LLMs), chatbot, retrieval augmented generation (RAG), artificial intelligence in education, higher education

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Introduction

Artificial intelligence (AI) has demonstrated significant potential for application across diverse domains of knowledge. In contemporary education, AI can serve as a flexible tool for designing and developing educational material, enhancing learner engagement through interactive experiences, and supporting the assessment and evaluation of student performance (Wang et al., 2024). Among the various real-world applications of AI, digital assistants—commonly referred to as chatbots—have emerged as one of the most widely adopted and practically impactful forms.

The integration of AI-powered chatbots into educational contexts has introduced new opportunities for transforming teaching and learning practices. These systems provide enhanced support for both educators and learners, enabling more personalized, responsive, and efficient educational experiences. According to Gupta (2020), chatbots can be classified into three primary categories based on their underlying technologies, employed algorithms, and user interface design:

1. **Menu/Button-Based Chatbots**, which offer users a predefined set of options and direct them to responses corresponding to their selections.
2. **Keyword Recognition-Based Chatbots**, which identify specific words or phrases within a user's input and generate relevant responses accordingly.
3. **Contextual Chatbots**, which interpret not only the literal meaning of a user's message but also their underlying intent, purpose, or emotional state. These chatbots maintain conversational histories, allowing them to learn continuously and refine their interactions over time. As a result, their responses increasingly approximate natural human communication.

The incorporation of chatbots into educational environments has proven to be particularly beneficial, offering diverse applications that support both teaching and learning processes. As noted by Kasneci et al. (2023), chatbots are utilized across multiple educational levels—including primary, secondary, and higher education—as well as in special education, lifelong learning, and vocational training.

As pedagogical tools, chatbots offer a broad spectrum of functionalities, as discussed by Kasneci et al. (2023) and Wang et al. (2024). They can act as digital assistants to improve reading and writing proficiency through automated correction of spelling, grammatical, and syntactical errors. They serve as always-available learning companions, providing immediate assistance and continuous feedback. Moreover, chatbots can foster critical thinking by generating questions and problem-solving tasks, facilitate practice through quiz generation, and assist learners in organizing and managing their academic workload. Additionally, they hold particular promise for supporting learners with disabilities by delivering adaptive written or spoken language responses and personalized instructional assistance.

This study examines the design and implementation of an AI chatbot developed as an educational tool within higher education contexts. The chatbot is built upon the Retrieval-Augmented Generation (RAG) framework, which grounds the system's responses in domain-specific course materials. By integrating retrieval-based components with generative language modeling, the RAG architecture enhances response reliability and contextual accuracy while mitigating common challenges associated with Large Language Models (LLMs), such as hallucinations and misinformation.

The RAG framework optimizes the output of pre-trained LLMs by incorporating external knowledge sources through document retrieval. This process enables the model to extend its internal knowledge base and generate more accurate, contextually grounded responses (Lewis et al., 2020). Specifically, by dynamically retrieving relevant information, the RAG architecture effectively reduces the limitations of LLMs and minimizes the probability of generating false or unsupported statements (Arslan et al., 2024).

The architecture comprises three core components: information retrieval, response generation, and model optimization. Each RAG system includes:

a) the Retriever, which accepts user queries, converts them into vector embeddings, and identifies the most relevant documents or text passages within a database based on similarity metrics, and
b) the Generator, typically a sequence-to-sequence transformer model (e.g., BART - Bidirectional and Auto-Regressive Transformers or T5 - Text-to-Text Transfer Transformer), which synthesizes responses by integrating the retrieved passages with the user's query.

A critical element of the RAG workflow is embedding creation and indexing, where documents are segmented into smaller textual units (chunks) and transformed into high-dimensional vector embeddings stored in a vector database. During inference, the user's query is similarly embedded and compared to indexed chunks to retrieve semantically related content. Importantly, RAG-based systems can undergo continuous learning, allowing iterative improvement of both the retriever and generator components (Dimitrova, 2025; Lewis et al., 2020).

Implementing such systems in the Greek language presents additional Natural Language Processing (NLP) challenges due to the language's rich morphology, flexible syntactic structure, and inflectional complexity (Papantoniou & Tzitzikas, 2020). These linguistic characteristics complicate text segmentation and chunking processes compared to English, underscoring the need for tailored approaches adapted to the Greek linguistic context.

Accordingly, this study seeks to evaluate the effectiveness, reliability, and perceived usability of RAG-based chatbots in higher education, focusing on how different chunking methods and retrieval depths (Top-K values) affect system performance by setting three evaluation criteria: content accuracy, completeness, clarity. The research explores these parameters across two disciplinary domains—Family Psychology and Sports Medicine—to assess how varying content complexity and corpus characteristics influence response quality.

The findings aim to contribute to the emerging field of AI-enhanced education by demonstrating how intelligent retrieval-augmented systems can support teaching and learning processes, particularly in linguistically complex environments. The research questions guiding this investigation are as follows:

RQ 1. Which chunking model among fixed-size και delimiter-aware Chunking Methods for RAG achieves the highest overall performance within the RAG-based chatbot?
RQ 2. For each model, which of the three evaluation criteria (content accuracy, completeness, clarity) represents its strongest aspect?

Methodology

Chatbot Design and RAG Architecture

The primary objective of the chatbot developed in this study was to investigate the application of AI-powered conversational agents in higher education contexts. Specifically, the system was implemented using a RAG architecture designed to ground the chatbot's responses in course-specific content. This implementation also facilitated the evaluation of various text chunking strategies to identify the configuration that yields the most accurate and complete responses based on three evaluation criteria:

1. **Content Accuracy:** Assesses whether the chatbot's response directly addresses the user's query, provides factually correct and contextually grounded information, and avoids factual or logical errors.
2. **Completeness:** Evaluates the extent to which the response fully covers all aspects of the query without omitting relevant information.
3. **Clarity:** Examines the coherence and readability of the response, including the logical organization of ideas and ease of comprehension for the user.

For the purposes of this study, six distinct chunking strategies were implemented to segment the input text into discrete units ("chunks"). The effectiveness of each strategy was assessed to determine its impact on response quality according to the aforementioned criteria. The method employed for text chunking is a critical determinant of the overall performance of RAG-based systems, as it directly influences both the retrieval accuracy and the contextual coherence of the generated responses. Poorly designed chunking approaches can therefore degrade system functionality by impeding the efficient linkage between information retrieval and response generation.The chatbot system followed the standard RAG pipeline architecture, comprising two main components: a **retriever** and a **generator**.

For the retrieval stage, a vector-based semantic search method utilizing cosine similarity was employed to identify the most relevant text chunks. Document embeddings were generated using the *"dimitriz/st-greek-media-bert-base-uncased"* sentence transformer model, selected for its proficiency in processing the Greek language and capturing semantic relationships in Greek academic texts. The retrieved text segments were then provided as input to the generator component, implemented using the **Gemini Flash 2.0** large language model. This model synthesized the final responses by integrating the user query with the retrieved passages, ensuring both semantic coherence and contextual fidelity.

This architecture enabled a controlled and consistent evaluation of the different chunking strategies under uniform retrieval and generation conditions, thereby providing a robust framework for assessing the impact of text segmentation methods on RAG-based chatbot performance.

Chunking Strategies (Six Models)

As mentioned above, we implemented six distinct chunking strategies, grouped into two functions - character-based splitting and paragraph-based splitting.

The first applied function *(split_text_into_chunks)* splits the input text into chunks based on a specified maximum length of characters. Its parameters include the *input text* and the maximum length limit *max_len = [parameter value].* The function preserves sentence integrity, ensuring

that sentences are not split into chunks. The output is a list of text segments - chunks. This function was applied to four variants (Models 1–4), each corresponding to a different *max_len parameter value* = 200, 400, 500, and 800. These configurations produced different chunks sizes.

The second case involved dividing the text into paragraphs with two options:

1. using the function *split_text_into_paragraphs_using_sentences(text*) - Model 5, which first splits the text into individual sentences and then groups them into paragraphs by combining a fixed number of sentences per paragraph.
2. using the function *split_text_into_paragraphs_newline(text)* - Model 6, which preserves the original paragraph structure by using blank line separators as boundaries. Given the varying lengths of paragraphs, this method maintains the natural diversity found in the source text.

Table 1
Chunking Splitting Strategies

Model	Chunking splitting strategy	Parameter
Model 1	*split_text_into_chunks(text, max_len = [parameter value])*	200
Model 2	*split_text_into_chunks(text, max_len = [parameter value])*	400
Model 3	*split_text_into_chunks(text, max_len = [parameter value])*	500
Model 4	*split_text_into_chunks(text, max_len = [parameter value])*	800
Model 5	*split_text_into_paragraphs_using_sentences(text*)	3 sentences in a paragraph
Model 6	*split_text_into_paragraphs_newline(text)*	new line separator (`\n\n`)

Experiments

Following the development of the chatbot and the implementation of various chunking strategies, instructional materials from two academic courses—Family Psychology and Sports Medicine—were integrated into the system to initiate the experimental phase. Each domain was evaluated independently to identify potential variations in chatbot performance across distinct subject areas.

To assess the accuracy of the chatbot's responses relative to the course content, the human expert and in the same time the educator of both courses formulated five (5) domain-relevant questions, which were employed as prompt queries. For each question, the chatbot generated two distinct response versions. These responses were subsequently evaluated by the respective human experts using a five-point Likert scale, ranging from 1 (Poor) to 5 (Excellent), based on predefined assessment criteria.

In total, six (6) distinct clustering models, as previously described, were applied to each question, yielding twelve (12) chatbot responses per question. To ensure comparability, the same set of clustering strategies was employed consistently across both domains, with retrieval constrained to the Top-K = 20 most relevant chunks for each question. Given the larger corpus size and greater conceptual complexity of the Sports Medicine domain, additional experiments were conducted using an extended retrieval depth of Top-K = 50 to investigate the relationship between retrieval breadth and chunking performance.

Evaluation Criteria and Scoring

Based on the five-point Likert evaluation scale applied to each assessment criterion, the minimum possible total score for a response version across the three criteria was three (3), representing a poor response, whereas the maximum attainable score was fifteen (15), representing an excellent response. A response was classified as satisfactory if it achieved a cumulative score exceeding eight (8) points across all criteria. According to the expert's evaluation, performance varied notably across the different chunking models.

Moreover, discernible differences were also identified between the two response versions generated within the same model. The mean of the two scores was calculated and used for subsequent analysis. The results were then compared across models, questions, and evaluation criteria, with all three criteria assigned equal weighting. Descriptive statistical analysis was conducted using mean scores and visualizations to summarize the numerical data.

Domain-Specific Experimental Setup

The *Family Psychology* domain comprised a textbook consisting of four chapters of educational material in Greek, corresponding to the content taught in the respective university course. The total size of the associated PDF files was approximately 1.65 MB. In contrast, the *Sports Medicine* domain exhibited a substantially larger and denser dataset, with the total size of the Greek-language PDF files exceeding 6.5 MB.

The use of the Greek language introduces additional linguistic challenges. Specifically, *Sports Medicine* terminology is characterized by flexible word order, extensive morphological variation, and considerable variability in sentence and paragraph length. These linguistic properties result in a more diffuse distribution of relevant information across the text, thereby reducing the efficiency of shallow retrieval methods. Given these characteristics, the *Sports Medicine* domain was selected to examine the relationship between retrieval depth *(Top-K)* and document separation strategies. Accordingly, experimental evaluations in this domain were conducted under two retrieval configurations: *Top-K* = 20 and *Top-K* = 50.

Results

Answer to Research Question 1: For each model, which of the three evaluation criteria (content accuracy, completeness, clarity) represents its strongest aspect?

The results obtained from the two courses reveal notable variations in performance. In the case of the *Family Psychology* course, the analysis demonstrated significant differences among the six (6) chunking models across the three evaluation criteria, as well as distinct patterns of performance at the question level. Specifically, based on the overall average scores per model and per question, the findings indicated that each model exhibited unique performance characteristics across the evaluated criteria.

Among the three criteria, **Content Accuracy** achieved the highest average performance, followed by **Clarity** and **Completeness**, respectively. Moreover, **Model 5** (*split_text_into_paragraphs_using_sentences(text)*) consistently outperformed the others across all criteria, with **Models 4** (*max_len parameter value* = 800) and **Model 6** (*split_text_into_paragraphs_newline(text)*) ranking next in performance. As illustrated in

Figure 1, **Model 5** achieved the highest overall mean score (4.13), thereby demonstrating its superiority as the most effective chunking strategy within this experimental context.

Figure 1
Overall Performance of Chunking Models in Family Psychology (Top K = 20)

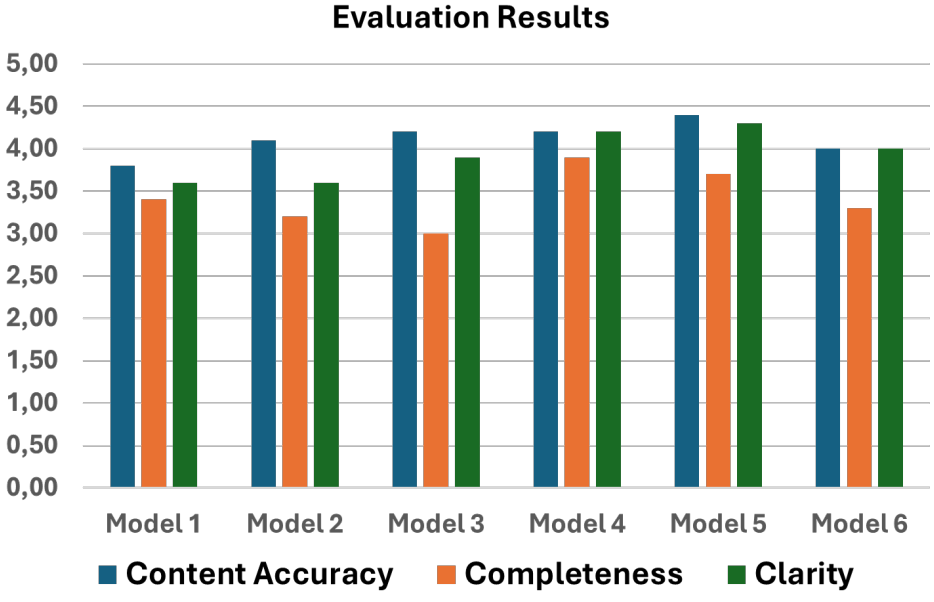
The total average score for all questions

Model 1	Model 2	Model 3	Model 4	**Model 5**	Model 6
3.60	3.63	3.70	4.10	**4.13**	3.77

To conduct a more detailed assessment of performance across evaluation criteria, notable variations were observed among the models. For **Content Accuracy**, **Model 5** achieved the highest mean score (4.40), demonstrating superior capability in generating factually accurate and contextually relevant responses. **Models 1** and **4** also exhibited strong performance in this criterion. With respect to **Completeness**, **Model 4**—configured with *fixed-length* segmentation using *800*-character chunks—obtained the highest score (3.90). This outcome suggests that employing larger chunk sizes facilitated more comprehensive coverage of the input questions. **Model 5** followed closely with a score of 3.70. In terms of **Clarity**, **Model 5** again outperformed the other configurations (4.30), with **Model 4** showing comparable results (4.20). These findings indicate that both segmentation strategies contributed to the generation of coherent and well-structured responses.

To provide a comparative overview, Figure 1 illustrates the average scores for **Content Accuracy, Completeness,** and **Clarity** across all models within the *Family Psychology* domain.

Figure 2
Average Scores of the Six Chunking Models Across Content Accuracy, Completeness, and Clarity in the Family Psychology Domain (Top K = 20)



As illustrated in Figure 2, certain models demonstrated clear strengths in specific criteria, which is further examined in the following section addressing Research Question 2.

Having established the performance patterns in the *Family Psychology* domain, the analysis was extended to the *Sports Medicine* domain to assess whether these patterns generalized in a more complex dataset. Following the methodology described above, we evaluated the performance of all six (2) chunking models in the *Sports Medicine* domain under two retrieval settings (*Top K = 20* and *Top K = 50*).

At *Top K = 20*, performance differences across models were modest, with a slight lead by *fixed-length, sentence-preserving* chunking (**Model 2**; average score 3.03), and **Clarity** tended to be the strongest criterion overall. This pattern suggests that shallow retrieval is sufficient to produce clear but not necessarily fully accurate or complete answers when dealing with complex technical content. Increasing the retrieval depth to *Top K = 50* resulted in a clear improvement in overall performance. The *newline-paragraph* model (**Model 6**) became dominant (average score 4.00). As shown in Figure 3, **Model 2** achieved the highest average score at *Top K = 20*, while **Model 6** performed best at *Top K = 50.*

Figure 3

Total Average Scores of the Six Chunking Models in the Sports Medicine Domain at Two Retrieval Depths (Top K = 20 and Top K = 50), Showing That Model 2 Performed Best at K = 20 and Model 6 at K = 50

The total average score for all questions

K = 20

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
2.87	**3.03**	2.50	2.67	2.93	2.97

K= 50

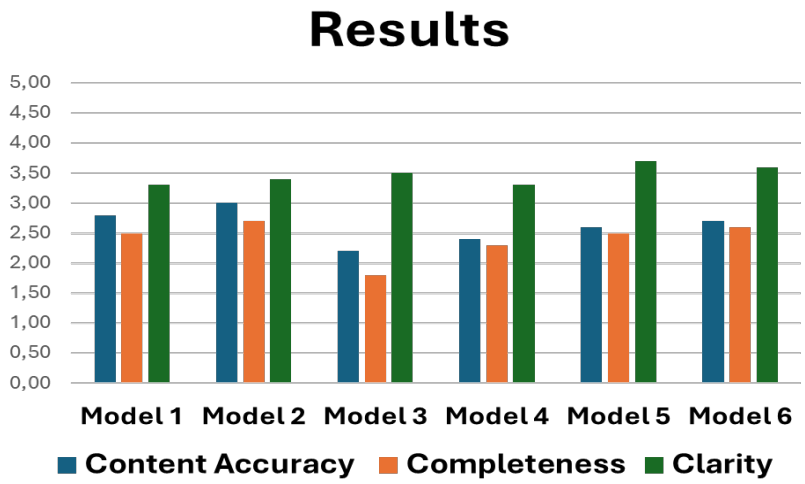
Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
3.57	3.30	3.50	3.47	3.17	**4.00**

Based on the criterion-level analysis at *Top K = 20*:

- **Clarity** consistently outperformed the other two criteria across all models.
- In terms of **Content Accuracy**, **Model 2** achieved the highest score, followed closely by **Models 1** and **6**, while **Model 3** demonstrated the lowest accuracy.
- For **Completeness**, scores were generally modest, with **Model 5** performing slightly better than the other models, whereas **Model 3** received the lowest completeness score.

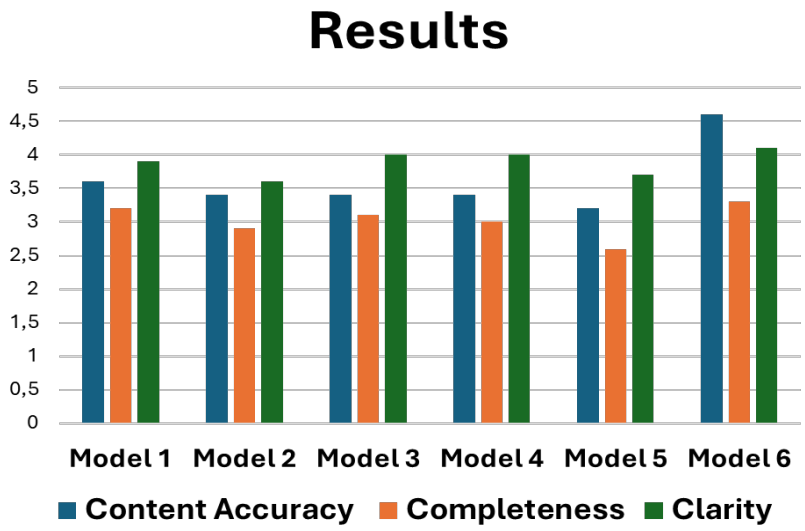
Clarity emerged as the strongest dimension overall, with **Model 5** obtaining the highest score, followed by **Model 4** and **Model 6**. This indicates that at shallow retrieval depth, most chunking strategies favored clear and well-structured responses rather than fully accurate or comprehensive ones. To provide a visual comparison of model performance across the three evaluation criteria at shallow retrieval depth, Figure 4 presents the average scores for **Content Accuracy, Completeness,** and **Clarity** at *Top K = 20*.

Figure 4
Average Scores of the Six Chunking Models Across Content Accuracy, Completeness, and Clarity in the Sports Medicine Domain (Top K = 20)



When the retrieval depth increased to *Top K = 50*, performance improved across all criteria. **Content Accuracy** showed a notable increase, with **Model 6** achieving the highest score (4.50), significantly outperforming the other models, followed by **Model 1** and **Model 3**. **Completeness** also improved, with **Model 6** and **Model 1** tying for the highest score, while **Model 4** remained the lowest. **Clarity** continued to be a strong criterion for most models, with **Model 5** achieving the highest clarity score, closely followed by **Models 6** and **2**. Unlike the *Top K = 20* condition, however, **Model 6** slightly surpassed **Clarity** in **Content Accuracy**, indicating that deeper retrieval enabled this model to integrate fine-grained evidence more effectively. These results highlight that increasing *Top K* amplifies the benefits of *paragraph-based* chunking strategies, leading to more accurate and informative responses. To examine the effect of deeper retrieval on model performance, Figure 5 illustrates the criterion-level scores at *Top K = 50*.

Figure 5
Average Scores of the Six Chunking Models Across Content Accuracy, Completeness, and Clarity in the Sports Medicine Domain (Top K = 50)



Answer to Research Question 2: For each model, which of the three evaluation criteria (content accuracy, completeness, clarity) represents its strongest aspect?

Regarding the strongest evaluation criterion for each chunking model in the *Family Psychology* course, the results showed a consistent pattern in favor of **Content Accuracy**. Specifically, **Models 1, 2,** and **3** demonstrated their highest performance in **Content Accuracy**. **Model 5** also achieved its strongest scores in **Content Accuracy**, with only a marginal difference from **Clarity**, while **Model 6** showed a nearly equal performance between **Content Accuracy** and **Clarity** but remained slightly higher in **Content Accuracy**. The only exception was **Model 4**, which performed best in **Clarity**, indicating that this chunking strategy facilitated more readable and well-structured responses even if **Accuracy** or **Completeness** were slightly lower.

Overall, five out of the six models **(Models 1, 2, 3, 5,** and **6)** showed **Content Accuracy** as their strongest criterion, suggesting that most chunking strategies supported accurate retrieval and generation more than **Clarity** or **Completeness**, while **Model 4** uniquely favored **Clarity**.

For the *Sports Medicine* course, the strongest evaluation criterion for each chunking model showed a highly consistent pattern in favor of **Clarity**. Specifically, **Models 1, 2, 3, 4** and **5** achieved their highest scores in **Clarity** at both retrieval depths (*Top K = 20* and *Top K = 50*), indicating that these chunking strategies supported well-structured and understandable responses even in a technical domain. **Model 6** exhibited a different behavior: at *Top K = 20*, its strongest criterion was also **Clarity** and at *Top K = 50,* **Content Accuracy** slightly surpassed **Clarity**. This suggests that deeper retrieval enabled this model to access and integrate complementary, fine-grained evidence distributed across multiple chunks, thereby producing more accurate responses.

Overall, for almost all models, **Clarity** was the strongest criterion, highlighting the importance of coherence and readability in technical content. Only **Model 6** at *Top K = 50* performed best in **Content Accuracy**, demonstrating that deeper retrieval can enhance accuracy when combined with paragraph-level chunking likely due to improved coverage of relevant information.

Conclusion

This study examined how different chunking strategies and retrieval depths influence the performance of a Greek-language RAG-based chatbot in higher education. The results clearly showed that response quality is not determined by a single model, but by the interaction between chunking and *Top K*. *Sentence-based* paragraphing **(Model 5)** worked best in expository content such as *Family Psychology*, while *paragraph-preserving* chunking **(Model 6)** combined with deeper retrieval (*Top K = 50*) achieved the highest accuracy in the denser and more technical *Sports Medicine* corpus. Based on a large corpus of Greek sports medicine texts in structured book format, the study shows that higher *Top K* values have a clear positive effect in domains with rich and complex content. Overall, the results show that chunking strategy and the choice of *Top K* are key factors for the performance of RAG-based chatbots, indicating that there is no universal configuration and that domain-aware optimization is essential.

From an educational perspective, the chatbot provided accurate, clear, and context-grounded responses aligned with course material, demonstrating its value as both a student support tool and an aid for educators in generating learning resources. Importantly, the study confirms that

RAG-based chatbots can operate effectively in linguistically complex languages such as Greek when supported by appropriate retrieval and segmentation strategies, contributing to more inclusive AI-enhanced learning environments.

Future work could explore adaptive retrieval mechanisms, integration with knowledge graphs, and real-world classroom deployment to evaluate long-term learning impact.

In general, findings support the potential of RAG-based chatbots to transform static educational content into interactive, pedagogically meaningful support. Future research will focus on testing the system in real higher education settings with both students and educators, as well as expanding the evaluation to additional domains. An important direction is to examine how different chunking strategies can be tailored to the characteristics of Greek-language academic texts, bringing theory and practice closer together. Taken together, these findings support the potential of RAG-based chatbots to transform static educational content into dynamic, pedagogically meaningful interaction in higher education.

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

The AI-assistive technology, ChatGPT, has been used for text improvement and proofreading the manuscript.

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Contact email: mariloukoutsi@gmail.com

The Right to Education in Angola: Observations From Teachers in Bocoio – City in the Province of Benguela, Angola

Dalva de Oliveira, Federal University of Pará, Brazil

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Abstract

This study analyzes key aspects observed during a meeting with primary school teachers held in January 2019, in Bocoio, Benguela province, Angola. Organized by OMUNGA, a non-governmental organization dedicated to promoting and protecting the rights of children and youth, the event sought to reflect on the difficulties reported by teachers, stimulate discussion, and support the development of effective educational actions. During the meeting, 47 teachers shared experiences and challenges related to the lack of continuing education, poor infrastructure, low salaries, food insecurity, and insufficient public policies to ensure school retention. Adopting a qualitative approach, the research draws on written records, teacher testimonies, and a critical analysis of public education policies. The theoretical framework is based on perspectives linking education and democracy, the notion of the subject as a holder of rights and knowledge, and the defense of education as a fundamental right. Although not conclusive, the findings reveal the urgency of implementing more effective and context-sensitive public policies that respond to teachers' realities. The study concludes that valuing teachers and actively listening to their lived experiences are essential to guaranteeing the right to education and promoting school continuity, especially in socially vulnerable contexts.

Keywords: education, public policy, school retention, teacher training, child rights

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Introduction

Education constitutes one of the fundamental pillars for the socioeconomic and cultural development of any country, with teacher training representing a central element in ensuring quality and equity within the educational process. In Angola, an African nation with vast territory and cultural diversity, education has faced historical challenges arising from long periods of colonization, war, and national reconstruction. Since independence in 1975, teacher training has become a strategic priority, given the decisive role of educators in promoting literacy, fundamental learning skills, and the preparation of critical and participatory citizens.

The Angolan education system currently serves a growing student population exceeding 9.6 million learners across all educational levels. This demographic expansion places constant pressure on the teaching workforce, which must be prepared to deal with large classes, diverse sociocultural contexts, and often limited pedagogical resources. Within this context, teacher training emerges not only as a process of acquiring technical and pedagogical knowledge but also as a tool for promoting educational equity—helping to reduce disparities between urban and rural regions, between more developed provinces and more peripheral municipalities.

Historically, teacher training in Angola has gone through distinct phases that reflect the country's political, economic, and social conditions. During the colonial period, access to formal education and teacher preparation was highly restricted, concentrated mainly in urban contexts and among specific social groups. Independence brought the urgent need to expand school coverage and to train a teaching body capable of serving a large and diverse student population. However, the effects of the civil war (1975–2002) posed significant obstacles, including the destruction of school infrastructure, scarcity of qualified teachers, and interruptions in the operation of teacher training institutions.

The reconstruction of the education system, initiated after the end of the armed conflict, involved the implementation of public policies and programs aimed at strengthening both initial and continuing teacher education. Among these measures, the creation and expansion of teacher training schools, technical and pedagogical training programs promoted by public and private universities, and international cooperation initiatives with organizations such as UNESCO, the World Bank, partner African countries, and various NGOs operating in Angola stand out. These efforts sought not only to increase the number of teachers but also to improve their qualifications, promote innovative teaching methodologies, and adapt curricula to local and national needs.

This analysis seeks to provide a comprehensive overview of teacher training in Angola, considering historical, structural, and statistical aspects, with particular emphasis on the province of Benguela and the municipality of Bocoio. These areas were selected because Benguela is a strategic province with a large student population and teacher training institutions, while Bocoio, an inland municipality, exemplifies the challenges faced in rural areas, including infrastructure limitations, reduced access to continuing education, and the scarcity of disaggregated official data.

The article adopts both qualitative and quantitative approaches, using recent national data on the teaching workforce, educational policies, and training programs, complemented by provincial and municipal information when available. The analysis includes indicators such as the number of teachers, student–teacher ratios, coverage of pedagogical training, in-service teacher development programs, as well as contextual factors affecting teaching quality. The

goal is to provide a solid foundation for public policy formulation, educational planning, and initiatives aimed at improving teacher education in Angola.

Furthermore, the paper emphasizes the importance of equity in teacher training, recognizing that teaching quality depends not only on the number of teachers but also on the adequacy of their preparation, the availability of pedagogical resources, and their capacity to work effectively in diverse contexts. Municipalities such as Bocoio exemplify the challenges faced in rural and inland areas, where school infrastructure is often insufficient, access to continuing training is limited, and teachers must cope with adverse socioeconomic conditions.

In summary, the introduction establishes the relevance of teacher education as a central element for educational development in Angola, situating the reader within the historical and current context of the national education system. The following analysis will address in detail the historical, structural, statistical, and territorial aspects of teacher training, offering a comprehensive overview that will serve as the basis for recommendations and policies aimed at improving educational quality across all regions of the country.

The inspiration for this study arose from a meeting with teachers organized by **OMUNGA**, a non-governmental organization dedicated to promoting and protecting the rights of children and youth. During the meeting, 47 teachers from the Province of Bocoio shared their experiences and challenges in teaching practice—such as the absence of continuing education, precarious school conditions, low salaries, food insecurity, and weak public policies to ensure student retention. The purpose of this reflection is to examine the difficulties reported during the meeting, foster further discussion, and contribute to the formulation of actions and solutions within the educational field.

Historical Overview of Teacher Training in Angola

The historical trajectory of teacher education in Angola reflects the profound social, political, and economic transformations experienced by the country throughout the 20th and early 21st centuries. Understanding this process is essential for contextualizing current challenges, the territorial distribution of teachers, and public policies aimed at teacher training—particularly in regions such as the province of Benguela and inland municipalities like Bocoio.

During the colonial period (until 1975), Angola was under Portuguese administration, and formal education was deeply influenced by an elitist and exclusionary logic. Access to schooling was limited, concentrated mainly in urban areas and among social groups closely connected to the colonial administration. Teacher training at that time was scarce and primarily aimed at meeting the needs of primary education, with few opportunities for advanced pedagogical qualification.

Colonial teacher training schools, known as *escolas de instrução primária* (primary education schools), were designed to prepare teachers with basic literacy and numeracy skills, without emphasis on critical pedagogy or modern teaching methodologies. The number of locally trained teachers was insufficient, making it necessary to recruit educators from Portugal or other colonies. In many cases, teaching was carried out by individuals without adequate training.

Moreover, colonial education sought to reinforce political and cultural domination, emphasizing content that consolidated a European worldview while ignoring or marginalizing

Angolan history and culture. This historical context left a legacy of shortages in qualified teachers and deep inequalities in access to education—especially in rural and inland areas such as Bocoio.

It became necessary to envision an educational proposal aligned with the aspirations of a newly independent and democratic nation. As Saviani (2021) explains:

> If members of the popular classes do not master cultural content, they cannot assert their interests, for they remain disarmed before the dominators, who use precisely such cultural content to legitimize and consolidate their domination […] the dominated cannot free themselves unless they master what the dominators master. Therefore, mastering what the dominators master is a condition for liberation. (p. 45)

Angola's independence, proclaimed on November 11, 1975, brought the immediate challenge of creating a national education system capable of serving a heterogeneous population and addressing the shortage of qualified teachers. The country faced severe gaps in teacher preparation, with few professionals trained to teach at primary, secondary, or technical levels. As Saviani (2021) notes:

> Systematized education, as a rule, is an activity directed toward the other: the other generation, the other social class, the other culture. It therefore presupposes a real heterogeneity and a possible homogeneity; an inequality at the starting point and an equality at the point of arrival. (p. 101)

The civil war, which lasted from 1975 to 2002, profoundly affected education and teacher training. School infrastructures were destroyed, teacher training institutions were disrupted, and the country experienced an exodus of qualified professionals, either through internal displacement or migration to neighboring countries. This scenario led to a severe shortage of teachers, especially in rural and peripheral areas, making it difficult to maintain educational quality and implement comprehensive teacher training policies.

During this period, the Angolan government undertook efforts to train new teachers, mainly through emergency short-term programs known as *reforço teachers* or *provisional teachers*, whose pedagogical qualification was limited. Although these measures allowed for the minimal functioning of the school system, they did not resolve the structural deficiencies of teacher training nor reduce regional disparities.

Educational Reforms and Teacher Training Policies

With the end of the civil war in 2002, Angola embarked on an intensive process of national reconstruction in which education and teacher training received strategic attention. The government implemented structural reforms aimed at expanding access to education, improving teaching quality, and strengthening teacher qualification. Key measures included:

1. Creation and Expansion of Teacher Training Schools: These institutions began offering initial training courses for primary and secondary school teachers to meet the demand for qualified professionals. Teacher training schools were established in both urban and rural areas, although distribution remains uneven.
2. Continuous Professional Development Programs: Public universities, NGOs, and international partnerships established in-service training programs focused on modern

teaching methodologies, educational assessment, and the integration of technology in learning.
3. Curriculum Review and Standardization: Efforts were made to harmonize teacher education, defining minimum competencies, standardizing undergraduate programs in education, and introducing supervised teaching internships.
4. International Cooperation: Organizations such as UNESCO, the World Bank, and several NGOs have played key roles by providing pedagogical resources, training teacher educators, and funding pilot programs in strategic regions.

Despite these advances, significant challenges persist, especially in rural and less urbanized regions. Municipalities such as Bocoio, in Benguela, still face limited school infrastructure, restricted access to continuous training, and a lack of reliable data on teachers and their qualifications. These challenges highlight the need for more targeted educational policies and sustained investment in teacher development and professional recognition.

Historical Legacy and Current Challenges

The historical path of teacher education in Angola leaves several key legacies for understanding the current situation:

- Regional Inequality: Teacher training is concentrated in urban and central provinces, while inland regions such as Bocoio face major barriers to professional development.
- Insufficient Qualification: A significant proportion of teachers—especially in rural schools—work without adequate pedagogical training, compromising teaching quality.
- Precarious Infrastructure: The destruction caused by the civil war and the slow reconstruction of schools continue to limit innovative pedagogical practices and the use of didactic resources.
- Need for Continuous Training: Curriculum reforms, demographic growth, and new educational demands require ongoing professional development programs, whose implementation remains uneven across the country.

In summary, teacher education in Angola results from a complex historical process marked by colonial constraints, the impacts of civil war, and recent reconstruction and qualification efforts. Understanding this panorama is essential for critically analyzing current challenges and opportunities in teacher training, especially in strategic provinces such as Benguela and in rural municipalities like Bocoio, which reflect the historical inequalities and limitations of the education system.

Current Structure of the Teacher Training System in Angola

Teacher education in Angola today is organized into different levels and modalities to meet the needs of the national education system. This structure reflects attempts to overcome historical gaps inherited from the colonial period and decades of civil conflict, as well as the need for ongoing qualification in response to demographic, technological, and pedagogical changes. Understanding this structure is key to assessing the adequacy of the teaching workforce, particularly in urban, provincial, and rural regions such as Benguela and Bocoio.

Initial teacher training in Angola is offered by various institutions, including teacher training schools (*escolas de magistério*), polytechnic institutes, and public and private universities. This stage prepares teachers for work at the primary, secondary, and technical-vocational levels.

Teacher training schools constitute the main pathway for preparing teachers for primary and lower secondary education. These institutions provide both pedagogical and disciplinary training, typically lasting from two to four years, depending on the desired qualification level. Curricula combine theoretical courses, pedagogical practice, and supervised internships in public schools, enabling future teachers to gain hands-on experience in real classroom contexts.

Geographically, most teacher training schools are concentrated in urban provinces and capitals such as Luanda and Benguela. Inland municipalities like Bocoio often depend on teachers trained in urban centers or on accelerated training programs, due to the scarcity of local higher education institutions.

Angolan universities, such as Agostinho Neto University, Katyavala Bwila University (Benguela), and several private institutions, offer undergraduate degrees in education designed to prepare teachers for secondary and higher education. These programs typically last four to five years and include pedagogical, methodological, and disciplinary components, enabling teachers to apply contemporary teaching methods in various subjects.

The expansion of higher education in Angola over the past two decades has increased the number of qualified teachers. However, challenges remain regarding training quality, university capacity to meet growing demand, and the adaptation of curricula to regional realities—particularly in inland municipalities.

Continuous teacher education is essential to maintaining teaching quality, allowing teachers to update their pedagogical skills, integrate new technologies, and improve their instructional methods. In Angola, continuing education is offered by universities, teacher training institutes, provincial education departments, and international organizations, targeting teachers already in service.

Programs include short-term courses, workshops, seminars, and specialization programs in areas such as mathematics, science, languages, and educational technologies. Despite these efforts, participation remains uneven, with teachers in rural and peripheral municipalities—such as Bocoio—often having limited access.

Moreover, the lack of disaggregated data makes it difficult to accurately assess the impact of these programs, although regional studies indicate that participation in continuing education is positively associated with improved teaching practices and student outcomes.

Responsibility for teacher education in Angola is shared among several actors:

- Ministry of Education (MINED): Defines national policies, plans, and guidelines for teacher training, regulates curricula, and oversees the implementation of both initial and continuing education programs.
- Universities and Polytechnic Institutes: Offer undergraduate and postgraduate programs in education, training teachers for secondary and technical-vocational levels.
- Teacher Training Schools: Focus on preparing teachers for primary and lower secondary education, combining pedagogical instruction, supervised school practice, and disciplinary content.
- International Organizations and NGOs: Contribute to continuing education by providing pedagogical resources, training educators, and implementing innovative projects, often targeting rural and low-infrastructure municipalities such as Bocoio.

Although Angola's teacher training system has expanded considerably since the end of the civil war, several challenges persist:

1. Territorial Inequality: The concentration of training institutions in urban centers limits access for prospective teachers from inland municipalities.
2. Quality versus Quantity: Increasing the number of teachers does not automatically ensure improved teaching quality, particularly when many still work with insufficient or outdated training.
3. Limited Infrastructure: Teacher training schools and universities often face shortages of laboratories, libraries, and technological resources, affecting both theoretical and practical training.
4. Insufficient Continuing Education: In-service teachers, especially in peripheral regions, have limited access to pedagogical development programs, hindering the adoption of innovative methodologies and adaptation to modern curricula.

Recent Perspectives and Initiatives

In recent years, the Angolan government has sought to promote greater equity and quality in teacher education. Key initiatives include:

- Expanding teacher training schools to inland provinces, including Benguela, to reduce reliance on urban centers.
- Implementing digital and methodological training programs to integrate technology into teaching and learning.
- Establishing international partnerships with UNESCO, UNICEF, and the World Bank to strengthen teacher education in priority areas, promote school inclusion, and enhance pedagogical capacity.

These actions reflect a growing recognition that teacher education is not merely an initial process but a continuous one—adaptable to curricular changes, student diversity, and regional specificities—serving as a cornerstone for improving educational quality across Angola.

Total Number of Teachers and Distribution by Education Level

According to data from MINED (2022), Angola has approximately 240,000 teachers across all educational levels. Their distribution is as follows:

- Primary Education: ~150,000 teachers (62.5%)
- Secondary Education: ~70,000 teachers (29%)
- Technical-Vocational and Higher Education: ~20,000 teachers (8.5%)

Primary education employs the majority of teachers, reflecting the national policy of universalizing basic education. However, this concentration also exposes challenges in pedagogical training, especially in rural and inland municipalities like Bocoio, where the number of qualified teachers per student remains lower than in urban centers.

Table 1
National and Regional Educational Indicators (Source: MINED, 2022)

Indicator	Angola (National)	Benguela (Province)	Bocoio (Municipality)
Total number of teachers	240,000	18,500	1,200
Teachers with full pedagogical training	68%	75%	52%
Student–teacher ratio (primary)	38:1	32:1	45:1
Annual coverage of continuing education	35%	40%	28%
Number of teacher training schools	12	3	0
Schools with ICT laboratories	42%	50%	18%

Student–Teacher Ratio

The student–teacher ratio is a critical indicator of teaching quality and system capacity. According to INE (2021):

- Primary Education: 41 students per teacher
- Secondary Education: 32 students per teacher
- Technical-Vocational Education**:** 25 students per teacher

Although gradual improvements have been recorded, ratios remain high, particularly in primary education within populous provinces such as Benguela. Inland municipalities like Bocoio face additional difficulties due to teacher shortages, limited infrastructure, and scarce access to continuing education programs.

Student–Teacher Ratio (Primary Education)

Figure 1
Number of Students per Teacher



Pedagogical Training Coverage

Pedagogical qualification remains one of the most important indicators of teacher quality. According to MINED (2022):

- Teachers with complete pedagogical training: 68%
- Teachers with partial or insufficient training: 20%
- Teachers without pedagogical training: 12%, concentrated mainly in rural or remote municipalities

These figures show significant progress since independence, when most teachers lacked formal qualifications. However, the challenge remains critical in inland municipalities such as Bocoio,

where many teachers still rely on emergency or accelerated training programs offered by teacher training schools and NGOs.

Regional Distribution and Inequalities

Teacher distribution in Angola reveals pronounced disparities between urban and rural areas and between central and peripheral provinces:

- Urban Provinces (e.g., Luanda, Benguela, Huambo): Concentrate around 60% of the total teaching workforce, with higher qualification levels.
- Rural and Inland Provinces (e.g., Bocoio, Cubal, Catumbela): Show lower teacher-to-student ratios and higher rates of underqualified teachers.

Figure 2

Percentage of Teachers With Complete Training (%)



Teacher Training in Benguela and Bocoio

In Benguela, the province is estimated to have approximately 18,000 teachers, with an average student–teacher ratio of 35 in primary education, slightly below the national average. In the municipality of Bocoio, however, the number of teachers is proportionally lower, with larger class sizes and additional challenges in continuous professional development.

According to data from the Ministry of Education (MINED) and reports from international organizations such as UNESCO (2021), approximately 35% of in-service teachers regularly participate in continuous professional development programs, including pedagogical updating, teaching methodologies, and the integration of educational technologies. However, this participation is concentrated in urban areas and central provinces, with much lower coverage in rural municipalities such as Bocoio.

Moreover, the availability of specializations and postgraduate programs for teachers remains limited, particularly outside provincial capitals, which restricts the possibilities for continuous professional growth in peripheral regions.

The following Table 2, based on data from MINED (2022), illustrates the main differences between Benguela and Bocoio:

Table 2
Comparative Overview of Educational Conditions in Benguela and Bocoio (2022)

Aspect	Benguela	Bocoio
Access to initial teacher training	Good (3 teacher training schools)	Limited (no local school)
Continuous training	Moderate (40% of teachers)	Low (28% of teachers)
School infrastructure	Good	Poor
Teacher retention	Medium	Low
Pedagogical methodologies	More modern	Traditional
Use of ICT	Medium–high	Low

Complementary Indicators

Other relevant indicators include:

- Average teacher age: 38 years, with most teachers between 30 and 45 years old.
- Gender distribution: 52% women and 48% men, showing a relatively balanced proportion, though disparities persist at technical and higher education levels.
- Teacher turnover: An estimated annual rate of 7%, due to retirements, transfers, and migration to the private or urban sectors.

These indicators complement the analysis of the teaching workforce, highlighting both the advances achieved and the structural challenges that affect teacher preparation and pedagogical performance.

In summary, statistical data indicate that Angola has made significant progress in expanding its teaching workforce and improving pedagogical training since the end of the civil war. Nevertheless, regional inequalities persist, especially in inland municipalities such as Bocoio, where the share of qualified teachers is lower and access to continuous training programs is limited. These disparities directly affect the quality of education and underscore the need for educational policies that prioritize teacher training, the expansion of teacher training schools in peripheral areas, and the use of educational technologies to overcome geographic and logistical barriers.

Teacher Training in Benguela and Bocoio

Analyzing teacher education at provincial and municipal levels allows for a more precise understanding of educational inequalities and the effectiveness of public policies. In this context, the province of Benguela and the municipality of Bocoio present distinct characteristics that reflect both historical progress and structural challenges. A detailed understanding of local conditions is essential for designing strategies for capacity building, teacher distribution, and continuous professional development.

Demographic and Educational Context of Benguela

Benguela is a strategic province in southern Angola, with an estimated population of 2.2 million inhabitants (INE, 2022). The educational sector of the province is relatively developed compared with other regions of the country, encompassing both urban and rural schools, universities, and teacher training institutions. The urban population density—particularly in Benguela City—facilitates the allocation of resources and access to both initial and continuing teacher education.

According to MINED (2022), Benguela has approximately 18,000 teachers, distributed by level of education as follows:

- Primary education: 11,500 teachers
- Secondary education: 5,500 teachers
- Technical, vocational, and higher education: 1,000 teachers

The average student–teacher ratio in the province is 35 at the primary level and 28 at the secondary level, both slightly below national averages. This indicates a relatively stronger presence of teachers compared with rural municipalities.

The province has teacher training schools and university campuses offering undergraduate degrees in education, preparing teachers for both primary and secondary levels. The main institutions include:

- Benguela Teacher Training School: Offers initial training programs for primary school teachers lasting two to three years, including supervised internships in both urban and rural schools.
- Katyavala Bwila University: Offers undergraduate and postgraduate programs in education, with emphasis on pedagogy, school administration, and subject-specific specializations.

Despite these opportunities, demand for initial training exceeds institutional capacity, especially in inland municipalities such as Bocoio, where many teachers must travel to Benguela City to complete their studies.

Educational Situation and Teacher Training in Bocoio

Bocoio is an inland municipality in Benguela province with an estimated population of 80,000 inhabitants (INE, 2022). Compared with Benguela City, Bocoio faces substantial challenges in teacher education:

- Number of teachers: Around 1,200 across all education levels, mostly in primary education.
- Student–teacher ratio: Approximately 45 students per teacher in primary education—higher than both provincial and national averages.
- Pedagogical qualification coverage: About 60% of teachers have full pedagogical training, 25% partial, and 15% none.

This situation highlights regional inequalities and the need for targeted policies to strengthen teacher education in inland municipalities. The lack of local teacher training schools and the need to travel to urban centers make access to both initial and continuing training difficult, perpetuating traditional and less innovative pedagogical practices.

Continuous professional development in Bocoio faces logistical and structural barriers. Programs offered by universities, NGOs, and the Ministry of Education have limited reach due to distance, inadequate technological resources, and transport difficulties. Regional data show that fewer than 30% of teachers regularly participate in pedagogical updating courses, compared to 40–50% in urban areas of the province.

Main challenges include:

1. Limited access to training programs: Teachers must travel long distances to attend courses, increasing costs and reducing participation.
2. Insufficient pedagogical resources: Schools lack laboratories, libraries, and educational technologies, making the adoption of modern methodologies difficult.
3. Shortage of qualified trainers: Few specialized trainers are available to work in rural areas, limiting the effectiveness of professional development programs.

Despite these challenges, there are opportunities to strengthen teacher training in Benguela and Bocoio:

- Expansion of teacher training schools and local training centers: Creating training hubs in municipalities like Bocoio would reduce dependence on larger cities and expand access to initial training.
- Integration of educational technologies: Online and distance learning programs can extend access to continuous professional development without requiring frequent travel.
- Incentive and teacher appreciation programs: Financial incentives, scholarships, and professional recognition can help attract and retain qualified teachers in rural areas.
- Partnerships with NGOs and international institutions: Cooperative projects can provide resources, trainer capacity building, and technical support for local professional development initiatives.

Challenges and Prospects for Teacher Training in Angola

Teacher education in Angola is central to building a high-quality education system. Although the country has made significant progress since independence and the post-civil war period, structural, regional, and pedagogical challenges continue to impact the effectiveness of both initial and continuing teacher training. Based on national data and analyses of provinces such as Benguela and municipalities like Bocoio, the main constraints and future strategies can be identified.

Territorial inequality remains one of the most critical challenges. While urban centers such as Benguela City concentrate teacher training schools, universities, and continuing education programs, inland municipalities like Bocoio face serious gaps:

1. Limited access to initial training: The absence of local teacher training institutions forces candidates to travel long distances, increasing personal costs and reducing the number of qualified teachers available for rural schools.
2. High student–teacher ratios: Inland municipalities face overcrowded classrooms—such as Bocoio's 45:1 ratio in primary education—reducing teaching quality and limiting individualized instruction.
3. Uneven distribution of qualified teachers: The concentration of fully trained teachers in urban areas deepens educational disparities and undermines equity in access to quality education.

In addition to structural inequalities, teacher education faces pedagogical challenges related to quality and skills updating:

1. Insufficient continuous training: Fewer than 35% of teachers regularly participate in professional development; the rate is even lower in inland municipalities (< 30%).
2. Traditional methodologies: The absence of ongoing training and limited access to modern resources perpetuate content-centered, teacher-led practices, rather than active or inclusive approaches.
3. Scarcity of specialization opportunities: Limited postgraduate and specialization courses outside provincial capitals restrict the development of advanced competencies in areas such as inclusive education, ICT, and technical-vocational teaching.

Institutional and governance issues also affect teacher training:

1. Limited institutional capacity: Universities and teacher training schools face infrastructure shortages, inadequate libraries, and limited technological equipment, constraining the quality of theoretical and practical instruction.
2. Ineffective teacher distribution planning: The lack of mechanisms to reallocate qualified teachers to underserved areas reinforces regional inequality.
3. Insufficient integration of national and local policies: Although national continuous training programs exist, their implementation in rural municipalities faces logistical, financial, and administrative barriers.

Despite these challenges, several opportunities can strengthen teacher education in Angola:

1. Expansion of initial training in inland regions: Establishing new teacher training centers and university campuses in municipalities such as Bocoio would reduce territorial inequality and increase the local availability of qualified teachers.
2. Promotion of distance and hybrid continuous education: Online courses, virtual tutoring, and digital learning materials can expand access to pedagogical updates and mitigate logistical barriers.
3. Pedagogical innovation: Investing in active learning methodologies, educational technologies, and inclusive education is key to modernizing teaching practices and improving student outcomes.
4. Incentives for rural teacher retention: Differentiated salaries, scholarships, and professional development opportunities can attract and retain qualified educators in rural and peripheral areas.
5. National and international partnerships: Collaborations with NGOs, UNESCO, UNICEF, and the World Bank can provide funding, trainer development, and innovative project implementation.
6. Monitoring and evaluation: Developing systems to track teacher performance and training outcomes ensures evidence-based adjustments and effective educational investment.

Regional Perspectives: Benguela and Bocoio

Within Benguela Province, teacher training reflects contrasting realities:

- Benguela City: Benefits from a concentration of institutions, training programs, and qualified teachers, allowing more effective implementation of pedagogical policies and educational innovation.
- Bocoio Municipality: Requires differentiated policies focused on expanding initial and continuing teacher training, improving school infrastructure, and promoting teacher

retention. Distance learning strategies and decentralized professional development can help reduce inequalities and strengthen local education quality.

Synthesis of Main Findings

1. National teacher training: Angola has approximately 240,000 teachers, mostly at the primary level. The student–teacher ratio remains high, and only 68% have full pedagogical training. Less than 35% participate regularly in continuous education programs.
2. Regional inequalities: Urban centers and provincial capitals concentrate qualified teachers, while inland municipalities such as Bocoio suffer shortages and limited training access.
3. Benguela context: The province enjoys relatively favorable conditions, with teacher training schools, universities, and better-qualified teachers.
4. Bocoio context: The municipality faces serious challenges—large classes, limited pedagogical qualification, and poor access to training.
5. Structural and pedagogical barriers: Territorial inequality, resource shortages, traditional methodologies, and lack of specialization remain major obstacles to improving teaching quality.

Recommendations

For Benguela:

- Expand postgraduate and specialization programs to strengthen advanced pedagogical competencies.
- Broaden continuing education in innovative methodologies, inclusive education, and digital integration.
- Encourage educational research and collaboration between schools and universities.

For Bocoio:

- Establish local initial training centers to reduce access barriers.
- Implement distance-based continuous education with mentoring and regular follow-up.
- Improve school infrastructure and teaching resources.
- Develop incentive programs for teacher retention, including financial support and professional recognition.

Conclusion

Teacher education is a cornerstone of an equitable, inclusive, and high-quality education system in Angola. Although significant progress has been achieved—especially in urban centers and more developed provinces—regional inequalities and structural challenges persist. Expanding teacher education to inland regions, modernizing pedagogical practices, and enhancing professional recognition are strategic priorities for bridging these gaps.

Ultimately, strengthening teacher education in Angola requires integrated policies, consistent investment, and continuous innovation, tailored to regional specificities and historical challenges. Improving teacher preparation in Benguela, Bocoio, and other inland municipalities will directly contribute to reducing educational inequalities, enhancing teaching quality, and promoting the sustainable development of the country.

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Twenty Years of the Psychology and Education Master's Program at the University of the Republic, Uruguay

Esther Angeriz, University of the Republic, Uruguay

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Abstract

There is a long-standing tradition of research in the field linking psychology and education, which has enabled the identification of both tensions and responses to educational challenges shaped by socio-historical contexts. The Master's Degree in Psychology and Education at the Faculty of Psychology, University of the Republic (Uruguay), established in 2005, is part of this tradition, contributing to key areas in the field, including research on childhood and adolescence, special education, and higher education. The program emerged in response to a growing demand for specialized academic training and was aimed at psychologists, educators, and other professionals interested in critically reflecting on educational practices. Over the past two decades, the program has generated a significant body of academic work through postgraduate theses. These works reflect a diverse and evolving landscape of actors, contexts, theoretical approaches, and educational practices, highlighting the multiple ways in which psychology and education intersect and inform each other. This paper analyzes Master's theses in Psychology and Education submitted in the last twenty years, comparing with international trends, and explore their link with Uruguayan public educational policies. A case study methodology was conducted, based on documentary research and two reports that systematize the submitted theses, providing the empirical basis for identifying key trends and shifts in the research lines in the program's agenda over time.

Keywords: psychology and education, research lines, inclusive education, childhood and adolescence, higher education

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Introduction

There is a long-standing tradition of research in the link of psychology and education, which has enabled the identification of both tensions and responses to educational challenges shaped by socio-historical contexts. The Master's Degree in Psychology and Education at the Faculty of Psychology, University of the Republic (Uruguay), established in 2004, is part of this tradition, contributing to key areas in the field, including research on childhood and adolescence, inclusive education, and higher education. The program emerged in response to a growing demand for specialized academic education and intended for psychologists, educators, and other professionals interested in critically reflecting on educational practices.

Over the past two decades, the program has generated a significant academic work through postgraduate theses. These works reflect a diverse and evolving landscape of actors, contexts, theoretical approaches, and educational practices, highlighting the multiple ways in which psychology and education intersect and inform each other. Three main research questions guide this study:

- Are the original research lines defined two decades ago still pertinent?
- Are the submitted theses aligned with international trends in psychology and education?
- Does our academic production engage with social issues and public educational policies in Uruguay?

Regarding those questions, the main objective of this paper is to analyze Master's theses in Psychology and Education submitted over the last twenty years, comparing with international trends and exploring their connection to public educational policies in Uruguay.

Research Design

A qualitative study with a descriptive and explanatory approach was designed, based on a case study methodology (Yin, 2018) to analyze trends in the ways issues inherent to the psychology–education field are approached within the Master's program. Analyzing the theses submitted within the program, offers valuable insight into the evolution of perspectives and approaches across its main research lines, specifically those focused on childhood and adolescence, special/inclusive education, and higher education. Additionally, a quantitative component was incorporated by identifying the number of theses submitted per cohort in each research line, allowing for a descriptive overview of the primary topics and research concerns addressed by the students.

In this regard, the case study represents an ideal strategy for examining a contemporary social phenomenon (Yin, 2018), exploring its multiple dimensions, and supporting decision-making; in this case, concerning the relevance and current orientation of the program's research lines.

Master's Degree in Psychology and Education

The Master´s Degree in Psychology and Education offered by the Faculty of Psychology at the University of the Republic in Uruguay—the country´s largest public university, founded in 1849—contributes to the study of public interest issues in the psychology and education field.

The program was founded in 2004 with a singular mission: to democratize access to free, high-quality postgraduate education in areas of relevant interest related to psychology and education. Before its establishment, there was no public postgraduate program in the country enabling psychologists and other professionals to pursue advanced studies and research on relevant topics in this field; thus, the program responded to a significant demand and need for academic research within the University of the Republic.

The three lines originally reflected the conceptual frameworks and issues identified at that moment: practices with childhood and adolescence; special education; and higher education. Over the years, the inclusive education paradigm gained strength; therefore, to avoid a long approval process for a new designation, we adopted the phrase *special education/inclusive education* to reflect this conceptual shift.

The program admits an interdisciplinary cohort of 40 participants every two years, with places reserved for psychologists who graduated more than five years ago, those who graduated within the past five years, professionals from disciplines related to psychology and education, as well as international applicants. At the time of application, candidates are required to submit a research proposal registered under one of these three areas. To date, nine cohorts of master's students have been enrolled in the program, corresponding to the following years: 2005, 2009, 2011, 2013, 2015, 2017, 2019, 2021, 2023.

Literature Review

The literature review focused on selecting key studies in each line, with the purpose of identifying the predominant thematic and evolutionary trends in the field of study over the past two decades. Then our literature review highlights the theoretical developments within each research line.

In childhood and adolescence line, the study of learning difficulties and Attention-Deficit/Hyperactivity Disorder (ADHD) was a developing field in the late 20th and early 21st centuries, with an emphasis on diagnosis, assessment, and pedagogical strategies (Alfaro Rocher, 1998). This scope then expanded to encompass contextual and systemic factors such as school climate and family school collaboration, grounded in ecological and socio-cultural approaches (Herrera Fuentes & De la Uz Herrera, 2010). The last ten years reflects a contemporary push toward digital technologies, diversity, with a heightened focus on mental health, emotional education, and youth participation (Guerrero et al., 2017; Jailani et al., 2025).

In special/inclusive education line, the field has undergone a decisive paradigm shift: moving beyond the traditional deficit model—which often focused exclusively on intellectual disability—to embrace a social and rights-based approach (Colmenero Ruiz, 2015). The international literature clearly demarcates this change, highlighting the enduring coexistence and tension between traditional and fully inclusive models (Acosta, 2020). Central to this evolution is the crucial role of teachers as primary agents of change (UNESCO, 2008). This shift has redefined focus from risk factors and individual deficits to accessibility, barriers to learning, and neurodiversity model, with inclusion now recognized as a fundamental right (Ávila, 2023; Cruz Vadillo, 2018).

In higher education line, the key trend is a pedagogical paradigm shift from teacher-centered models toward student-centered learning. This shift is profoundly influenced by the focus on

learning strategies, and the psychological well-being of university students. This transformation is then accelerated by technology integration and the pandemic effects, addressing digital learning and virtual environments, alongside the persistent challenge of digital equity and mental health in remote contexts (Alonso-Muñoz et al., 2022; Eisenberg et al., 2013; Pima et al., 2018).

Results

We analyzed a total of 120 theses completed between 2005 and 2025. The following table shows the distribution of completed theses per cohort:

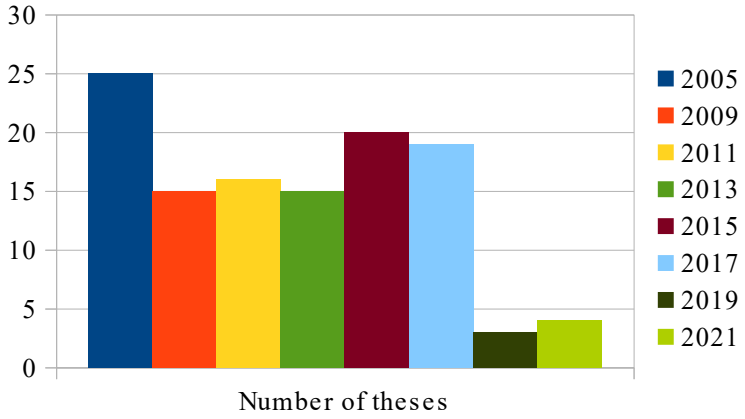
Table 1

Number of Theses per Cohort

Cohort	2005	2009	2011	2013	2015	2017	2019	2021
Number of theses	25	15	16	15	20	19	3	4

Figure 1

Number of Theses per Cohort



As shown in the graph, the largest number of completed theses correspond to the first cohort, which was composed mainly of university teachers from the Faculty of Psychology. Due to funding limitations, the second cohort began in 2009, rather than two years after the first. Then, the number of completed theses declined, reaching an intermediate level of approximately 20 theses per cohort for 2015 and 2017. For the 2019 and 2021 cohorts, theses submission deadlines had to be postponed due to the pandemic and the resulting difficulties in conducting research activities. The submission deadline for the 2019 cohort is approaching at the end of 2025, whereas the 2021 cohort will reach its deadline next year. We expect that the 2023 cohort, currently in progress, will be able to normalize its processes, as fieldwork access has now been authorized.

The table below shows the distribution of theses by research line and cohort:

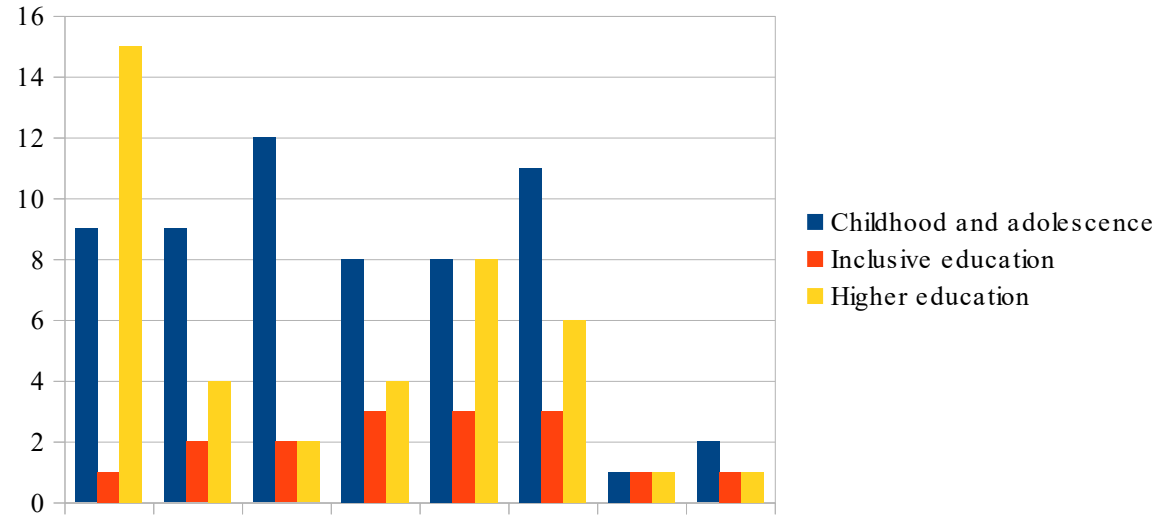
Table 2

Number by Research Line and Cohort

Theses	2005	2009	2011	2013	2015	2017	2019	2021
Childhood and adolescence	9	9	12	8	8	11	1	2
Inclusive education	1	2	2	3	3	3	1	1
Higher education	15	4	2	4	8	6	1	1

Figure 2

Number of Theses per Cohort



The chart highlights that in 2005 the main concern was focused in higher education. In later cohorts, the number of completed theses was more evenly distributed between childhood and adolescence studies and higher education. Although the number of theses specifically in inclusive education is smaller, it remains a theme that consistently cuts across the other two lines. Thus, we can find theses in childhood and adolescence and in higher education lines that are informed by inclusive education approaches.

Using evidence from our theses systematization reports (De León et al., 2024; Ruiz Barbot et al., 2017), we identified several major research themes in each line. For instance, research on childhood and adolescence explored the pathologization of children, affective and emotional dimensions of teachers-students relationships and socio-cultural perspectives on learning. In inclusive education studies, key topics included educational disengagement and vulnerability, teachers' conceptions about inclusion, and inclusive strategies. Finally, in the higher education line, theses focused on equitable access, teacher identity, student experiences, and institutional perspectives on higher education (De León et al., 2024; Ruiz Barbot, et al., 2017).

Discussion

A comparison of national research topics with international trends reveals clear parallels in conceptual frameworks, approaches centered on teachers and students, and educational practices. Although there are similarities between international and national trends, international research places greater emphasis on mental health, emotional education, and youth participation cognitive (Guerrero et al., 2017; Jailani et al., 2025), whereas national completed theses submitted to the Master´s Degree focus on issues such as the excessive

pathologization of children and dimensions related to psychic structuring of children and adolescents (Ruiz Barbot et al., 2017). There are convergences in socio-cultural perspectives for understanding teaching and learning processes and the transformations brought about by Information and Communication Technology, particularly following the pandemic (De León et al., 2024).

In inclusive education, research globally and nationally is unified by the paradigm shift from deficit models to social and rights models (Ávila, 2023; Cruz Vadillo, 2018; Ruiz Barbot et al., 2017). While both contexts recognize the rights focus and the teachers' crucial role, their emphasis differs: international trends position teachers as key drivers of change within a global context (UNESCO, 2008), whereas national research concentrates more keenly on the evolution to inclusive education at the local level, specifically prioritizing the study of teachers' conceptions about inclusion and the efficacy of inclusive strategies and pedagogical approaches (Ruiz Barbot et al., 2017).

Research in higher education reflects a shared global transition from teacher-centered to student-centered approaches. International trends emphasize the pedagogical implementation of this shift, highlighting active learning methods, the development of soft skills, and the foundational role of digital tools and digital literacy alongside the persistent challenge of digital equity and mental health in remote contexts (Alonso-Muñoz et al., 2022; Eisenberg et al., 2013; Pima et al., 2018). Similarly, national research shares an interest in teaching strategies and digital tools but focuses more specifically on implementation, equitable access, and maximizing student engagement, while also closely examining teachers' professional identity and effective instructional strategies within this rapidly evolving digital landscape (De León et al., 2024).

In response to our research question regarding whether our academic production engages with social issues and public educational policies in Uruguay, our analysis reveals a strong alignment between Master's theses and the country's public educational policies. The output of the Master's program frequently provides a critical foundation for central educational policy strategies, demonstrating a direct link between specialized research and public actions. Our students' work provides valuable insights into:

- Early childhood education: promoting universal access and early stimulation programs, such as Plan CAIF in Uruguay (*Early Childhood and Family Care Centers*). Our research provides the essential psychological and clinical basis for policies expanding universal coverage and reducing achievement gaps. Studies on psychic structuring and affective dimensions offer critical clinical tools for early stimulation programs and care in Family Centers.
- Elementary education: addressing educational gaps and expanding technology access through initiatives. The analysis of teaching and learning processes directly underpins elementary initiatives aimed at reducing dropout rates and enhancing performance in vulnerable contexts, strategically complementing technological access efforts such as Plan Ceibal (Educational Connectivity and Basic Computing for Online Learning).
- Inclusive education: strengthening diversity principles and ensuring comprehensive protection systems for individuals with disabilities. The theses reflect a conceptual evolution closely aligned with to the system's declaration of diversity and inclusion as guiding principles and provide the evidence base necessary to ensure the comprehensive protection system for individuals with disabilities guarantees not only access but also full participation and equitable opportunities.

- Higher education: supporting equitable access, academic mobility, and the digital transformation of institutions. The analysis of digital technologies provides insights for the successful implementation of digital transformation policies, guaranteeing both digital equity and improved teaching strategies in the University of the Republic.

Conclusions and Recommendations

In conclusion, we can state that analyzing the theses proved to be an effective strategy to identify theoretical and methodological trends in graduate training in Psychology and Education. The findings shows that the research lines have diversified and strengthened over time, reflecting epistemological shifts and broader social changes in the study of education, subjectivity and teacher–student–knowledge relationships. In our case, although the research lines were defined twenty years ago, they continue to demonstrate their relevance by supporting contemporary theses. Nevertheless, a strategic review is recommended to maximize their future impact.

Our analysis further reveals that the frameworks and approaches represented in the theses closely align with international trends and conceptual shifts, while also addressing local priorities, including child poverty and equitable access for diverse populations across all educational levels. Moreover, academic theses serve as a crucial bridge to public policy, contributing both to its analysis and evaluation. Nevertheless, a reorganization of the research lines would be beneficial to more accurately reflect current theoretical frameworks and emerging directions in the field.

To strengthen the relevance and impact of future research, we recommend that inclusion, equitable access, student engagement, and attention to diverse populations be established as transversal criteria. These principles should guide the organization of the research lines into the following categories:

1. Pedagogical relationships linking teachers, students, and knowledge within educational contexts.
2. Formative and educational pathways: students' and teachers' learning experiences.
3. Educational practices: reflecting on pedagogical strategies and technological innovations.

This reorganization would further reinforce the connection between psychological research and educational policy in Uruguay.

Building on the findings of this study, future efforts aim to:

- maintain updated thesis metadata to ensure accurate records and facilitate future analyses;
- promote academic discussion with collectives regarding the review of research lines and the relevance of proposed changes;
- initiate the necessary institutional procedures to adjust not only the Master's research lines but also the curriculum and evaluation mechanisms, with the aim of streamlining thesis processes and maximizing academic outcomes.

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

The author declares that Grammarly, an AI-assisted writing software, was used in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The literature review was conducted with the support of AI research tools, such as Elicit and ResearchRabbit, to identify studies and meta-analyses within each of the program's research lines.

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Fostering Interdisciplinary Talent Through Cross-Disciplinary Project-Based Learning: A Case Study From a Japanese National University

Xixi Zhang, The University of Osaka, Japan
Natsuki Tsujita, The University of Osaka, Japan
Toshiya Tsujita, The University of Osaka, Japan
Yosuke Otani, The University of Osaka, Japan
Goro Yamazaki, The University of Osaka, Japan

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Abstract

This study examines a cross-disciplinary education model implemented at a Japanese national university, targeting graduate students through Project-Based Learning (PBL). The program emphasizes addressing social issues and exploring diverse career pathways in academia, industry, and government. This presentation outlines the program's background and design, reviews implementation outcomes over the past 12 years, and evaluates its impact on cultivating interdisciplinary talent within Japan's higher education context. The program offers original courses, long-term project-based learning opportunities, and both group and independent practical activities. Drawing on expertise from all graduate schools and involving faculty members from diverse fields in both program management and teaching, the curriculum equips students with essential skills in problem identification, problem-solving, and social engagement. It encourages students to play active roles across disciplines beyond their own specialization, fostering innovative thinking and responsiveness to complex societal challenges. Over the past 12 years, more than 170 graduate students—including many from international backgrounds—have participated in the program. Follow-up surveys indicate that most graduates secured employment across a wide variety of fields, often beyond the direct scope of their graduate research. Many alumni have launched unconventional career paths for PhD holders, highlighting the program's success in enhancing the employability of doctoral graduates and fostering interdisciplinary talents who can adapt to the rapidly evolving demands of society and industry.

Keywords: cross-disciplinary education, graduate student, project-based learning, social issues, Japanese university

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Introduction

In many countries, the number of PhD graduates (PhDs) now exceeds the number of available academic positions, making access to professorships highly competitive (OECD, 2024). Universities face growing pressure to rethink doctoral education. They are urged to equip graduates with the knowledge and skills needed for diverse types of jobs (OECD, 2021). As traditional academic pathways narrow, the need for reform in doctoral education systems becomes increasingly urgent to ensure that graduates can thrive in both academic and non-academic career environments.

Graduate employability is critical for professions and industries, many of which are experiencing crippling talent shortages that impede organizational and sector-wide productivity. Alongside the economic gains from high-performing graduates, developing rounded, socially responsible citizens is also critical for global wellbeing (Bennett, 2019). The alignment between doctoral education and labor market demands thus plays a central role not only in addressing economic challenges but also in contributing to societal resilience and development.

For students pursuing doctoral and higher-degree studies, engaging in interdisciplinary research provides numerous benefits (Vanstone et al., 2013). It broadens intellectual horizons, equips students with a versatile skill set, and prepares them for a wide array of career paths (Rana et al., 2025). Employers value the unique perspectives and problem-solving skills that interdisciplinary researchers bring to their organizations (Miller & Boix-Mansilla, 2004). At the University of Osaka, interdisciplinary approaches are increasingly emphasized as an integral part of doctoral training to cultivate innovation and adaptability among researchers.

Extra- and co-curricular activities can further support employability by broadening social and professional networks, aiding career planning (Jackson & Bridgstock, 2021; Jackson & Tomlinson, 2022), and developing transferable skills (Buckley & Lee, 2021; Dickinson et al., 2021; Jackson & Cameron, 2025). These activities complement academic learning, enabling doctoral students to acquire the soft skills and professional awareness essential for navigating complex career landscapes.

However, scoping reviews on interdisciplinary education and the career trajectories of PhD students have so far largely relied on English-language sources (Rana et al., 2025; Skakni et al., 2025; Vanstone et al., 2013). This indicates a gap in the literature concerning non-English contexts and calls for broader comparative research that includes diverse linguistic and cultural perspectives to better understand the global dynamics of doctoral employability and interdisciplinary learning.

Cross-Disciplinary Education in Japan's Higher Education Context

In the Japanese context, academic jobs are losing popularity due to uncertain career prospects (Arimoto et al., 2019), which may drive away talented students. The long-standing poor career prospects of Japanese academics are particularly noteworthy, as they have likely influenced Ph.D. progression in terms of students' motivations and career decision-making (Yoshioka-Kobayashi & Shibayama, 2023). This situation underscores the challenges faced by universities in sustaining interest in academic careers among highly capable students.

In Japan, the number of individuals pursuing doctoral degrees has shown a long-term decline. While enrollment in doctoral programs has exhibited a modest recovery over the past two years, it remained on a downward trajectory between 2003 and 2022 (Shuji Kawagishi, 2025). This decline reflects broader structural and societal issues, including limited academic employment opportunities and changing perceptions of the value of doctoral education. For institutions such as the University of Osaka, addressing these trends requires reexamining the role of doctoral education in fostering employability and creating diverse pathways for Ph.D. graduates beyond academia.

Figure 1

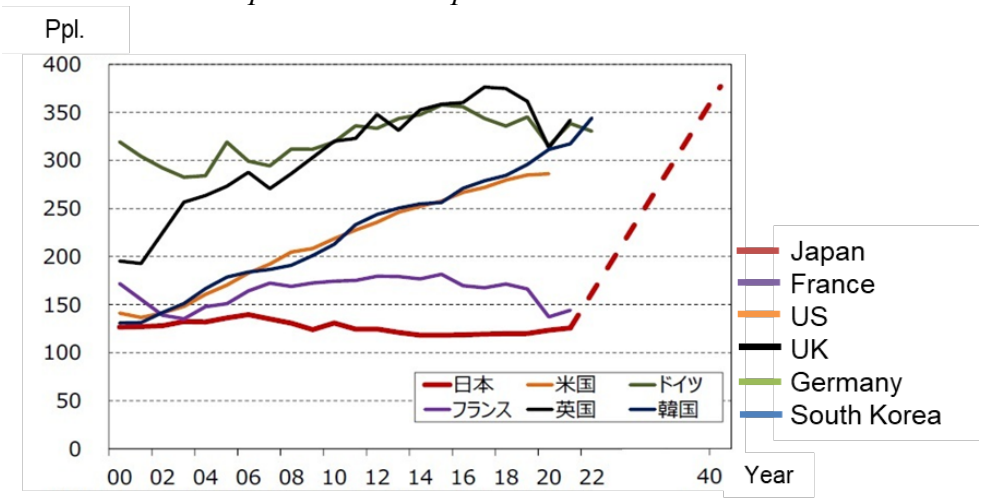
Number of Students Enrolling in Doctoral Programs



Source: Shuji Kawagishi, 2025

Figure 2

Doctorate Holders per Million People

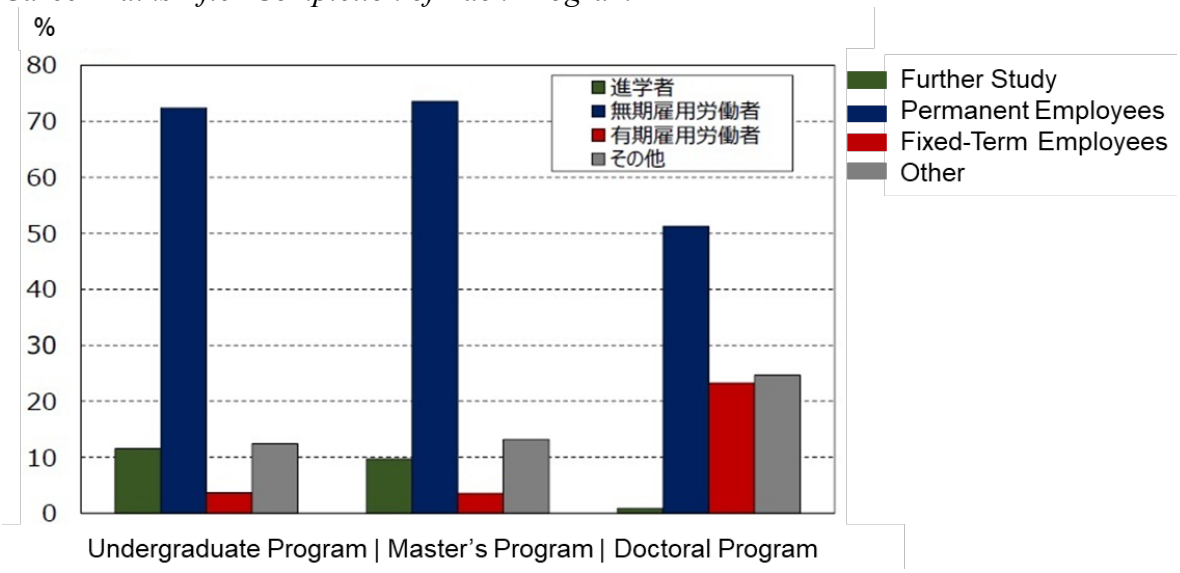


Source: Shuji Kawagishi, 2025

Students' financial circumstances during their studies, combined with the uncertainty of their future career trajectories, constitute significant factors that discourage progression to doctoral programs. In addition, compared with graduates of undergraduate and master's programs, those holding doctoral degrees face a substantially higher incidence of fixed-term employment, highlighting the unique career challenges encountered by this group (Shuji Kawagishi, 2025).

Figure 3

Career Paths After Completion of Each Program



Source: Shuji Kawagishi, 2025

Recent Policy Background in Japan

In the early 2000s, postdoctoral employment and career outcomes became a policy focus in Japan due to a decline in academic job opportunities and increased attention to the professional status of doctoral graduates (S. Kobayashi, 2011). By the mid-2000s, the Central Education Council reformulated faculty ranks and doctoral training systems to support younger academics and broaden academic career pathways (MEXT, 2006).

From 2012 to 2018, the Leading Graduate Program (MEXT) and the WISE Program (Doctoral Program for World-leading Innovative & Smart Education) were introduced. These initiatives funded integrated five-year doctoral tracks with an emphasis on interdisciplinarity, industry-academia-government collaboration, and the development of global skills (MEXT, 2019, 2023). In the 2020s, policy efforts have focused on enhancing financial support, such as the SPRING program, strengthening career services, implementing quality assurance reforms, and promoting internationalization, all aimed at better aligning doctoral education with societal and labor market needs (MEXT, 2024).

Case Study

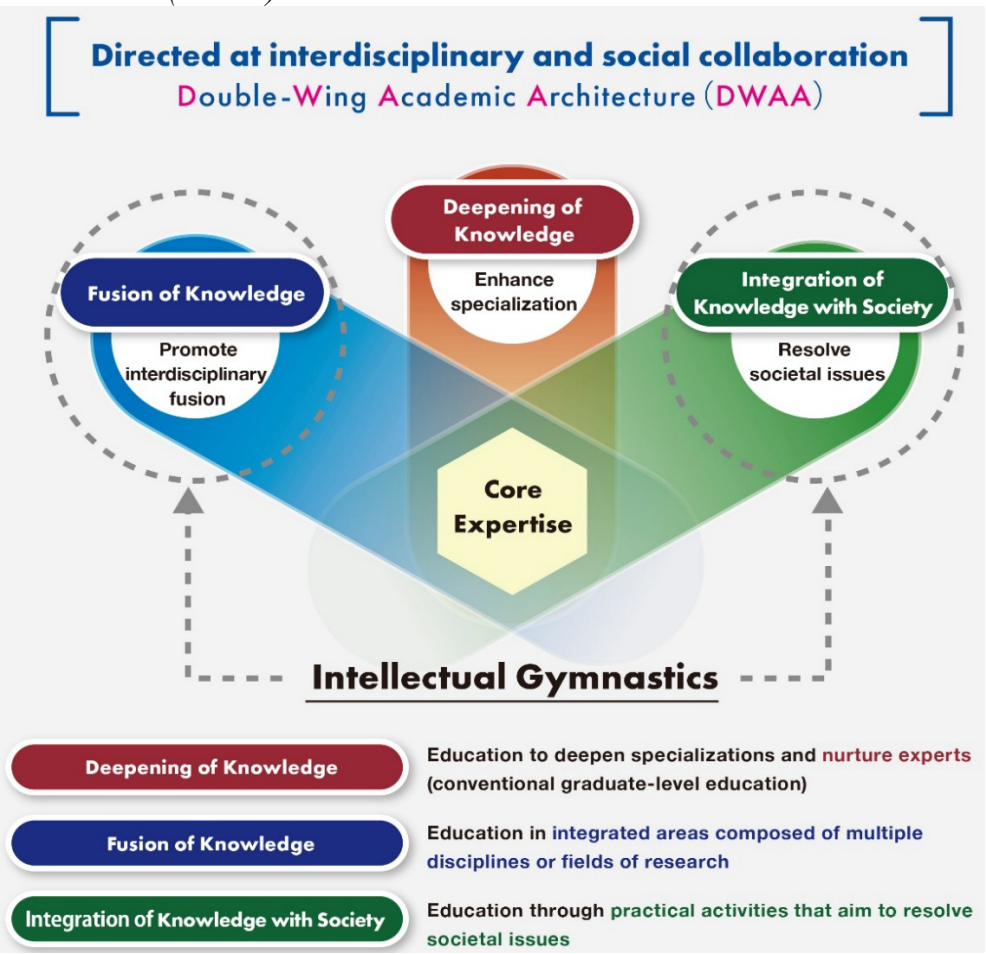
This paper presents a case study examining how cross-disciplinary education can enhance the employability of doctoral graduates and cultivate interdisciplinary talents capable of adapting to the rapidly evolving demands of society and industry. The study focuses on cross-disciplinary education at a national university in Japan, the University of Osaka, and explores the program's background and design, the outcomes achieved, the challenges encountered and discusses future directions for such educational initiatives.

Since 2021, the University of Osaka has been promoting the Double-Wing Academic Architecture (DWAA), an advanced graduate education system focused on interdisciplinary and social collaboration. Its goal is to nurture doctoral professionals who can create social innovations across many fields, not limited to academia. DWAA is composed of three areas: Deepening of Knowledge, Fusion of Knowledge, and Integration of Knowledge with Society.

In addition to developing expert knowledge, the system expands education in two new directions predicated on the acquisition of core expertise. Graduate degree holders are expected to tackle problems with flexibility and a broad worldview, collaborate with diverse stakeholders, and leverage their core expertise as they more broadly and deeply apply their graduate school education.

Figure 4

Structure of Graduate Education at the University of Osaka—Double-Wing Academic Architecture (DWAA)



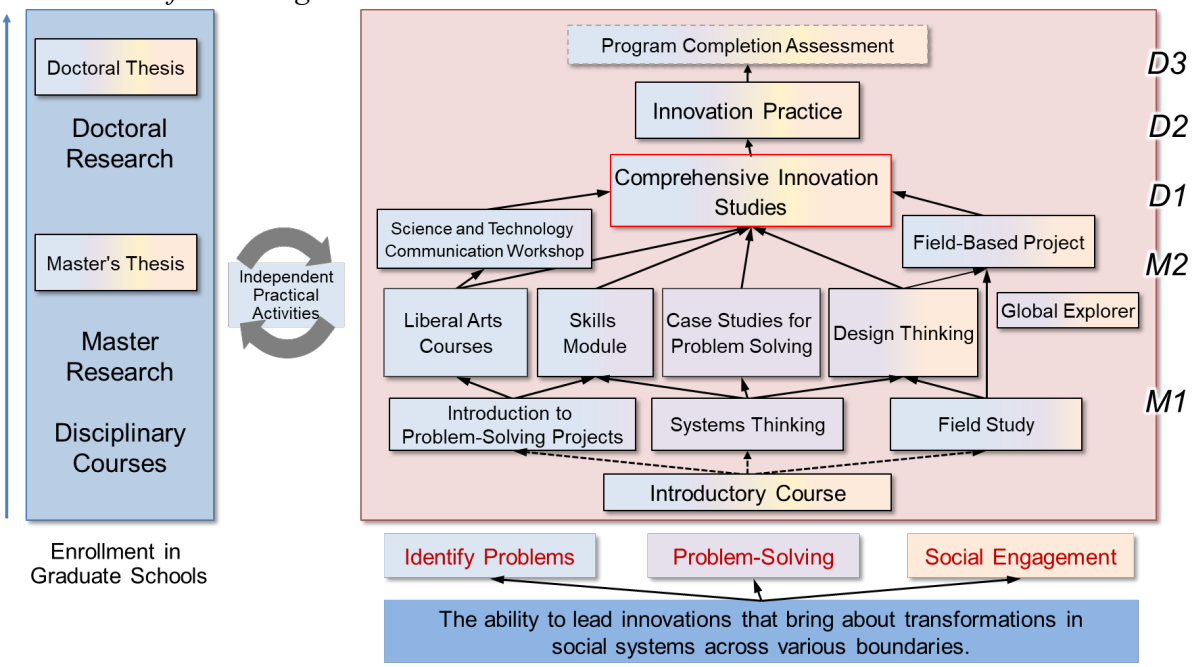
Source: https://itgp.osaka-u.ac.jp/en/systems/dwaa/

The Cross-Boundary Innovation Program (CBI Program) is an all-round cross-disciplinary graduate program that started in 2012. In this program, graduate students and faculty from all graduate schools of the University of Osaka come together around the main theme of addressing social issues, with classes and project-based learning offered to graduate students from both the humanities and the sciences. The program aims to cultivate a new type of doctoral talent who can play active roles across various fields beyond their specialization and supports diverse career paths in academia, industry, and government. From 2012 to the 2024 academic year, more than 190 graduate students from all graduate schools have participated in the program, covering a wide range of disciplines, including Human Sciences, Engineering, Humanities, Medicine, Sciences, International Public Policy, Biosciences, Pharmaceutical Sciences, Informatics, Law and Politics, Engineering Science, Economics, and Dentistry. Faculty members from all graduate schools, with diverse backgrounds, are also involved in program management and teaching.

The program offers original courses, long-term project-based learning, and both group and independent activities. Through these, students develop skills in finding and solving problems and in social engagement, while working beyond their own specializations to foster innovative thinking. Key features include workshops and project-based learning where students from different backgrounds and years can have constructive discussions, as well as overseas experiences and projects with companies and government agencies to find and solve social issues.

Figure 5

Curriculum of CBI Program



Source: https://www.cbi.osaka-u.ac.jp/teaching/feature/

Independent Practical Activities (Jishu Jissen Katsudō) are initiatives planned and carried out by students themselves, allowing them to apply the knowledge and skills they have acquired in real-world social settings and to develop integrated, comprehensive abilities. Through these activities, students can plan and implement volunteer projects, internships, joint research, or other practical tasks aligned with their interests or expertise. So far, more than 70 students have participated in these activities. Between 2015 and 2024, students engaged with universities, research institutes, NPOs, companies, and government agencies. They organize these activities using networks provided by their supervisors, the program, or their own connections.

As an example of the Independent Practical Activity, a graduate student from the Graduate School of Frontier Biosciences developed a business model for sustainable medical aromatic essential oils. Drawing on prior nursing experience and recognizing the limits of conventional care, the student focused on aromatherapy. The objectives were to explore medical applications and develop sustainable, socially implementable models that support cognitive function and complement lifestyle disease and dementia care. Practical activities included upcycling by-products in Japan to reduce environmental impact, combining traditional cultivation with ecosystem restoration in France, and utilizing synthetic fragrances with data-driven production optimization in Switzerland. The next steps involve conducting empirical studies and establishing a sustainable supply model in collaboration with industry and medical partners.

The curriculum equips students with essential skills in problem identification and resolution, as well as social engagement, through courses and activities designed to support both individual and collaborative work. From the perspective of the KSAO model (Knowledge, Skills, Abilities, and other characteristics), students develop through three stages. In individual work, they acquire foundational and specialized knowledge, analytical skills, and problem-identification abilities, while fostering integrative thinking, curiosity, and motivation. In group work, students co-create with peers from different fields and collaborate with real-world partners, developing communication, teamwork, and collaborative problem-solving skills, along with flexibility, adaptability, and openness. In upgraded individual work, students apply cross-disciplinary insights to complex societal challenges, building advanced problem-solving, social engagement, and project management skills, while cultivating independent application, innovation, confidence, responsibility, and a reflective mindset. Further observation and analysis at each stage are needed, which will remain an ongoing goal for the future.

Table 1
Objectives and Benefits

	Knowledge	Skills	Abilities	Other Characteristics
Individual Work: Exposure to multiple disciplines through course contents	Foundational & specialized knowledge	Analytical, problem-identification	Integrative thinking	Curiosity, motivation
Group Work: Co-creation with students from different fields & engagement with real-world partners	Peer knowledge across disciplines	Communication, teamwork, collaborative problem-solving	Flexibility, adaptability, synthesis of multiple perspectives	Teamwork, openness
Upgraded Individual Work: Apply cross-disciplinary insights to complex societal challenges	Integrated knowledge, cross-disciplinary insights	Advanced problem-solving, social engagement, project management	Independent application, innovation	Confidence, responsibility, reflective mindset

Over the past 12 years, more than 170 graduate students, including several international students, have participated in the program. Most graduates found employment across a wide range of fields, often beyond their research areas, with many pursuing unconventional career paths, demonstrating the program's success in enhancing employability and fostering interdisciplinary talents. Over half of the graduates (51%) entered the private sector, a figure significantly higher than the national average of 34%, while others took administrative or strategic roles. Among the 22 students aiming for academic careers, 18 secured full-time faculty or researcher positions, and the remainder became postdoctoral or part-time researchers. Returning to our research question—how does cross-disciplinary education enhance employability and foster interdisciplinary talents?—we note that doctoral employability involves a combination of knowledge, skills, attributes, social resources, and personal agency, enabling doctorate holders to secure, sustain, and advance in meaningful work both inside and outside academia throughout their careers (Jackson & Michelson, 2015; Pham , 2023). These outcomes clearly demonstrate the effectiveness of the program in achieving its objectives.

Challenges

The program faces several challenges. High turnover of faculty and staff has affected continuity, consistency in teaching, and long-term relationship building with students, while also increasing the burden of recruitment and training for new members. Integrating multiple disciplines makes curriculum design complex, requiring ongoing adjustments to balance depth and breadth, maintain coherence, and respond to student needs and evolving societal and industry demands.

Currently, all courses are taught in Japanese, and the number of international students is very limited, restricting opportunities for cross-cultural interaction and global learning. While the program provides a strong academic foundation, additional support may be needed to help students develop cross-cultural communication skills, multilingual abilities, and the global mindset essential for pursuing international careers. Evaluating interdisciplinary learning is also challenging, as it involves both disciplinary knowledge and cross-field skills such as critical thinking and collaboration. Continuous improvement relies on feedback to refine teaching and learning activities.

Another major challenge concerns students' workload and mental health. Existing research on doctoral students' well-being has consistently reported high stress levels (Kernan et al., 2011; Virtanen et al., 2017; Wyatt & Oswalt, 2013), mental health concerns such as depression (Hyun et al., 2006; Pallos et al., 2005), and physical health symptoms, including upper respiratory infections (Juniper et al., 2012; Kernan et al., 2011; Pallos et al., 2005). In their social and personal lives, doctoral students also tend to experience difficulties maintaining relationships (Dabney & Tai, 2013; Wellington & Sikes, 2006) and participating in social activities (Juniper et al., 2012; Longfield et al., 2006) due to limited time, financial constraints, and reduced motivation. Balancing the demands of both individual and collaborative work alongside their primary research can be challenging, making effective time and workload management essential. Collaborating with peers from diverse academic backgrounds may also present difficulties in communication, reconciling different perspectives, and coordinating approaches. Nevertheless, these experiences provide valuable opportunities for interdisciplinary learning and personal growth.

Conclusion and Future Directions

Cross-disciplinary education is increasingly recognized as essential, both globally and in Japan, for addressing complex societal and academic challenges. In this context, programs like CBI serve as effective hubs for cultivating interdisciplinary talents and enhancing doctoral graduates' employability by equipping them with diverse knowledge, adaptable skills, and the ability to respond flexibly to the rapidly evolving demands of society and industry.

There is a growing need for specialized training and education programs tailored to interdisciplinary research skills, encompassing not only technical competencies but also emotional, social, cultural, and contextual factors (Menken & Keestra, 2016; Rana et al., 2025). We now conduct student follow-up interviews to monitor their progress and have launched several new initiatives to support students both mentally and physically. As Sverdlik et al. (2018) note, understanding doctoral students' physical, psychological, and emotional well-being is key to capturing the challenges of graduate education. Looking ahead, a future aim could include developing additional initiatives and opportunities that promote cross-cultural interaction and global learning.

CBI maintains strong collaboration with industries and other non-academic stakeholders. As Skakni and Inouye (2023) suggest, future research could explore these stakeholders' perspectives to inform more targeted preparation, enhance onboarding and retention practices, and further strengthen university-industry collaboration.

As interdisciplinary research in doctoral studies continues to evolve, it is essential for academic institutions to adapt and enhance their support mechanisms, including establishing more interdisciplinary platforms, integrating collaborative methodologies into curricula, and providing targeted funding, all while fostering a culture of collaboration (Lyall et al., 2013; Rana et al., 2025; Sun et al., 2021; Vienni-Baptista et al., 2023). We have an efficient support system, including support from faculty and staff, dedicated classrooms and interaction spaces, diverse course content and activity opportunities, as well as grants. Maintaining continuous, ongoing support remains both a crucial component and a significant challenge to this system.

Overall, our case study suggests that a well-structured cross-disciplinary education can effectively prepare doctoral graduates to meet complex societal challenges, thrive in diverse career paths, and contribute meaningfully to both academic and non-academic sectors.

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

During the preparation of this manuscript, the authors used ChatGPT solely for proofreading and refining language, including correcting grammar, spelling, and rephrasing for clarity and accuracy. Apart from Grammarly, no other AI or AI-assisted tools were used to generate content. All ideas, study design, procedures, findings, analyses, and discussions are original and derived from the careful and systematic conduct of the research.

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How to Optimize Résumés With AI Tools

Najwa Saba ‘Ayon, Rafik Hariri University, Lebanon

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Abstract

Artificial intelligence (AI) has become increasingly pervasive across multiple domains: Industry, tourism, healthcare, and education among others. Recruitment is not an exception. In fact, Team IO (2023) states, “With AI becoming increasingly prevalent, it’s essential for both job seekers and employers to harness its potential to achieve better results in the hiring process.” In our AI-driven world, résumés are initially reviewed by AI-powered Applicant Tracking Systems (ATS), and only résumés that pass the initial AI screening in terms of keywords, formatting, and relevance to the job description are then considered by human recruiters. As a result, the most qualified candidates for the jobs cannot be considered unless their résumés pass the initial AI screening. Hence, it becomes essential to help undergraduate students, particularly English as a Foreign Language (EFL) learners, prepare their résumés to meet the linguistic and technological criteria. To this end, the researcher implemented an instructional intervention in her Professional English Communication Course. In more detail, she integrated AI tools, specifically ChatGPT 3.5 and Careerflow.ai, to train her fifty EFL undergraduates in optimizing their résumés for ATS initial screening, meet specific job descriptions, and hence increase their employability in AI-mediated recruitment contexts. The purpose of this paper is to share the instructional steps the researcher has followed, the outcomes of this intervention, and qualitative feedback from students. In this paper, the researcher will also discuss the limitations of these AI tools in résumé writing and emphasize the importance of human feedback and personalization in creating résumés.

Keywords: Applicant Tracking Systems, Careerflow.ai, ChatGPT, professional English, résumé optimization

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Introduction

Artificial intelligence (AI) has been transforming how human beings live, work, learn, and even get hired. In fact, AI has been playing a decisive role in the hiring process as résumés are initially screened by AI- powered Applicant Systems (ATS) before they are sent to human recruiters. As a result, job seekers must ensure that their résumés meet the ATS criteria in terms of keywords, formatting, and relevance to the job description to pass the initial AI screening and reach human recruiters.

Hence, higher education institutions are integrating AI résumé tools to help their students develop competitive résumés that transition them from the applicant to the interview pool (Abdelwahab et al., 2022). According to the National Association of Colleges and Employers, AI tools should be used appropriately, and university educators have developed guides for such use (Lang & Catrino, 2024). In addition, Ponce (2024) maintains that educators should continue teaching résumé writing while also helping their students develop critical AI literacies because "this dual approach ensures that students can effectively utilize AI tools while maintaining control over their résumés" (p. 21).

However, Lookadoo and Moore (2024) found that there is a mismatch between what is taught in the textbooks and what is needed to be taught to align with the real business world and AI-mediated hiring process. Hence, they recommended that students and instructors "need to know how ubiquitous AI is in the job search process… [and] students need a résumé that works for both an AI and a human" (Lookadoo & Moore, 2024, p. 16).

Thus, it becomes necessary to help undergraduate students prepare their résumés to meet these criteria, especially when "Using AI to polish résumés can significantly improve job seekers' chances of getting hired, receiving more job offers, and earning higher wages" (Team IO, 2023, n.p). That's why the author incorporated AI tools, namely ChatGPT 3.5 and Careerflow.ai, in her Professional English Communication Course to train her EFL students to use these AI tools to optimize their résumés to pass ATS initial screening, to meet specific job descriptions, and to increase their chances of being accepted for the job they are applying for.

Context

The intervention, which is qualitative and classroom-based, takes place in a Professional English Communication (PEC) Course at a relatively small private English-speaking university in Lebanon, which has three colleges: The College of Business, the College of Engineering, and the College of Arts and Sciences. Almost all their programs are accredited.

PEC is a required course for all students. The main objective of this course is to prepare students for the workplace, and as such, students learn about workplace communication, including résumé writing.

Before introducing the instructional procedure, the author did the following with her students. First, the participants were taught about AI, what it can and cannot do. Through their discussions, the researcher and the participants concluded that ChatGPT is not intelligent, unlike what the term artificial intelligence implies; it is more like a "stochastic parrot" that lacks actual knowledge but analyzes data for "identifiable patterns to generate responses" (Bender et al., 2021 as cited in Kostka & Tomcelli, 2023, para.2). They also concluded that ChatGPT is an imperfect tool whose output and ideas need to be evaluated and deepened by

themselves, which is in line with Koehler (2023). Second, they were also instructed not to use ChatGPT or any AI tool to replace their work but to enhance their learning, and the participants were requested to follow an AI policy to ensure integrity while they maintain their identity and voice, arouse their critical thinking, and help them co-construct knowledge with the AI tool and the instructor.

The AI policy states the following:

> To promote transparency and integrity, you must disclose any use of ChatGPT or similar AI tools. You are allowed to receive feedback on optimizing your résumés. However, you mustn't submit AI-generated résumés as your final work. You must log each use of AI (prompt, output summary, decision to adopt or reject in your learning log) and cite AI tool according to APA guidelines, such as ChatGPT (2025, February 15). Use the following link to learn how to cite it: https://apastyle.apa.org/blog/how-to-cite-chatgpt. Any violations of this policy will be treated as breaches of academic integrity, following the university policy.

Participants

The participants were fifty EFL undergraduates from different majors (Business, Engineering, Graphic Design, and Computer Science). The majority were seniors and juniors, with a few sophomores. They were females and males. These participants were enrolled in two sections of PEC taught by the author during the spring semester. They were informed about the intervention and its rationale at the beginning of the semester, and almost all participants, if not all, were interested in following it.

All of them had used AI tools as follows[1]: ChatGPT (91.1%), Copilot (6.7%), Grammarly (2.2%) for the following purposes: To brainstorm ideas (82%), find sources (68.9%), summarize articles (62.2%), edit drafts (51%), and explain concepts (46.9%). More than half (51.1%) were concerned about ethics when using AI, while fewer (48.9%) were not concerned.

Intervention: Step-by-Step Procedure

The procedure consisted of eight steps, which are the following:

1. The participants were taught about what a résumé is and the importance of developing an attractive and persuasive résumé to ensure to be selected.
2. They were given instructions about how to create their résumés and what elements to include in their résumés (See below). Sample résumés were also shared with the participants (see Appendix A). The participants were also informed about AI-powered Tracking System (ATS) and why they should use appropriate keywords and format. Most importantly, they were asked to customize their résumés to the job description.
3. The participants brainstormed about their expertise (core competencies), skills, experiences, achievements, and other information (such as languages) to include in their résumés. Identifying their expertise is the most difficult part for the participants because at this stage, not all of them are aware of their strengths and competencies.
4. The participants individually developed their résumés following what they were taught in class.

[1] Data were collected through online survey distributed before the intervention.

5. The participants uploaded their résumés on AI tools to get feedback using specific prompts. The participants had the freedom to choose the AI tool (ChatGPT or Careerflow.ai) to get feedback that was related to suggested improvements, suggested KPI's or percentages, editing, and formatting. If students had a specific job they intended to apply for, they asked the AI tool to match their résumés to the job description.
6. The participants critically evaluated the AI output and reported what they needed to adopt and why in a learning log.
7. The participants discussed feedback with the instructor.
8. The participants submitted their résumés for evaluation.

Instructions on How to Write a Résumé

The participants were taught about how to develop their résumés and what elements they should include, as follows:

1. Their names in full and the positions the participants are applying for (such as *Aspiring Mechanical Engineer)*. Their address (only city and country), email address, and LinkedIn address as a hyperlink, updated with a professional photo and an attractive headline.
2. A professional summary that provides a quick idea about who the candidates are, what they offer, and what their career direction is. According to Columbia University Center for Career Education, the summary should have the following key characteristics: Concise (2–5 lines or bullet phrases), tailored to the job /role, highlighting keywords and experiences relevant to what the employer is seeking, presented in strong /active language (avoiding I-statements), action-oriented (avoiding narratives), and specific as well as quantifiable if possible. (https://www.careereducation.columbia.edu/resources/how-write-resume-profile-or-summary-statement)
3. Areas of expertise or core competencies that the applicants have.
4. Professional experience that includes all the actual roles the participants held, the university projects, the internships, or freelance. This should also be presented in terms of strong action verbs and achievements in terms of measurable results or KPI's to be ATS-friendly.
5. Education including the date of joining the university, the major, the degree, and the academic status. Relevant coursework is added if it matches the job applied for.
6. Additional skills (both technical and soft) that were not mentioned in the areas of expertise or core competencies.
7. Languages that the participants speak and their proficiency level in each language.

Notes for ATS Compatibility

To help them ensure that their résumés are ATS-friendly, they were instructed to format their résumés as follows:

- To use standard fonts (e.g., Arial, Calibri, Times New Roman).
- To save as **.**docx or PDF (check job post if PDF is accepted).
- To avoid tables, graphics, text boxes, and columns.
- To use plain text and consistent formatting.
- To customize the skills and experience section using keywords from the job description.
- To always include section headings like "Professional Summary," "Education," and "Skills" to improve parsing accuracy.

Optimize Résumé With ChatGPT

The quality of the AI output depends on the quality of the prompt. For example, Ponce (2024), who explored how confidence in the prompts affects the résumé-generated content by AI tools, found that "the confidence level in the prompts … impacted the personalization and relevance of generated résumés" (p. 21). Hence, the participants were asked to use the following confident prompt generated by the Prompt Maker to get personalized and relevant outputs on their résumés: "Analyze my résumé and provide tailored improvements to align it with a [job title] role at [company]. Highlight skills, achievements, and keywords from the job description. Ensure it passes ATS screening and appeals to hiring managers" (OpenAI, personal communication, March 15, 2025).

Optimizing Résumé With Careerflow.ai

Because all the participants had never used Careerflow.ai before, they were given detailed information about how to access and use this tool. They were asked to go to the website at www.careflow.ai and create an account. Though creating one's résumé with AI is an option with Careerflow.ai, the participants were instructed to create their own résumés first (as presented earlier) and then upload them to this website for feedback. They were also informed that if they had a specific job description, they could paste it there too and ask the AI to optimize their résumés accordingly. Instantly, the AI would grade the résumés, indicate to what extent they matched the description, and suggest improvements to be carried out by the job seekers. However, the subscribed version of this tool can automatically optimize the résumés.

Because the author was interested in developing students' critical thinking and decision-making, she required the students to use the free version and required them to critically evaluate the AI output, reflect on it, and decide on what to adopt or reject in a personal log.

ChatGPT and Careerflow Output

Sample suggestions by ChatGPT and Careerflow.ai, together with a sample of student logs, are provided in Appendix B.

Participants' Feedback

At the end of the course, the researcher sought the participants' feedback through two focus group interviews. Twelve participants volunteered to take part in these focus groups, the first of which consisted of seven participants, and the other of five participants. Most of the participants had a positive attitude towards using AI tools in optimizing their résumés. They found AI tools helpful in several ways: "improved organization," "better formatting," "language refinement," "suggested keywords and KPI's to match the job," and "making it [the résumé] more concise." One participant emphasized the importance of using AI tools as a guide and not as a replacement for them. Another participant stated that "It really helped me improve my résumé. The percentage [grade given by careerflow.ai] was 38% and after editing, it reached 76%." However, one participant had a different attitude towards this experience; he stated that "The AI tool messed up all the points … and the suggested revisions were not logical to me," and added that he preferred to get feedback "from a human." These findings were in line with the literature. LeFebvre and LeFebvre (2025) found that 70.5% of undergraduate students in a business communication course at a university in the US had positive perceptions of AI tools in improving their résumés, whereas 29.5% had a different opinion.

Conclusion

How AI tools were employed helped students improve their résumés in two main ways: Tactically and strategically. The AI tools critiqued the content of the résumés and suggested revisions related to language refinement, formatting, and word choice, such as the use of strong action verbs. In addition, the AI tools suggested adding skills to the résumés to match the job descriptions and highlighting achievements and strengths, as well as adding necessary details that recruiters admire.

The benefits of this intervention were not only limited to improved résumés and hence improved grades, but they were also felt at different levels: (1) students' enjoying the experience and their finding it helpful, (2) improved students' self-analytical and reflective skills, (3) students' intention to transfer these skills for future professional work, and (4) sharing this strategy with their acquaintances, who were job-hunting.

Limitations

The researcher acknowledges several limitations that may affect the transferability of this instructional intervention. Some limitations are derived from the AI tools, whereas others are related to the scope of this intervention. First, ChatGPT 3.5 and Careerflow.ai may generate biased, generic, impersonal responses based on the quality of the prompts, coupled with any possible linguistic misinterpretation in the EFL context. Second, the intervention was conducted with a relatively small sample of fifty EFL participants at a private Lebanese university. Hence, the outcome may not be the same when applied in other EFL contexts. Third, the focus group data were based on voluntary participants, whose opinions may not be representative of other participants. Fourth, though the participants had to document their AI use to ensure transparency and integrity, the possibility of unintentional plagiarism cannot be eliminated.

Despite these limitations, this qualitative classroom-based intervention provides important preliminary evidence of how AI tools can optimize students' résumés while enhancing students' self-reflective and analytical skills.

Recommendations

The author recommends using AI tools to complement, not to replace, the instructors' teaching and feedback. This resonates with Drewey, Woodside, and Eppel (2022), who found that AI feedback cannot match human feedback that helps students' critical self-reflection about their strengths and interests. The author also warns against over-relying on AI-driven résumés, which is in line with LeFebrve and LeFebrve (2025), who state that AI résumé technology should be used only to enhance résumé development skills, and students should be warned against blindly trusting algorithmic feedback.

As AI continues to evolve, there will be a necessity to conduct more research that explores the advancement in AI tools and their impact on résumé writing. Further research with a bigger sample, as well as longitudinal research that tracks the extent to which optimized résumés with AI tools could ensure the job seekers' move from the applicant to the interview pool, is needed.

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

As the paper is about using AI to optimize résumés, it is expected to share some of the AI output with the readers as examples. That said, the author declares that the shared sample résumé, the AI output, and the prompt are AI-generated, which are all cited. Apart from these uses, the author declares that the paper is original and written by the author herself.

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Appendices

Appendix A

[FIRST NAME LAST NAME]
[Phone Number] | [Professional Email] | [LinkedIn Profile] | [Portfolio Link – if applicable]
Location: City, Lebanon |
Prospective Mechatronic Engineer

Professional Summary

Motivated and detail-oriented undergraduate student pursuing a Bachelor of Science in Mechatronics Engineering at Rafik Hariri University. Proven ability to contribute to real-world projects through academic coursework, volunteer work, and/or freelance experience. Skilled in CAD Design (SolidWorks, AutoCAD), Microcontroller Programming (Arduino, Raspberry Pi), 3D Printing and Prototyping, with a strong commitment to learning and professional development. Eager to apply technical skills and soft competencies in a challenging internship or entry-level role.

Areas of Expertise

- CAD Design (SolidWorks, AutoCAD)
- Microcontroller Programming (Arduino, Raspberry Pi)
- 3D Printing and Prototyping
- Robotics and Automation Systems
- Sensor Integration
- MATLAB
- C/C++

Professional Experience

Volunteer Robotics Assistant

IEEE Student Branch – City, Lebanon

Jan 2024 – May 2024

- Assembled and tested components for a line-following robot used in a university-level competition.
- Programmed Arduino-based control system using C++ to improve speed accuracy by 20%.
- Collaborated with a team of 5 students to integrate sensors and motor control.

Education

Bachelor of Science in Mechatronics Engineering

Name of University – City, Lebanon

Expected Graduation: June 2026

• Relevant Coursework: Automation & Control Systems, Electronics, Machine Design

Technical and Soft Skills

Technical Tools & Platforms

• SolidWorks, MATLAB, Arduino IDE, Python

Soft Skills

• Team Collaboration
• Time Management
• Critical Thinking
• Communication
• Problem Solving
• Analytical Skills

Languages

• Arabic: Native
• English: Fluent
• French: Intermediate (Optional)

(OpenAI, personal communication, March 10, 2025).

Appendix B

ChatGPT and CareerFlow Output

Revised Version: Highlights and Fixes

📌 Header

Make it ATS-friendly and add a GitHub or portfolio link.

Participant Name

Prospective Data Scientist | Beirut, Lebanon

LinkedIn: [Insert URL] | GitHub: [Insert URL] | Email: XXX@students.yyy.edu.lb

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🎯 Professional Summary *(Use keywords + value proposition)*

Analytical and motivated Computer Science student passionate about leveraging data to drive impactful decisions. Experienced in SQL, machine learning, Python and related libraries (pandas, NumPy, scikit-learn) to extract insights and build predictive models. Skilled in data wrangling, visualization, and model development. Proven ability to support instructional teams and deliver tech-focused workshops. Eager to apply statistical and programming expertise to real-world problems at a global scale like Google.

🧠 Skills *(Group and align with DS role)*

Programming: Python, SQL, C++, HTML, CSS, JavaScript, PHP

Data Science: Scikit-learn, Pandas, NumPy, Matplotlib, Seaborn, JSON, Web Scraping, Jupyter

Web: Laravel, Bootstrap, Tailwind, jQuery, Ajax

Soft Skills: Problem-solving, Leadership, Communication, Adaptability, Critical Thinking

Languages: Arabic (Native), English (Fluent), Italian (Beginner).

(OpenAI, personal communication, March 27, 2025).

Sample Student Log

What I Changed and Why[2]

- Added my GitHub account to the contact information because as a computer scientist I have my projects there, that way the company can directly check my skills and work.
- Mentioning Python libraries related to data science that I'm experienced in would boost my cv and ensure that it passes the ATS screening
- Will be adding the probability and statistics course to the relevant course work because it is an important mathematical skill related to data science
- Changed the way I wrote the professional experience because I felt that the one ChatGPT generated is neater
- Will divide the technical skills based on what ChatGPT did because it's easier to read and understand + it highlights data science related skills
- Rephrased the way I wrote my extracurricular activities in order to make them verb phrases

Careerflow.ai Output

- Personal information in a résumé is important because it provides essential details about you as a candidate, helping recruiters to identify, contact, and evaluate you for a potential job opportunity. Here is what you can include in your résumé's personal information:
- Including your LinkedIn URL on your resume is a good idea. It makes you look more professional and gives extra info about your work.
- Adding links to your portfolio like your personal website or Github in your resume is important because it shows a glimpse of your work and proves your skills. These links let recruiters see examples of your projects, skills, and accomplishments. By sharing a link to your portfolio, you help recruiters check your abilities and understand how you can contribute to their team.
- Including a target title in your résumé is a good idea because it helps recruiters understand what job you want. It also makes your résumé more likely to be noticed by the Applicant Tracking System (ATS) that many companies use to find résumés. The target title is like a short headline that tells recruiters the kind of job you're looking for, making it easier for them to see if you're a good fit.

(Careerflow.ai generated résumé feedback)

[2] This was kept as it is to maintain student's voice.

Informing Curriculum Design and Policy: Insights From Technology Integration in Circle Geometry Teaching at South African TVET Colleges

Hlengiwe Mbhele, North-West University, South Africa

The Barcelona Conference on Education 2025
Official Conference Proceedings

Abstract

This qualitative study investigates the experiences and challenges of mathematics lecturers at a selected Technical and Vocational Education and Training (TVET) College in KwaZulu-Natal, South Africa, concerning their integration of technology in teaching Level 4 circle geometry. Utilizing an interpretive paradigm and a case study approach, data were collected through open-ended questionnaires and semi-structured interviews with five lecturers. Guided by the Technological Pedagogical and Content Knowledge (TPACK) framework, the research examined the methods and rationales behind lecturers' use of technology. Key findings indicate a notable deficit in relevant technological resources for teaching circle geometry within TVET Colleges, leading to significant pedagogical challenges for lecturers. While lecturers demonstrated proficiency in fundamental content, pedagogical, and technological knowledge (CK, PK, and TK), they often lacked the specialized competencies in Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and integrated TPACK essential for effective technology-enhanced geometry instruction. The study also highlighted disparities in technology access and the impact of students' foundational mathematical weaknesses on their geometry comprehension. These findings are crucial for informing curriculum planning and design initiatives by the Department of Higher Education and Training (DHET) and the Department of Basic Education (DBE) in South Africa. The research suggests that policies should be developed to facilitate access to appropriate technology and provide targeted professional development for mathematics lecturers, thereby enhancing the effectiveness of technology integration in the national mathematics education curriculum.

Keywords: circle geometry, curriculum design, mathematics education, technology integration, TVET colleges, policy recommendations, DHET

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Introduction

Mathematics is essential within the South African Technical and Vocational Education and Training (TVET) colleges because it prepares students and is a necessity for the future employment prospects (Adelabu & Pharamela, 2024). Despite this, research have placed in sharp perspective some of the typical problems of mathematics learning in such institutions, i.e., minimal conceptual understanding, poor teaching materials, and variable student preparedness.

Amongst the Level 4 mathematics syllabuses, circle geometry is 25% of the examination and is at the heart of students' geometric problem-solving ability, logical reasoning, and space appreciation. Knowledge of the principles of geometry of the circle—i.e., the interplay between angles, tangents, chords, and arcs—is the stepping stone on which more mathematical theory and application to architecture, engineering, and technical design are erected (Glaeser, 2020). Thus, successful understanding of circle geometry is of the highest priority to the realization of the advantages of the curriculum beyond enhancing the confidence and competence of students in mathematics.

Improvement of the quality of teaching mathematics over the last decade utilized the use of technology as a core strategy. Some examples of technology that have successfully facilitated learning interactions with abstract geometric ideas in an interactive and tangible fashion include interactive simulation, dynamic geometry software, and visualizations (İbili et al., 2020). The use of technology at large in TVET colleges would enable differentiated instruction, learner-centred pedagogies, and instant feedback, all of which assist in making sense and memorization of higher-level math concepts such as circle geometry easier (Ndlovu, 2023). In addition, this suggests that when embracing technology is in line with global trends in the education of STEM and prepares future workers for the technologically aligned work environments they will encounter.

This study focuses on assessing the effect of technology integration on the curriculum policy and planning of South African TVET colleges, with an emphasis on instruction of circle geometry at Level 4. Based on the consideration of pedagogical innovation, learner participation, and teaching approaches, this study presents evidence for teachers, curriculum planners, and policymakers to employ to improve the quality of mathematics teaching in the TVET sector. Despite recent improvements in pass rates, Mathematics in South Africa continues to face deep-rooted performance challenges (Department of Basic Education (DBE), 2025). The constant low performance of learners in matric results, achieving 40% reflects gaps in conceptual understanding and problem-solving skills. The widening gap between basic passes and higher achievement levels suggests that while access to the minimum standard has improved, the quality of learning remains uneven. In South Africa, the Post-School Education and Training (PSET) system, which includes the TVET colleges, is supposed to integrate Artificial Intelligence in the curriculum redesign, lecturer development, and digital infrastructure investment. Current planning documents and the National Digital and Future Skills Strategy explicitly position digital competence as a cross-cutting outcome and call for integrating ICT into programmes and pedagogy (Jagannathan, 2021). Within this policy document in the National Certificate Vocational (NCV) Mathematics, there is a need for technology integration because it connects many drawings, measurements, and algebra (Nedambale, 2024). However, technology on its own cannot guarantee transformation in teaching and learning; the successful integration depends on how mathematics didactics is used with it.

Research Problem & Rationale

Research Questions

As stated earlier, this study aims to examine how technology integration in the teaching of circle geometry at South African TVET colleges can inform curriculum design and policy development in mathematics education. The study seeks to bridge the gap between policy intent and pedagogical practice by exploring how technology-enabled teaching can enhance learners' understanding, lecturers' practice, and systemic curriculum frameworks, in alignment with the demands of the Fourth Industrial Revolution (4IR) and national education priorities. This study seeks to answer the questions:

1. What challenges and opportunities arise in integrating technology into geometry teaching within TVET contexts?
2. How do lecturers use digital technologies in teaching circle geometry, and what pedagogical strategies do they adopt?
3. How does technology integration inform curriculum design and teaching strategies in the instruction of circle geometry at the South African TVET colleges?

Review of Related Literature

Geometry is an important part of mathematics for the following reasons:

Firstly, it contributes to spatial reasoning and visualisation skills, which are not only foundational for more advanced mathematics (e.g., trigonometry, analytic geometry) but also increasingly relevant in STEM fields and in technologies that rely on spatial understanding (robotics and modelling).

Geometry remains central in mathematics education for several interconnected reasons. First, it contributes to spatial reasoning and visualisation skills, which are not only foundational for more advanced mathematics (e.g. trigonometry, analytic geometry) but also increasingly relevant in STEM fields and in technologies that rely on spatial understanding (CAD, robotics, modelling). For instance, Gamage and Charles-Ogan (2019) show that using technology (GeoGebra) in teaching circle geometry improves conceptual understanding in learners; therefore, both the learners' performance and their interest improve.

Secondly, geometry develops logical and deductive reasoning, particularly through proof and theorems. Mudhefi et al. (2024) emphasise that beyond rote that include memorisation, learners also struggle with understanding properties of shapes, visualisation, and geometry terminology, which are critical for building deductive reasoning.

Thirdly, geometry, especially circle geometry, holds a place in curriculum policy and assessment in many countries (including South Africa), meaning that competence in this area is essential for learners' success in national examinations and further studies. For example, Motseki and Jojo (2022) in their work in South African TVET colleges have discovered that using the Geometer's Sketchpad significantly improved the understanding of circle geometry among Level 4 students. This is an indication that curricula that include geometry components that can align with technology use can lead to improved outcomes.

Finally, geometry also has key pedagogical benefits because it can serve as a basis for integrating other areas of mathematics (algebra, coordinate geometry), strengthen general

mathematical thinking, and help with the transition from concrete to abstract reasoning. For instance, the use of Van Hiele's levels in several recent studies indicates that curriculum design that attends to how learners move through geometric thinking stages can make geometry teaching more effective (Bediako, 2021; Candiotes, 2023).

Within mathematics education, circle geometry remains a challenge for many learners because it is taught in abstract ways that fail to use digital tools for visualisation and exploration (Jones, 2003). Research demonstrates that the effective integration of digital technologies such as dynamic geometry software can enhance learners' conceptual understanding and reasoning (Guven, 2012; Leung et al., 2024). However, such practices are not systematically embedded within the Curriculum and Assessment Policy Statement (CAPS) under DBE or the curriculum frameworks of the TVET sector overseen by DHET (Vuthela & Ngumbela, 2024). The problem lies in the disconnect between the policy plan and curriculum implementation**.** While DHET and DBE call for ICT integration, they provide limited guidance on the pedagogical models and assessment practices needed to integrate technology meaningfully into mathematics education curriculum. Also, curriculum policy sometimes mandates geometry components without giving sufficient support (in teacher development workshops, resources, or assessment design) to ensure that geometry is taught in a way that fosters understanding rather than shallow coverage.

Teaching With Technology Using the TPACK Framework

This study was embedded within the theoretical framework of Technological Pedagogical Content Knowledge (TPACK)since it offers a means of exploring the key concepts in the study.

The Technological Pedagogical Content Knowledge (TPACK) framework was developed by Mishra and Koehler (2006). It extends Shulman's concept of Pedagogical Content Knowledge (PCK) by adding the technological dimension. TPACK suggests that effective teaching with technology requires the integration of three forms of knowledge: content knowledge (CK), which is the subject matter to be taught (in this case, circle geometry); pedagogical knowledge (PK), which refers to the teaching strategies; and technological knowledge (TK**),** which relates to the use of digital tools and resources. The value of TPACK lies in highlighting that these domains cannot operate in isolation; therefore, teachers need integrated knowledge that combines technology, pedagogy, and content to design meaningful, technology-enhanced learning experiences (Koehler et al., 2013).

The TPACK framework is relevant to this study because it explains how and why lecturers integrate technology into the teaching of circle geometry. Mathematics teaching often requires learners to move between abstract reasoning and visual representations, making the thoughtful use of digital tools such as GeoGebra particularly powerful. However, research has shown that access to technology alone is insufficient; teachers must develop the pedagogical and content expertise needed to use these tools effectively (Alenezi, 2017; Bingimlas, 2009). Within the South African TVET sector, where lecturers often face uneven professional development opportunities and infrastructural challenges, the TPACK framework provides a useful lens for analysing both successes and shortcomings in technology use. By applying TPACK, this study can inform whether lecturers are replacing traditional methods with digital equivalents or whether they are getting deeper integration where technology reshapes the way circle geometry is taught and understood. Such insights are important not only for improving classroom practice but also for informing curriculum design and policy development under the directives of DHET and DBE.

Methodology

Interpretive Research Paradigm

This study was framed within an interpretive research paradigm, which seeks to understand how individuals construct meaning within their specific contexts (Pervin & Mokhtar, 2022). Five mathematics lecturers who are teaching in South African TVET colleges were the participants. They were purposively sampled from a group of fifteen participants who teach mathematics at five different colleges. These participants were purposively selected because of their direct involvement in teaching circle geometry and their varying levels of experience with technology (Campbell et al., 2020).

The questionnaire that was used for this study belongs to a qualitative study. This study employed the Open-ended Questionnaires and the semi-structured interviews: These were used to gather baseline information on lecturers' experiences, perceptions, and practices related to technology integration. Together, these methods ensured data triangulation, enhancing the credibility and trustworthiness of the findings.

The interview analysis began with coding the themes that were identified from the data collected. The themes were created around the technology use of lecturers in the teaching of circle geometry, with the expectations for changing the education policies at the TVET Colleges.

Ethics strategies were observed before, during, and after this qualitative study. Before conducting the study, a gatekeeper application was written to the Department of Higher Education and Training and the college rector to conduct this qualitative study in three different campuses of the TVET College located in the Majuba district. Permission to conduct the study was granted. Also, consent letters were written to mathematics lecturers who teach level 4 (participants), requesting them to be engaged in the study.

Each participant had a consent letter addressed to them, where they were made aware that they had a right to consent to the letter by signing or to refuse to be part of the study. All participants who consented were called to the lecture theatre to inform them of the study, the phenomenon, purpose, and objectives. They were also informed that they had a right to withdraw during the study.

The participants' anonymity and confidentiality rights were taken into consideration. All participants were provided with my contact details and individual appointments to meet the privacy criteria. I also asked permission to conduct a study from the Research Office of the University of KwaZulu-Natal, where ethical clearance was approved.

During the study, all ethical issues were observed by avoiding mistreatment of the participants regarding age, religion, family background, culture, gender, and race. During data collection, confidentiality and anonymity of the participants were maintained using (lecturer A, lecturer B, lecturer C, lecturer D, and lecturer E) respectively, not using their real identification. It was disclosed to the lecturers that the study had no remuneration and was voluntary. The clear, appropriate, and straightforward language was used. Sharing data with other researchers and other participants was avoided. Participants were informed that copies of the data would be sent to them. Confidentiality for this study was taken into consideration. Participants were informed that data would be kept for five years in a safe cabinet at the university.

Findings and Discussions

Disparities in Technology Access

This theme was identified because the lecturers demonstrated varying levels of comfort and competence with digital tools, highlighting the need for differentiated professional development. The lecturers gave various meanings concerning the access.

All the lecturers gave different opinions concerning the various experiences with technology access. This revealed inequities in access to technology among both lecturers and students. Some colleges were better resourced, enabling lecturers to experiment with dynamic geometry software and online platforms, while others had little to no access. As mentioned above, lecturers reported that many TVET colleges lacked adequate computer laboratories, projectors, and access to licensed dynamic geometry software. Even where resources existed, they were often outdated or poorly maintained. This limitation not only hindered innovative teaching but also restricted students' exposure to technology-enhanced learning, reinforcing a reliance on traditional chalkboard methods.

This suggests that the students from disadvantaged backgrounds also lack personal devices or reliable internet connections, which creates disparities in participation and learning outcomes. These inequalities limited the scalability of technology integration and highlighted the need for policy interventions that prioritise equitable access.

Pedagogical Opportunities

Technology was seen as valuable in visualising abstract concepts in circle geometry, particularly through dynamic geometry software, which enhanced learners' conceptual understanding. When the participants were asked: How has technology changed how your students learn geometry?

The lecturer's use of technology can transform the teaching and learning of circle geometry by enabling the learner-centred visualisation of abstract concepts. This suggests that using technology has shifted from content delivery to an inclusive pedagogy that prioritises perspectives.

The use of online resources and software illustrates the potential of digital tools to scaffold spatial reasoning, allowing learners to manipulate and view shapes from different angles, thereby addressing challenges such as difficulty in imagining 3D objects. This resonates with the TPACK framework, where technology is not merely an add-on but a core enabler of conceptual understanding. From a curriculum and policy perspective, this underscores the need to integrate visualisation tasks using technology into the mathematics curriculum, while ensuring equitable access to digital tools across TVET colleges. Moreover, this emphasises the potential of technology to remediate learners' foundational weaknesses in mathematics, while also highlighting gaps in curriculum design and lecturer preparation that must be addressed at both institutional and policy levels.

Contextual Challenges

One of the participants mentioned that there is a challenge to use the technology due to some experienced challenges on campus.

Lecturers identified significant barriers, including limited access to ICT infrastructure, unreliable internet connectivity, and a lack of institutional support. The lecturer's statements address the contextual challenges that prevent the integration of technology in mathematics teaching and learning within TVET colleges. Although technological infrastructure, such as smartboards and data projectors, is physically available, it is often vandalised, misused, or left idle due to limited lecturer awareness and a lack of institutional support. The shared use of classrooms with colleagues who are not trained to operate available technologies further complicates the problem, also reflecting the systemic gaps in professional development. Moreover, the absence of reliable internet connectivity and restrictions on installing free educational software such as GeoGebra highlight structural and bureaucratic barriers that prevent lecturers from fully utilising digital resources. These issues point to a broader disconnect between policy aspirations and classroom realities: while curricula and policy frameworks encourage technology integration, resource degradation, theft, poor maintenance, and rigid ICT policies severely constrain practice. This testimony underscores how contextual barriers, ranging from infrastructure insecurity to institutional resistance, limit the transformative potential of technology for enhancing learners' understanding of mathematics.

Curriculum and Policy Implications

Participants expressed the need for curriculum guidelines that explicitly incorporate technology use in mathematics teaching, suggesting that policy frameworks often lag behind classroom realities.

Participants expressed the need for curriculum guidelines that incorporate technology use in mathematics teaching. They suggested that policy frameworks often have a gap behind classroom realities. While national and institutional policies encourage the integration of digital tools, they frequently lack concrete guidelines on how lecturers should embed technology into specific mathematical topics, such as circle geometry. As a result, technology use is often left to individual use, dependent on lecturers' initiative, digital literacy, and access to functional resources. This creates uneven implementation across colleges, with some lecturers attempting to integrate while others avoid technology altogether due to uncertainty or lack of training. The absence of curriculum-embedded strategies also means that lecturers are not supported in linking technology with learning outcomes, assessment practices, or remediation of learners' conceptual gaps. Consequently, even where technological infrastructure is available, its pedagogical potential is imbalanced in its use. Within this conference context, this gap underscores the challenge of aligning high-level policy intentions with practical curriculum design and classroom execution. It highlights an urgent need for curriculum guidelines that go beyond aspirational statements to provide clear, discipline-specific pathways for embedding technology into mathematics teaching, ensuring consistency and equity across the TVET sector.

Professional Identity and Confidence

Some lecturers felt that technology integration challenged their traditional teaching methods, while others embraced it as an opportunity for professional growth.

Some lecturers felt that technology integration compromised their traditional teaching methods, while others took it as an opportunity for professional growth. For those who enjoyed the traditional chalk-and-talk approaches, the shift towards digital tools disturbed their comfort zone and raised questions about their competence and authority in the classroom. Feelings of

uncertainty, frustration, and even resistance emerged when lecturers were expected to explore unfamiliar software or manage technical difficulties in front of learners. This often undermined their confidence, stressing that technology was imposed rather than a norm of their professional practice. In contrast, other lecturers viewed technology as a means to redefine and enrich their professional identity, positioning themselves as innovators who could make mathematics more accessible and engaging. For these participants, experimenting with tools such as dynamic geometry software not only boosted their confidence but also cultivated a sense of pride in adapting to modern pedagogical demands. The divergence in responses highlights a key challenge: professional identity in the TVET sector is unevenly shaped by lecturers' prior experiences, access to training, and institutional support. Within this conference paper framework, this underscores the importance of structured professional development that both validates traditional expertise and equips lecturers with the confidence to integrate technology meaningfully, enabling a shift from resistance to professional empowerment.

Limitation of the Study

The limitation of this study involved the lecturers who taught level 4 mathematics because of the study scope of geometry, which is only done at the exit level. This influenced the generalisation of study in other areas. A qualitative study was used to apply a case study with one-on-one interviews and an open-ended questionnaire. Observations were not done since they may take too long to complete, considering the pandemic era where Covid-19 limits the number of people in the classrooms.

Future Recommendations

Based on the implications, the following recommendations can be made to improve the teaching and learning of circle geometry in TVET colleges:

1. Enhance Technological Infrastructure in TVET Colleges

Recommendation: Colleges should prioritise upgrading and maintaining ICT facilities, including computers, projectors, and licensed dynamic geometry software. Adequate access to technological resources will enable lecturers to integrate digital tools more effectively, moving beyond traditional chalk-and-talk methods.

Rationale: Without reliable and functional infrastructure, the potential of technology to transform mathematics teaching remains unrealised. The recurring issues of vandalism, outdated equipment, and lack of software access, as expressed by participants, highlight that lecturers are often forced to revert to traditional chalk-and-talk methods. Upgrading and maintaining ICT facilities is therefore a foundational requirement: it provides the basic conditions under which innovative teaching practices can flourish and ensures that policy aspirations are not undermined by material constraints.

2. Professional Development in Integrated TPACK

Recommendation: Structured training programs should be developed to help lecturers build not only CK, PK, and TK but also TCK, TPK, and full TPACK. Workshops and continuous professional development (CPD) initiatives should focus on practical strategies for combining technology, pedagogy, and content knowledge, specifically in the context of circle geometry.

Rationale: Even where infrastructure exists, lecturers struggle to integrate technology effectively if they lack the pedagogical confidence and integrated knowledge base to do so. Participants frequently reflected on their tentative, exploratory use of tools such as dynamic geometry software, revealing gaps in their TCK, TPK, and TPACK. Structured CPD opportunities will not only build lecturer confidence but also support the redefinition of professional identity in a technology-rich environment, moving beyond surface-level use of tools to meaningful integration that improves learner outcomes.

3. Strengthen Students' Foundational Mathematics Skills

Recommendation: Colleges should implement remedial or bridging programs for students with weak mathematical backgrounds before introducing technology-intensive learning. Early intervention will ensure students are better prepared to engage meaningfully with technology-enhanced instruction.

Rationale: The success of technology integration is not only dependent on lecturer readiness but also on learner preparedness. Many students in TVET colleges enter with significant gaps in foundational mathematics, which hinders their ability to engage productively with technology-enhanced instruction. For example, dynamic software may allow visualisation of geometric concepts, but without basic algebraic or spatial reasoning skills, learners cannot fully benefit from such affordances. Remedial and bridging programs are therefore necessary to level the playing field, ensuring that technology serves as an enhancer rather than a barrier to learning.

4. Address Disparities in Technology Access

Recommendation: Policies should aim to reduce inequities in access to devices, software, and internet connectivity. Partnerships with the private sector, government funding, or blended learning approaches could ensure that all students and lecturers can participate equally in technology-supported mathematics teaching.

5. Curriculum and Policy Alignment

Recommendation: The findings under this theme suggest that the curriculum frameworks should integrate technology strategies in mathematics courses. This should give clear guidelines and directives on how lecturers should use digital tools within the content teaching, assessment, and student engagement practices.

Conclusion

This study has highlighted the complex interplay between technology integration, lecturer readiness, student preparedness, and institutional constraints in the teaching of circle geometry within South African TVET colleges. While technology holds significant promise for enhancing learners' spatial reasoning and bridging gaps in conceptual understanding, its impact is severely constrained by contextual challenges such as inadequate infrastructure, vandalism, inequitable access, and rigid ICT policies. Lecturers' reflections further reveal that their professional identity and confidence are shaped by the extent to which they are supported through structured professional development and curriculum guidelines that move beyond aspirational policy statements to concrete classroom practices. At the same time, students'

weak mathematical foundations remain a critical barrier, underscoring the need for targeted interventions that prepare them to engage meaningfully with technology-enhanced learning.

For DHET and other stakeholders, the insights offered here provide direction for designing responsive curriculum frameworks and institutional policies that acknowledge the realities of the TVET context while leveraging the transformative potential of digital tools. Ultimately, sustainable integration of technology in mathematics teaching will depend not only on resources but on the collective effort to reimagine pedagogy, strengthen professional practice, and create enabling conditions that position TVET colleges as drivers of educational innovation and equity. The resolution of such problems could enhance learning performance as well as practice teaching alignment with the Department of Higher Education and Training (DHET) strategic intentions for skill development (Paterson et al., 2024).

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

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Teachers' Psychological Literacy in Practice

Lucia Rapsová, Constantine the Philosopher University in Nitra, Slovakia
Katarína Grznárová, Constantine the Philosopher University in Nitra, Slovakia

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Abstract

Psychological literacy is one of the most important literacies of the 21st century, and it is crucial to include it in the primary outcomes of undergraduate training for future teachers. This study aimed to determine the levels and differences in psychological literacy among teachers at different levels of education (kindergarten teachers, primary school teachers at the first degree of education, primary school teachers at the second degree of education, secondary school teachers, and school directors). The research sample consisted of 180 teachers working in kindergartens, primary and secondary schools in the Slovak Republic, aged 20-64 (M = 44.61; SD = 10.50). We measured psychological literacy using several scales covering selected components of psychological literacy - psychological misconceptions (Psychological Misconceptions Questionnaire – Rapsová & Ballová Mikušková, manuscript in preparation), dispositions for critical thinking – critical openness, reflective scepticism (Critical Thinking Disposition Scale CTDS – Sosu, 2013), trust in science (Credibility of Science Scale CSS – Hartman, 2017), integrity (Integrity Scale IS - Schlenker, 2008). We used a one-factor analysis of variance (ANOVA) to verify the differences between the groups, and we found statistically significant differences in the trust in science component ($F(4, 175) = 2.67$, $p = .014$) and the integrity component ($F(4, 175) = 3.8$, $p = .018$). Post hoc analysis (Tukey HSD) showed that primary school teachers at the first degree of education scored significantly lower on trust in science ($p = .014$) and integrity ($p = .009$) than secondary school teachers. The results point to the need to develop psychological literacy tailored to teachers' professional focus. They support the inclusion of the construct of psychological literacy in the undergraduate preparation of teacher students and in the further education of teachers in practice.

Keywords: psychological literacy, psychological misconceptions, critical thinking dispositions, trust in science, integrity, teacher

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Introduction

As teachers are in direct contact with pupils, influencing, shaping, and developing their personalities, they must possess the knowledge, skills, and abilities that predestinate them for high-quality performance in this profession (Rapsová, 2021). In line with the increasing demands on the teaching profession, teachers should be experts not only in pedagogy but also in psychology. In this context, we can talk about a psychologically literate teacher.

Since its first definition, psychological literacy has been associated with psychology students and the psychological profession. However, Hakim (2015) points out that psychological literacy is not only the privilege of the psychological profession but is also necessary for the teaching profession. Throuvala et al. (2021) highlight the importance of pupils' healthy psychological development. They argue that teachers' lack of psychological knowledge and, consequently, their incorrect educational practices can affect or even disrupt the mental health of pupils. Cranney et al. (2022) also discuss the increased need for psychological education in the helping professions. According to the authors, this urgency became evident in the post-COVID period, which has brought with it many emotional and social problems, a growing prevalence of mental disorders, deepening social and economic inequalities, and an increased need for universities to produce flexible graduates. According to the authors, psychological education can help address these problems. Kosíková (2011), Sokolová et al. (2014) point out that teacher education should focus more on the development of competences and new literacies, especially psychological literacy. Hulme & Cranney (2021) and Cranney et al. (2022) consider psychological literacy one of the most essential literacies of the 21st century and argue that it should be the primary outcome of university education. In agreement, Pownall et al. (2022) state that psychological literacy can enhance performance quality in the helping professions. They see this benefit mainly in professional knowledge related to the experiences and behaviour of individuals, in research skills, and in the application of ethical principles (not only) in research.

It has not yet been determined whether to use a single scale to measure psychological literacy or multiple measurement methods to assess its individual components. Chester et al. (2013) recommend assessing psychological literacy by measuring its individual components outlined by McGovern et al. (2010). Based on the recommendations of Chester et al. (2013), Roberts et al. (2015) conducted a study in which they measured psychological literacy using several questionnaires that mapped the individual components of psychological literacy. Inspired by this research, we identified psychological misconceptions, critical thinking dispositions, trust in science, and integrity as key components of psychological literacy.

Psychological misconceptions are often defined as widespread beliefs that contradict established evidence (Gardner & Brown, 2013) and lack empirical support (Hughes et al., 2015). Individuals form misconceptions based on personal experience or through misinformation promoted by the media or the general public. However, this information is not consistent with basic psychological concepts, theories, and current empirical evidence (Tulis, 2022).

Dispositions for critical thinking examine the tendency to do something (Ennis, 1996) or the way individuals approach a task (Ku & Ho, 2010, cited in Sosu, 2013). Facione et al. (1995) define dispositions for critical thinking as a set of attitudes, intellectual virtues, or habits of mind that describe the way an individual reasons, argues, and makes decisions. Sosu (2013) discusses two dispositional domains in relation to critical thinking dispositions: critical

openness and reflective scepticism. He understands critical openness as the ability to modify one's opinions and thinking in response to convincing evidence, and reflective scepticism is the ability to critically evaluate information, question evidence, and learn from past experiences.

Another component of psychological literacy is trust in science. Wintterlin et al. (2022) define trust in science as the willingness of an individual or group to rely on science, scientists (as representatives of the system), and empirical evidence, despite a limited understanding of science and the risk of not reaching the "truth".

Integrity is the last indicator of psychological literacy in our research. In general, we can understand integrity as a person's inner wholeness. It is considered the basis for optimal personality functioning (Nábělková & Kahancová, 2013). According to Schlenker (2008), it represents a more substantial personal commitment to moral identity, which positively influences interpersonal relationships. Moreover, adherence to ethical principles helps resist the temptation to engage in illegal activities. According to the aforementioned author, integrity also includes a person's unwillingness to violate their principles, regardless of temptations or others' preferences. The attributes of integrity include principledness (holding clear values and acting in accordance with them), honesty (truthfulness, veracity, trustworthiness), concern for others (care, kindness, empathy, unselfishness), and reliability (Aquino & Reed, 2002). These indicators are consistent with Schlenker's understanding (2008).

Psychological literacy is a crucial part of teachers' professional competence, shaping the quality of the educational process and pupils' psychological well-being. Examining its level among different groups of teachers provides a better understanding of how psychological literacy manifests itself and how teachers apply it in pedagogical practice. At the same time, it provides insights that can optimise teacher training and the targeted development of their psychological competences.

The research aimed to determine the levels and differences in selected components of psychological literacy among teachers at different levels of education: kindergarten teachers, primary school teachers at the first degree of education, primary school teachers at the second degree of education, secondary school teachers, and school directors.

Methodology

A total of 180 Slovak teachers working in schools participated in the study. Our research sample shows a significant predominance of women (93%), a feature specific to the teaching profession – its feminisation. The predominance of women corresponds to the representation of women in the Slovak educational system. Participants' ages ranged from 20 to 64 years (M = 44.61; SD = 10.50). We administered the test battery to school directors and teachers at different levels of education. The most significant proportion of the research sample consisted of secondary school teachers (N = 45) and primary school teachers at the second degree of education (N = 40). Primary school teachers at the first degree of education (N = 35), school directors (N = 41) and kindergarten teachers (N = 29) also participated in the research. We asked participants to take part in the research via an email sent to the school directors of all kindergartens, primary and secondary schools in Slovakia. We obtained the relevant email addresses from freely available information provided by the Slovak Centre for Scientific and Technical Information. We conducted the research online via the Survio platform, and we collected the data in the spring of 2025. Participants signed a consent form to participate in the

research. The study was conducted in accordance with the ethical principles established by the American Psychological Association.

In terms of psychological literacy, we focused on measuring its selected components: psychological misconceptions and dispositions towards critical thinking – critical openness, reflective scepticism, trust in science, and integrity.

To assess belief in psychological misconceptions, we used the Psychological Misconceptions Questionnaire (Rapsová & Ballová Mikušková, manuscript in preparation), which was compiled from statements from the questionnaires by Tulis (2022) and McAfee and Hoffman (2021). The questionnaire contains 25 items, each of which collects individual psychological information that professionals and the lay public often present. Some of the psychological knowledge presented is true, while other statements are false and represent common misconceptions about psychological knowledge or its incorrect interpretations. Participants' task is to evaluate the statements on a 5-point scale (*1 – strongly disagree, 2 – disagree, 3 – no opinion, 4 – agree, 5 – strongly agree).* A higher score indicates a stronger belief in psychological myths.

We measured critical thinking dispositions using the Critical Thinking Disposition Scale – CTDS (Sosu, 2013). The scale contains 11 items – statements that participants rate on a 5-point scale (1 – *strongly disagree, 2 – disagree, 3 – no opinion, 4 – agree, 5 – strongly agree)*. Participants evaluate each statement in relation to themselves and their behaviour. The items focus on two dispositional domains – critical openness (7 items) and reflective scepticism (4 items) – that underpin critical thinking ability. Reflective scepticism is understood here as an individual's ability to view information critically, question evidence and learn from past experiences. On the other hand, the domain of critical openness is the ability to modify one's opinions and thinking in response to convincing evidence. A higher average score indicates greater critical openness and reflective scepticism.

We used a modified version of the Credibility of Science Scale CSS (Hartman, 2017) to measure trust in science. The scale consists of six statements, with participants indicating their degree of agreement or disagreement on a 5-point scale (1 – *strongly disagree, 2 – disagree, 3 – no opinion, 4 – agree, 5 – strongly agree)*. The modification of the tool consists of reducing the 7-point scale to a 5-point scale, which is considered more efficient (Hartman, 2017). The higher the participants' average scores, the greater their trust in science.

We measured integrity using the Integrity Scale IS (Schlenker, 2008), which consists of 18 items formulated as statements. Participants express their level of agreement or disagreement with the statements on a 5-point scale (1 – *strongly disagree, 2 – disagree, 3 – no opinion, 4 – agree, 5 – strongly agree)*. The integrity scale focuses on identifying attitudes and personality traits that predict desired ethical behaviour and thus lead to greater psychological well-being, better stress management, and effective functioning within the social system. A higher score on the integrity dimension indicates a more substantial presence of integrity traits in the personality.

Results

Table 1 provides descriptive statistics for the indicators of psychological literacy (psychological misconceptions, critical openness, reflective scepticism, trust in science, and integrity) identified by us in teachers in practice.

The results show that, in practice, teachers tend to hold stronger beliefs in psychological misconceptions. However, there are only slight differences in preferences between the teacher groups.

When measuring the dispositional domains of critical thinking – critical openness and reflective scepticism - we found high average values in both dispositions across all teacher groups, ranging around the level four (on a five-point scale). School directors and primary school teachers at the first degree of education achieved the highest values in both domains.

Secondary school teachers expressed the highest level of trust in science. Primary school teachers at the second degree of education and school directors achieved slightly lower average scores. Kindergarten teachers showed a medium level of trust in science. In contrast, primary school teachers at the first degree of education achieved the lowest scores, indicating relatively weaker trust in science than other groups.

Descriptive analysis showed an average to higher level of integrity among teachers in practice. The highest scores were achieved by secondary school teachers, indicating the most integrity-oriented behaviour. Subsequently, school directors and primary school teachers at the second degree of education followed with slightly above-average scores. Kindergarten teachers showed a medium level of integrity, while primary school teachers at the first degree of education achieved the lowest scores among the teacher groups.

Table 1

Descriptive Statistics of Psychological Literacy Among Teachers in Practice

		M	SD	min	max
PMC	kindergarten teacher	3.22	0.28	2.72	3.76
	primary school teacher at the first degree	3.21	0.34	2.28	3.92
	primary school teacher at the second degree	3.22	0.31	2.56	3.80
	secondary school teacher	3.20	0.30	2.44	3.88
	school director	3.25	0.25	2.68	3.84
CTDS_CO	kindergarten teacher	4.18	0.67	3.00	5.00
	primary school teacher at the first degree	4.32	0.46	3.43	5.00
	primary school teacher at the second degree	4.21	0.53	3.00	5.00
	secondary school teacher	4.30	0.48	3.43	5.00
	school director	4.45	0.45	3.14	5.00
CTDS_RS	kindergarten teacher	4.26	0.72	2.75	5.00
	primary school teacher at the first degree	4.36	0.67	2.25	5.00
	primary school teacher at the second degree	4.29	0.56	3.00	5.00
	secondary school teacher	4.22	0.63	2.50	5.00
	school director	4.42	0.52	3.00	5.00
ST	kindergarten teacher	3.62	0.82	2.17	5.00
	primary school teacher at the first degree	3.39	0.85	1.00	5.00
	primary school teacher at the second degree	3.97	0.91	1.00	5.00
	secondary school teacher	4.40	0.88	2.00	5.00
	school director	3.82	1.80	1.50	5.00
I	kindergarten teacher	3.78	0.51	2.73	4.79
	primary school teacher at the first degree	3.66	0.45	2.71	4.57
	primary school teacher at the second degree	3.83	0.42	3.70	4.80
	secondary school teacher	4.20	0.43	2.93	4.80
	school director	3.89	0.55	2.93	4.80

Note. PMC – psychological misconceptions, CTDS_CO – disposition towards critical thinking – critical openness, CTDS_RS – disposition towards critical thinking – reflective scepticism, ST – trust in science, I – integrity, M – mean, SD – standard deviation, min – minimum, max – maximum

Based on the data analysis, a one-factor analysis of variance (ANOVA) was used to test for differences among individual positions in the teaching profession across selected components of psychological literacy (Table 2). The results showed that there were no statistically significant differences between the groups in the components of psychological literacy — psychological misconceptions, critical openness, and reflective scepticism. All groups achieved comparable scores in understanding psychological concepts, openness to new information, and the ability to reflect critically on the reliability of knowledge. Therefore, we can assume that these attributes of psychological literacy are relatively stable across educational levels and are not significantly influenced by job position. However, we found a statistically significant difference in the trust in science (ST) component, $F(4, 175) = 2.67$, $p = .014$. Post hoc analysis (Tukey HSD) showed that primary school teachers at the first degree of education achieved significantly lower scores in trust in science than secondary school teachers ($p = .014$). A similar trend was evident in the integrity (I) component, where group differences were also statistically significant, $F(4, 175) = 3.8$, $p = .018$. Post hoc analysis confirmed that primary school teachers at the first degree of education achieved significantly lower integrity scores than secondary school teachers ($p = .009$). We present post hoc comparisons (Tukey HSD) between positions in the teaching profession in the psychological literacy components of trust in science and integrity in Table 3.

Table 2

Results of One-Factor Analysis of Variance (Anova) for Components of Psychological Literacy by Position in the Teaching Profession

		Components of psychological literacy				
		PMC	CTDS_CO	CTDS_RS	ST	I
Positions in the teaching profession	F(4, 175)	0.10	1.34	0.57	2.67	3.80
	p	.982	.257	.683	**.014***	**.018***

Note. PMC – psychological misconceptions, CTDS_CO – disposition towards critical thinking – critical openness, CTDS_RS – disposition towards critical thinking – reflective scepticism, ST – trust in science, I – integrity, $F(df_1, df_2)$ – value of the test statistic of one-factor analysis of variance (ANOVA), where df_1 represents degrees of freedom between groups and df_2 degrees of freedom within groups; p – level of statistical significance, * $p < .05$

Table 3

Post Hoc Comparisons Between Positions in the Teaching Profession in the Components of Psychological Literacy – Trust in Science and Integrity

Component PL	Comparison of positions in the teaching profession		MD	p Tukey	Cohen's d
ST	kindergarten teacher	primary school teacher at the first degree	0.22	0.862	0.25
		primary school teacher at the second degree	-0.35	0.507	-0.39
		secondary school teacher	-0.43	0.277	-0.47
		school director	-0.21	0.902	-0.23
	primary school teacher at the first degree	primary school teacher at the second degree	-0.58	0.052	-0.63
		secondary school teacher	-0.65	**0.014***	-0.72
		school director	-0.43	0.306	-0.48
	primary school teacher at the second degree	secondary school teacher	-0.08	0.995	-0.09
		school director	0.14	0.964	0.16
	secondary school teacher	school director	0.22	0.833	0.24
I	kindergarten teacher	primary school teacher at the first degree	0.11	0.873	0.24
		primary school teacher at the second degree	-0.05	0.992	-0.11
		secondary school teacher	-0.24	0.200	-0.51
		school director	-0.11	0.879	-0.24
	primary school teacher at the first degree	primary school teacher at the second degree	-0.16	0.555	-0.35
		secondary school teacher	-0.35	**0.009***	-0.76
		school director	-0.23	0.286	-0.49
	primary school teacher at the second degree	secondary school teacher	-0.19	0.340	-0.41
		school director	-0.06	0.980	-0.14
	secondary school teacher	school director	0.13	0.775	0.27

Note. PL – psychological literacy, ST – trust in science, I – integrity, MD – Mean Difference – difference in means between groups, p Tukey – level of statistical significance according to Tukey's HSD test, Cohen's d – effect size, * $p < .05$ – statistically significant difference

Discussion

The study focused on determining the levels and differences in psychological literacy among Slovak teachers in practice and school directors at various levels of education – kindergarten teachers, primary school teachers at the first degree of education, primary school teachers at the second degree of education, secondary school teachers, and headteachers. We measured psychological literacy using several scales covering its selected components (psychological misconceptions, dispositions towards critical thinking – critical openness, reflective scepticism, trust in science, and integrity), as there is currently no single measurement tool for this construct.

Regarding the prevalence of psychological misconceptions among teachers, the results show that, in practice, teachers tend to believe more in psychological myths. We found no statistically significant differences between the groups studied in this component of psychological literacy. Our findings on the relatively high level of belief in psychological misconceptions are also supported by previous studies investigating the prevalence of psychological myths among teachers in practice (Menz et al., 2021; Pieschl et al., 2021; Tulis, 2022). Tulis (2022) found that teacher students and practising teachers show a high level of support for psychological misconceptions. These psychological myths relate directly to the knowledge areas necessary for high-quality performance in the teaching profession. One reason for the high level of support for psychological myths among teachers is mistrust or underestimation of scientific evidence and a preference for unofficial beliefs. Adherence to psychological or other myths can be potentially harmful. Teachers who prefer psychological misconceptions may teach less effectively than those who draw on valid psychological knowledge based on empirical evidence (Bensley et al., 2014). They may then pass these myths on to their own pupils and students, further spreading the myths. For this reason, it is crucial to enrich undergraduate training and further teacher education with professional teaching materials and procedures specifically designed to dispel psychological myths.

In relation to teachers in practice, we focused our attention on their disposition towards critical thinking (critical openness and reflective scepticism). The relatively high average scores in both dispositions, as measured by a self-assessment scale, indicate that teachers are actively open to seeking and applying new ideas. They have no problem changing some of their firmly held beliefs when confronted with convincing evidence. They try to think in a broader context, so they need to understand other people's views on a given issue. To form a comprehensive view, they seek out multiple reliable sources of information. They tend to justify their decisions and think about their broader implications before taking action. They often re-evaluate their experiences and actions in order to learn from them or improve them.

These results indicate that the teachers in the studied sample have relatively strong dispositional predispositions toward critical thinking, an essential element of psychological literacy. The ability to reflect on one's own beliefs, openness to new information, and willingness to revise one's attitudes are crucial not only to teachers' personal and professional development but also to their pupils' development. The levels of these dispositions varied minimally across the teacher groups, suggesting these domains are relatively stable characteristics. From a pedagogical practice perspective, these findings support the need to develop critical thinking during the preparation of future teachers systematically and to reinforce it through further professional development.

In summary, the results showed that there were no statistically significant differences between the groups in the components of psychological literacy – psychological misconceptions, critical openness, and reflective scepticism. All groups achieved comparable scores in understanding psychological concepts, openness to new information, and the ability to reflect critically on the reliability of knowledge. Therefore, we can assume that these attributes of psychological literacy are relatively stable across levels of education and are not significantly influenced by job position. We think that these components are formed more through long-term professional and personal development than through dependence on the position in the teaching profession to which teachers belong.

However, data analysis revealed significant differences between primary school teachers at the first degree of education and secondary school teachers in two components of psychological literacy: trust in science and integrity. Primary school teachers at the first degree of education achieved significantly lower scores in trust in science and integrity than secondary school teachers. Higher trust in science among secondary school teachers reflects a stronger identification with science and rational thinking. Their professional activity is closely linked to teaching subjects (e.g., natural sciences, social sciences, technical sciences), in which it is vital to apply scientific knowledge systematically. It is therefore likely that these teachers follow new professional and scientific information, either to update the curriculum or because their students require a deeper, more up-to-date explanation of phenomena. This fact may support their positive attitude towards science and its credibility. Conversely, primary school teachers at the first degree of education may be more focused on the didactic and pedagogical aspects of teaching than on scientific content. Their primary task is to develop pupils' basic knowledge, social skills, and motivation, thereby reducing the need to reflect on scientific knowledge.

The same pattern of differences was also evident in the integrity component. We can understand the significantly higher integrity among secondary school teachers in the context of professional identity and ethical self-perception. Secondary school teachers often face moral and value dilemmas. At the same time, they act as value and moral role models for older pupils, which requires consistency between beliefs, values and behaviour, as well as their willingness to act in accordance with internal ethical principles under challenging situations – i.e. integrity in its broader sense. Higher integrity may also be associated with greater autonomy in decision-making, which is generally higher among higher education teachers than among primary school teachers at the first degree of education. In our opinion, both components (trust in science and integrity) share a common root in reflective and value-oriented thinking. We can assume that teachers who are more open to scientific thinking and trust science more also tend to act consistently and responsibly because they perceive the world as predictable, rationally organised and value-anchored. The results may point to different conditions in the teaching profession across levels of education – higher levels place greater emphasis on academic values, autonomy, and critical thinking. In comparison, lower levels are more oriented towards the educational aspect. Another likely explanation for the differences observed is the differing structures and orientations of undergraduate teacher preparation. While the curriculum for secondary school teachers is more oriented towards subject-specific content and the scientific basis of subjects (e.g., psychology, biology, physics), primary school teachers at the first degree of education have undergraduate training that is more pedagogically oriented, leading to a stronger educational orientation but less scientific reflection. Another factor influencing the differences found may be the different nature of professional experience. Secondary school teachers more often engage in discussions with pupils who critically reflect on the world and ask questions about sources of knowledge, thereby forcing teachers to rely on facts and scientific arguments. At the same time, working with adolescents and teenagers often involves

addressing moral and ethical dilemmas, which can naturally strengthen a teacher's integrity. On the contrary, primary school teachers at the first degree of education deal more with the emotional and developmental needs of children and pupils. While this requires empathy and pedagogical ethics, it does not necessarily require scientific and value-reflective thinking to the same extent. Teachers' personality and cognitive predispositions can also explain significant differences between these teacher groups. We can assume that teachers inclined towards theoretical and analytical thinking are more likely to choose a career path (in subjects taught in secondary schools) where scientific knowledge is a priority.

Conclusion

In conclusion, differences in trust in science and integrity between teacher groups are not only a consequence of their position in the teaching profession, but also a combination of several of the above-mentioned factors that can interact and reinforce one another. The results point to the need for further research into the factors that influence scientific thinking, trust in science, value attitudes and the ethical identity of teachers. Future research could focus on long-term changes in trust in science and integrity depending on the length of teaching experience, professional identity and the stage of life of the teacher. It would be beneficial to verify the effectiveness of educational programmes and interventions that promote scientific evidence, critical thinking, and ethical decision-making.

The findings of our research highlight the significant challenge of implementing fundamental changes in the undergraduate preparation of teacher students and in further education of teachers, aimed at the efficient development of their psychological literacy. The development of psychological literacy also strengthens teachers' professional competences, which significantly impact the quality of the educational process, pupils' learning outcomes, their motivation to learn, and the school climate. The benefits of psychological literacy extend beyond professional life to personal and social life. Individuals with developed psychological literacy can critically evaluate psychological knowledge and apply it to their own experiences and behaviour, as well as to those of others in various life situations. In this way, they improve their quality of life and, to a certain extent, also help to improve life in the community in which they live (Rapsová, 2024).

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Contact emails: lrapsova@ukf.sk
kgrznarova@ukf.sk

Change Management in Education

Talar Oumoudian, Université Saint Joseph, Lebanon

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Abstract

This article examines the role of change management and quality assurance in driving educational transformation, with a particular focus on leadership practices and institutional improvement in higher education. In an era of rapid technological advancements, shifting societal needs, and evolving student expectations, education systems face mounting pressure to adapt while safeguarding academic standards. Drawing on theoretical frameworks of change management, the study highlights models such as Lewin's Three-Stage Model, Kotter's Eight-Step Model, and the ADKAR approach, analyzing their relevance in the educational context. The discussion emphasizes how quality assurance tools—accreditation, internal audits, feedback mechanisms, and performance indicators—function as levers for sustainable change and continuous improvement. The research is contextualized within a university course on educational quality and change, where participants, primarily educational leaders and practitioners, engaged in projects aimed at enhancing institutional effectiveness. Through detailed project analysis, the article illustrates how leadership, stakeholder engagement, and the alignment of vision with strategic planning influence the success or failure of change initiatives. The findings underscore that effective change management requires a balance between top-down leadership and bottom-up participation, ensuring ownership and resilience in educational reform. Ultimately, the article argues that quality assurance, when strategically integrated into change processes, not only ensures compliance with standards but also fosters innovation, accountability, and a culture of continuous learning. This synthesis provides actionable insights for policymakers, administrators, and educators committed to advancing educational excellence in dynamic environments.

Keywords: change management, quality assurance, educational leadership, higher education, institutional improvement, continuous learning

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Introduction

Education systems around the world are experiencing profound and accelerating transformations driven by technological innovation, globalization, the pursuit of equity, and the growing demand for accountability. From digital learning platforms and inclusive pedagogies to international assessments and curriculum reforms, educational change is no longer optional—it is an imperative. However, despite the proliferation of reform initiatives, many fail to deliver lasting improvement. Research consistently shows that reforms in education often generate temporary enthusiasm but produce limited structural impact because they overlook the organizational, cultural, and human dimensions of change (Fullan, 2007). In this context, change management in education emerges as a critical field of practice: it focuses not only on *what* needs to change but also on *how* change should be implemented, institutionalized, and sustained.

The urgency of effective change management becomes even clearer when one considers the complex ecosystem of schools. Schools are not merely technical institutions that deliver instruction; they are social and cultural organizations that embody shared values, traditions, and interpersonal relationships. A reform that may seem rational at the policy level—such as introducing digital tools, adopting competency-based assessment, or embedding socio-emotional learning—will inevitably face resistance or distortion unless it is strategically planned, communicated, and monitored. As Kotter (1996) famously argued in *Leading Change*, up to 70% of change initiatives fail because leaders underestimate the importance of vision, stakeholder engagement, and reinforcement mechanisms. This observation is particularly relevant in education, where teachers' professional identity, students' experiences, and parents' expectations must all be harmonized for reform to succeed.

Quality assurance (QA) provides a complementary perspective to change management. While change management emphasizes the human and organizational processes of implementing reform, QA ensures that these processes are measured, transparent, and continuously improved. QA in education involves the use of diagnostic tools (such as SWOT analysis), performance indicators, benchmarks, and stakeholder feedback to promote accountability and coherence (Harvey & Green, 1993). Without QA, reforms risk being fragmented and unsustainable; without change management, QA risks being reduced to a bureaucratic exercise with limited impact on practice. When combined, these two frameworks form a powerful synergy: change management provides the roadmap, while quality assurance offers the compass to navigate it.

This article draws on research conducted within a university course on change management and quality assurance in education. Participants—comprising school leaders, teachers, and administrators—designed and implemented six school-based projects addressing diverse themes: (1) developing critical thinking, (2) establishing professional learning communities, (3) promoting empathy to prevent bullying, (4) enhancing formative assessment with parental involvement, (5) reforming internal communication, and (6) fostering higher-order thinking skills. Each project applied structured change management models (Kotter's 8-Step Process, Lewin's 3-Phase Model, and the ADKAR framework) and integrated QA tools such as SWOT analysis, rubrics, performance indicators, and feedback loops.

The findings of these projects highlight two major contributions. First, successful school reforms depend on distributed leadership, diagnostic planning, and systematic evaluation—elements that transcend individual contexts. Second, they provide empirical evidence that integrating change management with QA frameworks can create a coherent and sustainable

model for educational reform. By examining projects that range from empathy-based initiatives to communication reforms, this study demonstrates that structured, participatory, and measurable processes make reforms more credible, inclusive, and durable.

Ultimately, this article argues that sustainable change in education emerges at the intersection of leadership, change management, and quality assurance. Schools that achieve meaningful reform are those that cultivate shared ownership, measure their progress, and sustain momentum through reflective practice. The six projects analyzed here illustrate that when educators are equipped with clear models and quality tools, they become not only agents of change but also stewards of excellence within their institutions.

Literature Review: Change Management in Education

Defining Change Management in Education

Change management refers to the structured process of guiding organizations from a current state to a desired future state while minimizing resistance and maximizing adoption (Hiatt, 2006). In education, change management entails aligning teachers, administrators, students, and communities around reform goals and ensuring that innovations are implemented in sustainable ways. Unlike business settings, educational change is deeply value-laden: it shapes not only efficiency but also equity, identity, and human development (Fullan, 2016). Therefore, change management in education must be participatory, culturally sensitive, and grounded in pedagogical realities. Here are the description of the 3 models used for change management: Lewin 3 phase model, Kotter 8 steps model and Adkar model.

Kurt Lewin's 3-Phase Model

Kurt Lewin (1947) is considered the pioneer of change management theory. His model conceptualizes change as a three-phase process:

1. Unfreeze – creating readiness for change by challenging existing norms and highlighting the need for transformation.
2. Change – implementing new practices, behaviors, or structures.
3. Refreeze – embedding the changes into culture and routines to prevent regression.

In schools, the *unfreeze* phase might involve using diagnostic tools such as SWOT analyses to expose weaknesses in current teaching practices. The *change* phase could involve adopting new pedagogical methods or assessment strategies. The *refreeze* phase ensures that innovations are institutionalized through policies, evaluation mechanisms, and cultural reinforcement. Although criticized for oversimplification, Lewin's model remains foundational because of its clarity and adaptability.

Kotter's 8-Step Process

Building on Lewin, John Kotter (1996) developed an 8-step model that has become a cornerstone of organizational change. The steps are:

1. Establishing a sense of urgency.
2. Forming a powerful guiding coalition.
3. Developing a vision and strategy.
4. Communicating the change vision.
5. Empowering employees for broad-based action.

6. Generating short-term wins.
7. Consolidating gains and producing more change.
8. Anchoring new approaches in the culture.

Applied to education, Kotter's model emphasizes the importance of leadership and communication. For instance, when implementing a new formative assessment system, school leaders must first create urgency by showing gaps in current evaluation practices. They then need to form coalitions among teachers, communicate the vision clearly, provide training, celebrate small successes, and institutionalize assessment reforms in school policy. Kotter's model highlights the iterative nature of change: success depends not only on initial adoption but on cultural embedding.

The ADKAR Model

The ADKAR model (Awareness, Desire, Knowledge, Ability, Reinforcement) was developed by Hiatt (2006) with a focus on individual change. It emphasizes that organizational change succeeds only when individuals embrace and sustain it.

- Awareness – understanding the need for change.
- Desire – willingness to participate in and support the change.
- Knowledge – having the information and skills to implement the change.
- Ability – putting knowledge into practice.
- Reinforcement – sustaining the change through feedback and rewards.

In education, ADKAR is especially relevant because reforms often fail when teachers lack either the motivation or capacity to adopt new practices. For example, a project to develop higher-order thinking skills may fail if teachers understand the value (awareness) but lack practical strategies (ability). By addressing both cognitive and motivational dimensions, ADKAR bridges the gap between theory and practice.

While change management provides the human and strategic dimensions of reform, Quality Assurance (QA) ensures that reforms are evidence-based and accountable. Change without Quality Assurance risks being chaotic; Quality Assurance without change risks being bureaucratic. Together, they provide a balanced approach: change management motivates and mobilizes, while QA measures and sustains. For example, Kotter's emphasis on short-term wins can be operationalized through QA indicators, while ADKAR's reinforcement can be supported by stakeholder feedback surveys.

Quality Assurance Tools in Education

Quality assurance (QA) in education is an essential mechanism that ensures institutions maintain and enhance the standards of teaching, learning, and institutional governance. Within the framework of change management, QA tools serve not only as evaluative mechanisms but also as drivers of continuous improvement. Their systematic use provides evidence for accountability, informs decision-making, and creates feedback loops that reinforce effective practices.

The Role of QA in Change Management

In educational settings, change initiatives often fail when they are not accompanied by mechanisms that monitor progress and evaluate impact. QA tools act as a stabilizing structure

during change processes. They provide benchmarks, measurable indicators, and transparent procedures that allow institutions to move forward while remaining anchored to their mission and vision. Moreover, QA tools ensure that change is not episodic but systemic, promoting a culture of continuous improvement rather than isolated interventions.

Key QA Tools in Education

Several QA instruments have become central in guiding institutions through transitions. Among them:

Internal Evaluation and Self-Assessment

Internal evaluation is one of the most powerful tools, as it engages faculty, administrators, and sometimes students in reflecting on institutional practices. Self-assessment reports (SARs) typically examine curriculum relevance, teaching effectiveness, research productivity, and student support services. By involving multiple stakeholders, this process builds a collective responsibility for quality and ensures that proposed changes reflect the institution's identity and context.

Accreditation Frameworks

External accreditation provides an independent verification of quality standards. Accreditation bodies often require compliance with specific indicators such as faculty qualifications, curriculum design, research outputs, and governance structures. While sometimes perceived as bureaucratic, accreditation frameworks often stimulate change by obliging institutions to address weaknesses and adopt internationally recognized practices.

Benchmarking

Benchmarking involves comparing institutional practices with those of peer organizations. This tool not only identifies gaps but also provides models for adaptation. Benchmarking thus fosters innovation while keeping institutions grounded in evidence-based practices.

Key Performance Indicators (KPIs)

KPIs translate strategic goals into measurable outcomes. In education, KPIs might include student retention rates, graduate employability, research publication counts, or student satisfaction scores. By aligning KPIs with change management initiatives, institutions can track whether their reforms are producing tangible results.

Quality Circles and Continuous Improvement Models

Adapted from industrial quality systems, quality circles bring together faculty and administrators in collaborative problem-solving groups. Using methodologies like PDCA (Plan-Do-Check-Act) or Six Sigma, institutions can iteratively test solutions and refine their processes. These models embed change management into daily operations, normalizing improvement as an ongoing practice rather than a crisis-driven response.

Integration of QA and Change Management

The integration of quality assurance (QA) tools with change management processes is essential to ensure educational reforms are both accountable and effective. When used together—through self-assessment, student feedback, KPIs, and benchmarking—QA and change management create a dynamic, evidence-based system that supports continuous improvement. However, implementing QA tools presents challenges, including bureaucratic overload, resistance to evaluation, cultural mismatches, and unreliable data. Addressing these issues requires strong leadership, transparent communication, and a professional culture that values QA as a means of growth rather than control.

Methodology: Project Analysis

This section provides an in-depth analysis of six projects developed within the university course *Change Management and Quality Assurance in Education*. Each project illustrates how theoretical frameworks were applied to practical contexts, highlighting both successes and challenges. Collectively, they showcase the integration of change management principles, leadership strategies, and quality assurance (QA) tools in real educational settings.

Project One: Improving Student Engagement Through Digital Platforms

The rapid digitalization of education, especially accelerated during the COVID-19 pandemic, has reshaped teaching and learning. While digital platforms offer flexible, student-centered approaches, many schools reported a decline in student motivation and engagement when online learning was not adequately structured (Bond, 2020). The rationale of this project was to determine whether Learning Management Systems (LMS) and interactive digital tools could improve student participation and motivation at the secondary school level. Research has shown that well-designed digital interventions can enhance both cognitive and emotional engagement, provided that teachers are adequately supported (Martin & Bolliger, 2018).

The project adopted a mixed-methods approach. Data collection included teacher interviews, student surveys, and classroom observations. Tools such as Google Classroom, Kahoot, and Padlet were integrated into lessons across three grade levels. Engagement was monitored using quality assurance indicators, including attendance, assignment submission rates, and active participation. These methods allowed triangulation of evidence, strengthening the validity of findings (Creswell & Plano Clark, 2017).

The results indicated a notable rise in student engagement. Surveys revealed that 85% of students reported greater motivation when lessons involved interactive tools. Group projects showed higher collaboration levels, with peer-to-peer interaction facilitated by digital platforms. However, some challenges emerged: several teachers expressed reluctance due to the perceived workload of redesigning lessons for digital formats. Similar barriers have been documented in studies on technology adoption, where teacher preparedness and confidence significantly influence success (Ertmer & Ottenbreit-Leftwich, 2010).

The project demonstrated that digital platforms, when strategically implemented can significantly improve student engagement. At the same time, effective digital transformation requires continuous professional development and institutional investment (Fullan, 2020; OECD, 2021).

Project Two: Building Professional Learning Communities (PLCs)

Professional Learning Communities (PLCs) are increasingly recognized as effective mechanisms for fostering teacher collaboration and continuous professional development (DuFour & Eaker, 1998). Many schools, however, face difficulties in establishing sustainable collaborative practices, often due to time constraints, unclear goals, or weak leadership. This project aimed to strengthen collaborative practices by developing structured PLCs to enhance teaching quality and student outcomes. Research supports that schools with strong PLCs experience higher levels of teacher innovation and student achievement (Stoll et al., 2006).

The project used a qualitative approach, relying on meeting observations, teacher reflections, and document analysis of PLC outputs. A SWOT analysis was conducted at the beginning to identify strengths and weaknesses in existing collaboration practices. Teachers were grouped into PLCs based on subject areas, with regular bi-weekly meetings. Leadership provided facilitation and created accountability by requiring written meeting reports and action plans.

Teachers reported improved collaboration and professional growth, as PLCs encouraged them to share teaching strategies, co-design lessons, and reflect on classroom practices. The structured nature of the initiative fostered consistency and sustained engagement. However, challenges emerged in linking PLC discussions to direct student outcomes, as teachers tended to focus on planning rather than systematically tracking student progress. This mirrors findings in the literature that PLCs often struggle to demonstrate a clear impact on learning without strong monitoring systems (Vescio et al., 2008).

The project highlighted that PLCs can foster teacher professionalism and collaboration, but their long-term effectiveness depends on clear leadership support, systematic monitoring, and alignment with student learning outcomes. In summary, clear guidelines, coaching, and policy reinforcement were essential to sustain reform (Darling-Hammond et al., 2020).

Project Three: Promoting Empathy to Address Bullying

Bullying remains a critical issue in schools, affecting both student well-being and academic achievement. Traditional approaches often focus on punishment, which research shows to be less effective than preventative, empathy-based strategies (Olweus, 1993). This project explored whether empathy education could reduce bullying incidents and promote a positive school climate. The rationale was grounded in evidence that social-emotional learning (SEL) programs improve student behavior and resilience (Durlak et al., 2011).

The project employed a quasi-experimental design with two intervention classes and two comparison classes. Empathy-building activities included role-playing, storytelling, and structured peer dialogues. Data collection involved student self-reports, teacher observations, and pre- and post-intervention surveys on bullying incidents. The Kotter change model was used to guide implementation, particularly by building urgency and forming a guiding coalition of teachers and parents.

Results showed a measurable decrease in reported bullying incidents in intervention classes. Students demonstrated higher levels of empathy and were more willing to intervene when witnessing bullying. Teachers noted improvements in classroom atmosphere. However, challenges arose due to limited time and the difficulty of scaling the initiative beyond one

school year. These findings align with other research showing that SEL initiatives are most effective when integrated into long-term school culture (Payton et al., 2008).

The empathy project demonstrated the potential of SEL interventions to improve school climate and reduce bullying.

Project Four: Formative Assessment and Parent Involvement in Grade One

Assessment is a cornerstone of education, but summative assessments often dominate, providing limited feedback for learning. This project explored the role of formative assessment combined with parental involvement in Grade One. Research indicates that formative assessment improves learning outcomes by providing continuous feedback (Black & Wiliam, 1998). Additionally, engaging parents supports student motivation and achievement (Epstein, 2011).

The project employed classroom-based action research. Teachers implemented portfolios, checklists, and parent feedback forms. Parents were invited to regular meetings to discuss student progress. Data collection included teacher journals, parent surveys, and student performance tracking. SWOT analysis helped identify strengths and areas needing development.

The project revealed strong benefits. Parents felt more engaged in their children's learning, and students became more reflective about their progress. Teachers reported that formative assessment tools provided richer insights into student learning than traditional exams. However, challenges included the additional time required and the short implementation period, which limited long-term evaluation.

The project demonstrated that formative assessment, when combined with parental involvement, enhances student learning and engagement. However, successful implementation requires leadership support, teacher training, and sufficient time.

Project Five: Improving Internal Communication Within Schools

Effective communication is critical for school improvement, yet many schools experience fragmented or inconsistent communication channels. This project addressed internal communication challenges by implementing structured communication practices. Research highlights that clear, transparent communication fosters trust, collaboration, and effective leadership in schools (Bush, 2020).

The project adopted a case study design. Communication audits were conducted, including staff surveys and document analysis of meeting records. New practices were introduced: regular newsletters, digital communication platforms, and structured staff meetings. Data were collected through follow-up surveys and feedback from teachers.

The project improved clarity and reduced misunderstandings among staff. Teachers reported feeling more informed and connected to decision-making processes. However, the initiative faced challenges in integrating digital communication tools, as not all staff were equally comfortable with them. Similar issues have been reported in studies of organizational communication, where digital transitions require training and adaptation (Miller, 2015).

The project underscored the importance of structured communication in building a collaborative culture. Success requires leadership modeling, digital training, and systematic feedback mechanisms.

Project Six: Developing Higher-Order Thinking Skills (HOTS)

Higher-order thinking skills (HOTS), including analysis, synthesis, and evaluation, are essential for preparing students for 21st-century challenges. Yet, many schools remain focused on rote learning and standardized testing. This project sought to integrate HOTS into teaching practices to promote deeper learning. Research has consistently highlighted the importance of HOTS for student success in complex problem-solving and lifelong learning (Brookhart, 2010).

The project adopted an experimental design. Teachers received training in HOTS-based instruction, including problem-based learning, debates, and inquiry-based tasks. Students' performance was tracked through assessments designed to measure critical and creative thinking. Observations, rubrics, and student reflections provided additional data. Lewin's model guided the process, with particular focus on unfreezing entrenched rote practices.

Students demonstrated improved problem-solving abilities and greater engagement in lessons. Teachers reported that students were more willing to take intellectual risks and explore multiple perspectives. The main challenge was resistance from some parents and teachers who feared that prioritizing HOTS might compromise exam performance. This reflects broader tensions between traditional assessment systems and innovative pedagogies (Zohar & Dori, 2003).

The project showed that integrating HOTS into classrooms is both feasible and effective when supported by leadership and systematic QA tools. However, addressing stakeholder resistance remains a central challenge.

Results

Analysis revealed several consistent factors contributing to the success of the projects. First, each initiative began with a strong diagnostic foundation, using tools such as SWOT analyses, surveys, or needs assessments to establish a clear picture of existing challenges. This initial phase helped align stakeholders around a shared understanding of the problem and created a sense of collective purpose. Furthermore, stakeholder engagement played a crucial role; teachers, parents, and in some cases students, were actively involved in both the planning and implementation stages. This inclusion not only fostered collaboration but also increased participants' sense of ownership and commitment to change.

In addition, the projects benefited from structured frameworks that guided their progression. The use of established change management models—such as Kotter's 8-Step Model**,** Lewin's Three-Phase Model**,** and **t**he ADKAR Model**—**provided a coherent roadmap that ensured consistency and clarity throughout the change process. These frameworks helped teams anticipate resistance, communicate effectively, and maintain momentum. Finally, continuous monitoring through quality assurance tools, including rubrics, key performance indicators (KPIs), and feedback loops, enabled teams to track progress and make data-driven adjustments along the way. Altogether, the combination of diagnostic groundwork, inclusive participation, structured guidance, and systematic evaluation created a solid foundation for sustainable improvement across all projects.

Despite notable successes, the projects encountered several recurring obstacles that hindered their full potential. Resistance to change emerged as one of the most persistent challenges. Many teachers expressed concerns about increased workload or questioned the direct relevance of the new initiatives to their daily practice, which at times slowed adoption. Moreover, time pressure posed a significant constraint; tight school calendars often limited the opportunity to implement, test, and refine interventions thoroughly, leading to rushed or incomplete execution.

The comparative analysis of the six projects highlights the essential interplay between change management models and quality assurance (QA) tools**.** The two components are complementary and must operate in an integrated manner to ensure sustainable improvement. On one hand, change management models such as Kotter's eight-step framework, Lewin's three-stage model, and the ADKAR model offered a clear process roadmap, guiding teams through stages of preparation, implementation, and consolidation. On the other hand, QA tools—including surveys, indicators, rubrics, and feedback mechanisms—provided the evidence base needed to monitor progress and validate outcomes. When these elements were not aligned, projects tended to suffer: initiatives driven only by enthusiasm often lacked structure, while those focused solely on data collection lacked authenticity and engagement. The findings confirm that successful educational innovation depends on the integration of both strategic process design and systematic evidence collection.

From a broader perspective, several implications for policy and practice emerge. First, schools and educational systems should embed change management principles into professional development programs**,** ensuring that teachers are trained not only in pedagogical methods but also in navigating and leading change effectively. Second, fostering distributed leadership—where teachers share responsibility and decision-making—appears vital for sustaining reform and encouraging innovation. Third, diagnostic and evaluative tools should be mandatory components of any school improvement initiative, allowing for ongoing monitoring and adjustment. Finally, there is a pressing need to align innovation with accountability, balancing creative experimentation with measurable and transparent outcomes.

In terms of contribution to educational research, this analysis underscores how business-derived change management models like Kotter and ADKAR can be successfully adapted to the educational field. It also demonstrates how QA instruments translate abstract theories of change into concrete, measurable practices**,** making transformation more tangible.

Discussion

This study aimed to explore how the principles of change management and quality assurance (QA) can be effectively applied in educational settings to foster sustainable improvement. By analyzing six school-based projects designed within a university course, the research illuminated how diagnostic planning, leadership practices, stakeholder engagement, and quality monitoring interact to drive change. In the following discussion, these findings are situated within the broader literature on educational change, offering insights that bridge both theoretical understanding and practical application.

Educational change is inherently complex because schools are not merely instructional institutions but social ecosystems shaped by norms, traditions, and diverse actors. As Fullan (2007) asserts, change cannot be reduced to technical adjustments; it is also cultural and relational. The projects analyzed here confirm this view: whether focused on communication,

critical thinking, or behavior management, each initiative required cultural adaptation alongside technical intervention. The use of structured models—Kotter's (1996) Eight Steps, Lewin's (1947) three-phase process, and Hiatt's (2006) ADKAR framework—helped provide coherence.

Another key finding concerns the role of QA in sustaining improvement. Although QA is sometimes perceived as bureaucratic, the projects demonstrated that, when used formatively, it can promote reflection and professional growth. Diagnostic surveys lent credibility to initiatives, while key performance indicators (KPIs) made progress measurable. Similarly, rubrics and feedback loops encouraged teachers to engage in self-evaluation. These findings reinforce Harvey and Williams' (2010) argument that QA should not be limited to compliance but should instead cultivate a culture of continuous improvement.

Nevertheless, several challenges persisted. Time constraints hindered full implementation, and teacher resistance—whether active or passive—often reflected underlying fears about workload or change fatigue. Some initiatives struggled with sustainability, indicating the importance of embedding change within institutional structures rather than relying solely on individual motivation. These findings echo Fullan's (2007) concept of the "implementation dip," a temporary decline in performance during adaptation, and Kotter's (1996) warning that without institutionalization, early progress can quickly regress.

The results suggest clear implications for practice and policy. First, teacher education should incorporate explicit training in change management and QA tools to prepare teachers as proactive change agents. Second, schools should adopt distributed leadership models that engage teachers and parents collaboratively. Finally, policymakers should view QA not as a control mechanism but as a formative support for reflection, innovation, and accountability.

The research contributes to the academic field in three main ways. It demonstrates that change management models originating in business can be successfully adapted to educational settings, provided cultural and relational factors are acknowledged. It also illustrates how QA tools can operationalize abstract change principles into measurable actions. Most importantly, it reinforces that leadership and stakeholder engagement are indispensable for sustained improvement.

While the study yielded valuable insights, several limitations remain. The projects were relatively small-scale and context-specific, which limits generalization. Additionally, the reliance on self-reported data may have affected objectivity. Long-term follow-up is also required to assess lasting cultural impact. Future research could expand the analysis across varied educational systems, explore digital QA mechanisms, and examine how integrated leadership and QA strategies influence institutional culture over time.

Ultimately, the findings affirm that educational change is not achieved through isolated interventions but through the synergistic integration of leadership, structured change management frameworks, and formative QA tools—together forming the foundation for authentic, sustainable school improvement.

Conclusion

True educational change is not achieved through isolated initiatives but through shared purpose and perseverance. When leadership is collective, quality assurance reflective, and change

management structured, schools evolve into learning communities that grow with integrity and vision—transforming challenges into opportunities for lasting improvement and meaningful impact on students' lives.

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Investigating Mature Learners' Experiences of Social Inequality Stemming From Digitalisation in Higher Education

Eleni Meletiadou, London Metropolitan University, United Kingdom

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Abstract

Globalization, digitalization, and rapid technological advancements have been widely acknowledged as major forces reshaping both the labor market and Higher Education Institutions (HEIs). Mature learning workers, however, often face specific challenges in adapting to these transformations, particularly in relation to digital skill development and their sense of belonging in increasingly digitalized learning and professional environments. This study investigates how HEIs can better support mature learners in overcoming barriers to digital literacy, addressing employment inequalities, and preparing effectively for future career pathways. Despite the growing body of research on digital education, the experiences and needs of mature students remain underexplored, especially within cross-national contexts. An exploratory, mixed-methods design was employed, drawing on data from 105 mature learners across three HEIs in Cyprus, Albania, and the United Kingdom. Data collection involved anonymous online surveys, semi-structured interviews, and focus groups. Quantitative results were analyzed using SPSS, while qualitative data underwent thematic content analysis. Findings highlight the dual role of digitalization as both a driver of opportunity and a source of exclusion. Participants reported concerns about insufficient institutional support, limited access to tailored training, and persistent inequalities shaped by age and gender. Nevertheless, evidence also revealed that inclusive pedagogical approaches and targeted interventions can significantly enhance mature learners' digital competence, academic achievement, and employability prospects. The study offers practical recommendations for educators, policymakers, and employers to collaboratively develop strategies that foster digital literacy, belonging, and equitable participation of mature learners in higher education and beyond.

Keywords: mature learners, digital literacy, higher education, lifelong learning, employability, belonging, digital transformation

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Introduction

Globalization, digitalization, and rapid technological innovation have reshaped the labor market and Higher Education Institutions (HEIs), creating new challenges and opportunities for both educators and learners. As economies undergo profound transformations, digital competence has become a prerequisite not only for academic success but also for employability and social inclusion. Higher education is therefore expected to play a pivotal role in equipping students with the knowledge, skills, and confidence needed to navigate an increasingly digitalized world (Naeem & Mushibwe, 2025). However, despite widespread recognition of lifelong learning as a cornerstone of contemporary educational policy (Burns, 2020), mature learners remain one of the most under-supported groups in higher education. These students, who re-enter education later in life to reskill, upskill, or pursue personal development, often face significant barriers when engaging with technology-driven teaching and learning. Such barriers threaten their academic achievement, their sense of belonging in higher education, and ultimately their participation in the labor market.

Although younger generations are often described as "digital natives" who are familiar with technological environments from an early age (Evans & Robertson, 2020), digital competence is not determined solely by age but rather by access, training, and socio-cultural factors. Mature learners often encounter gaps in confidence and proficiency, which can lead to anxiety, disengagement, and even attrition when faced with digitalized curricula. Research on digital inequalities demonstrates that disparities in skills, access, and usage patterns reflect and reinforce broader social inequalities shaped by age, gender, and socio-economic status (Falloon, 2020). In this context, mature learners risk being further marginalized by institutional assumptions that all students are digitally fluent. The Covid-19 pandemic underscored this issue, as the rapid transition to remote and hybrid education exposed the vulnerability of those students, often mature learners, who lacked sufficient resources or digital support (Homer, 2022). Rather than enhancing inclusion, digitalization in higher education may reproduce patterns of exclusion if strategies are not specifically designed to meet the needs of diverse learners.

At the same time, the expansion of lifelong learning discourses has emphasized the role of HEIs in fostering employability by enabling learners to acquire and update skills throughout their working lives. In the digital economy, employability is increasingly associated with the mastery of advanced digital literacies, including the ability to critically evaluate information, collaborate online, and adapt to emerging technologies (Khuraisah et al., 2020). For mature learners, whose motivation for entering higher education is often closely tied to career progression or re-entry into the workforce (Chesters et al., 2020), digital literacy is not merely an academic requirement but a vital condition of labor market participation. Yet, HEIs often fail to provide targeted, contextualized opportunities for mature students to develop these competencies in ways that connect meaningfully with their professional trajectories (Ul Hassan et al., 2025). When teaching and assessment practices presume digital fluency, mature learners may be disadvantaged, resulting in diminished confidence, lower achievement levels, and reduced career opportunities. This situation reflects a broader tension between the rhetoric of lifelong learning and the reality of educational provision, where institutional practices remain oriented towards younger, traditional students.

In addition to skills acquisition, the concept of belonging has become central to understanding student engagement, retention, and success in higher education (Pedler et al., 2022). Belonging refers to the sense of being accepted, valued, and supported within an academic community,

and has been consistently linked to positive academic and personal outcomes. For mature learners, who often feel like "outsiders" in predominantly younger student cohorts, belonging plays a critical role in determining whether they persist with or withdraw from their studies (Hope & Quinlan, 2021). In digitalized contexts, belonging increasingly extends into virtual spaces, with "digital belonging" shaping how students experience online participation, peer interaction, and institutional support (Smith & Watson, 2022). For mature learners, negative experiences with digital platforms, combined with intersecting challenges such as caring responsibilities, socio-economic disadvantage, or gendered inequalities, can undermine their sense of belonging and increase the risk of disengagement (Folabit et al., 2025). Conversely, inclusive digital pedagogies and supportive online communities have the potential to enhance belonging, empowering mature students to participate fully and equitably in higher education.

The experiences of mature learners are also shaped by intersectionality, as age intersects with gender, ethnicity, and class to create complex patterns of disadvantage. Intersectional research highlights how women returning to education later in life often face additional barriers, including lower confidence in digital skills, greater caring responsibilities, and persistent labor market inequalities (Crimmins et al., 2023). Similarly, students from lower socio-economic backgrounds may struggle with access to reliable internet connections or up-to-date devices, leaving them at a disadvantage compared to their peers (Lembani et al., 2020). Such overlapping inequalities reveal that digital exclusion is not merely a matter of skills training but also reflects broader structural inequities that HEIs must address if they are to support equity, diversity, and inclusion effectively. Without such interventions, mature learners risk becoming "doubly excluded": first, because of their age and atypical student status, and second, because of systemic barriers to digital engagement.

Despite the growing body of literature on digital literacy and employability, the perspectives and needs of mature learners remain underexplored. Much of the existing research continues to focus on traditional undergraduate populations, with insufficient attention to how digitalization impacts mature students' experiences of learning, belonging, and career development. Furthermore, cross-national comparative studies are scarce, leaving little understanding of how different cultural and institutional contexts shape these experiences. The scarcity of empirical evidence on how mature learners navigate digitalized higher education and how HEIs can best support them highlights a critical gap in the literature.

This article seeks to address this gap by examining the experiences of 105 mature learners enrolled in three HEIs in Cyprus, Albania, and the United Kingdom. Through surveys, interviews, and focus groups, the study explores mature learners' perceptions of digitalization, their sense of preparedness for the future labor market, and the institutional strategies that can either support or hinder their academic journeys. It investigates the barriers and drivers shaping mature learners' digital skill development and belonging, offering evidence-based recommendations for educators, policymakers, and employers. By focusing on the intersections of digital literacy, belonging, and employability, this study contributes to ongoing debates on how HEIs can design inclusive educational environments that respond to the realities of an increasingly digitalized world. Ultimately, it aims to answer the following research question:

- How can Higher Education Institutions enhance mature learners' digital literacy and sense of belonging to support their academic achievement, employability, and equitable participation in higher education?

Methodology

The present study adopted an exploratory mixed-methods approach to investigate the experiences of mature learners regarding digital literacy development, belonging, and employability in HEIs across three European contexts. The aim was to capture both the breadth of mature learners' perspectives through quantitative data and the depth of their lived experiences through qualitative inquiry. This approach was deemed appropriate given the complexity of the research question and the need to address both measurable trends and nuanced, context-specific insights (Gerzso et al., 2024). A total of 105 mature learners participated in this study, drawn from three universities located in Cyprus, Albania, and the United Kingdom. Mature learners were defined as individuals aged 55 and above who entered or re-entered higher education after an extended period away from formal learning. Participants represented diverse socio-economic and cultural backgrounds, with many balancing educational commitments alongside employment, family responsibilities, and caregiving roles. Their ages ranged from 56 to 70, with an average age of 58. Approximately 68% of the participants identified as female, 30% as male, and 2% as non-binary, reflecting the gendered dynamics often found in mature learning cohorts. The sample included both full-time and part-time students, and the majority were enrolled in undergraduate or master's programmes in the social sciences, business, and education.

The study was conducted over the course of one academic year. A multi-stage sampling strategy was employed to recruit participants. Initially, institutional gatekeepers distributed an invitation email outlining the study's objectives, confidentiality measures, and voluntary nature. Students who expressed interest were then asked to complete an online consent form before participating. The researcher sought to ensure representation of genders and study modes to capture a wide range of perspectives. The data collection process involved three complementary instruments: an online survey, semi-structured interviews, and focus groups. The survey, distributed via institutional platforms, gathered quantitative data on participants' self-reported digital skills, frequency of digital tool usage, perceived preparedness for employment, and sense of belonging within their HEI. Questions were adapted from established digital literacy frameworks (i.e., van Deursen et al., 2022) and student belonging scales (Lingat et al., 2023). Responses were collected using mainly open-ended questions. A total of 105 valid survey responses were obtained, representing a response rate of 87%.

To gain deeper insights into learners' experiences, the researcher conducted 36 semi-structured interviews, each lasting between 45 and 60 minutes. Interviews explored participants' personal learning trajectories, challenges in acquiring digital skills, perceptions of institutional support, and the impact of digitalization on their academic confidence and career aspirations. These interviews were conducted online to accommodate participants' schedules and geographical locations, a format that also mirrored the digital environments under investigation. In addition, 8 focus groups were organized (2–3 per institution), each consisting of 5–8 participants. Focus groups provided an interactive forum where learners could discuss their shared experiences, reflect on institutional practices, and co-construct ideas for improving digital support in HEIs.

All survey data were exported into SPSS (version 26) for statistical analysis. Descriptive statistics were used to identify patterns in participants' digital literacy levels, employability perceptions, and belonging. Cross-tabulations and chi-square tests were employed to examine potential differences across gender, age brackets, and country. The qualitative data, comprising interview transcripts, focus group discussions, and open-ended survey responses, were analysed using thematic analysis (Braun et al., 2019). NVivo 12 software supported the coding

process. The researcher engaged in an iterative process of coding, moving from open coding of individual segments to the development of higher-order themes. To enhance the reliability of findings, a research assistant independently coded 20% of the data. Inter-coder agreement was calculated at 89%, and discrepancies were resolved through discussion until consensus was reached. The triangulation of data sources allowed the researcher to compare quantitative trends with qualitative accounts, ensuring a more robust and nuanced understanding of mature learners' experiences (Bans-Akutey & Tiimub, 2021). For example, survey findings on low self-reported confidence in advanced digital tasks were further illuminated by interview narratives describing the anxiety learners felt when required to use unfamiliar platforms for assessment. Similarly, focus group data provided collective reflections on institutional practices, highlighting structural barriers such as limited digital training opportunities and assumptions of universal digital fluency.

Ethical considerations were central to the research design. Ethical approval was obtained, and participants were assured of anonymity and confidentiality, with pseudonyms used in all qualitative reporting. They were reminded of their right to withdraw from the study at any point without consequence. Data were stored securely in compliance with GDPR, and care was taken to ensure that participants' reflections, particularly those touching on sensitive issues such as age discrimination or gendered barriers, were presented respectfully and without risk of identification. The research design thus enabled an in-depth exploration of the barriers and drivers shaping mature learners' digital literacy development and sense of belonging across diverse HEIs. By integrating quantitative and qualitative perspectives, the study not only captured the extent of challenges faced by mature learners but also illuminated the personal, emotional, and institutional dimensions underpinning their experiences. This methodology provided a strong foundation for the subsequent analysis and recommendations, ensuring that the voices of mature learners themselves remained central to the study's findings.

Findings

The analysis of the data collected through surveys, interviews, and focus groups revealed several dominant themes related to mature learners' experiences with digital learning, their development of digital literacy, and their sense of belonging in Higher Education. These themes emerged consistently across more than 60 participants and were corroborated by observations made by tutors and facilitators during online sessions and collaborative activities.

Perceived Impact of Digital Learning on Academic Confidence and Achievement

Participants consistently reported that engaging with digital tools and online learning platforms enhanced their understanding and retention of course content. Mature learners reflected on how digital resources allowed them to revisit complex materials at their own pace, engage in active problem-solving, and apply theoretical knowledge in practical exercises. Many participants noted that asynchronous learning materials, combined with interactive exercises, increased their confidence in tackling assignments, particularly those requiring critical thinking and analytical skills.

> I was hesitant about using online platforms at first, but being able to pause videos, revisit readings, and try interactive exercises made it so much easier to understand difficult concepts. I felt more prepared when completing my assignments, and I think my grades reflect that confidence. (Participant A)

Learners also highlighted that the combination of synchronous discussions and asynchronous exercises facilitated a deeper engagement with the material. Participants reported that they could reflect on course content, formulate questions, and discuss ideas with peers before applying them to assessments, which contributed to measurable improvements in academic performance. Tutors observed that students who actively participated in digital learning activities demonstrated higher-quality submissions, showing a greater ability to synthesize ideas and apply concepts critically, confirming previous research findings (Ong & Quek, 2023). Several learners emphasized that this digital engagement allowed them to feel more autonomous and in control of their learning journey. Unlike in traditional classroom settings, where opportunities for one-on-one clarification were limited, digital platforms provided a supportive environment for self-directed study. The structured yet flexible format of these learning interventions encouraged participants to take responsibility for their learning outcomes, reinforcing sustainable learning practices.

Development of Digital Literacy and Self-Efficacy

A second prominent theme related to the development of digital literacy and learners' confidence in navigating technological tools. Participants reported that engaging with online learning environments, collaborative platforms, and digital resources enabled them to acquire practical skills, such as using virtual meeting software, online research tools, and digital communication channels (also in Kumi-Yeboah et al., 2020). Many described an initial anxiety or lack of confidence with technology, which gradually diminished as they gained hands-on experience and peer support.

> I used to struggle with online tools, but after participating in group discussions and completing digital assignments, I now feel confident navigating different platforms. It's empowering to know that I can manage my learning digitally and even help my peers when they face difficulties. (Participant B)

The study also revealed that digital literacy development was closely linked to self-efficacy. Mature learners reported feeling more capable of handling tasks independently, which in turn improved their engagement and motivation. Participants indicated that digital exercises requiring decision-making, problem-solving, or collaborative input helped them practice resilience, adaptability, and critical thinking in ways that traditional learning did not always allow. Interestingly, learners highlighted that peer mentoring and collaborative digital activities were particularly valuable in building confidence. Working with peers to solve digital tasks allowed participants to learn from one another, share strategies for effective online learning, and provide mutual encouragement. This social dimension not only improved digital competence but also reinforced learners' belief in their own abilities.

Sense of Belonging and Social Inclusion

A third theme was the significant impact of digital learning on participants' sense of belonging and inclusion. Many mature learners reported that online platforms enabled them to interact with peers who shared similar academic interests and challenges, reducing feelings of isolation that often accompany adult learning (also in Abbas et al., 2022). Collaborative digital exercises, discussion forums, and team-based assignments created opportunities for social interaction, peer support, and networking, which were critical for fostering a sense of community.

> I often felt like I was alone in my studies before, but now I feel part of a group. Online discussions and collaborative assignments helped me connect with peers, share ideas, and feel supported. That sense of belonging motivates me to continue learning and engage more actively. (Participant C)

Participants noted that these experiences were particularly important for learners balancing education with work and family responsibilities. Digital environments offered flexible opportunities for interaction, allowing them to participate in meaningful discussions without the constraints of physical attendance. This flexibility contributed to their overall engagement and satisfaction, highlighting the role of inclusive digital practices in supporting mature learners.

Barriers and Challenges in Digital Learning

Despite the overall positive impact of digital learning, participants reported several challenges that affected their experiences. A recurring concern was technological anxiety, particularly among learners with limited prior exposure to online platforms (also in Sholeh & Muchibuddin, 2025). Some participants described initial frustration with navigating multiple systems, managing digital submissions, and troubleshooting technical issues. For instance, one of the participants indicated, “I sometimes felt overwhelmed by the number of tools we had to use. It took time to figure out how everything worked, and I worried that I might fall behind” (Participant D).

Language and communication barriers were another challenge for some learners, especially in collaborative online tasks. Participants explained that asynchronous discussions could lead to misunderstandings or slower responses, which sometimes hindered effective collaboration. In addition, a few participants highlighted intergenerational differences in technology use, where younger peers were more confident with digital tools, while mature learners needed extra guidance. However, these challenges were often mitigated through peer support, tutor guidance, and clear instructional design. Participants emphasized that structured training sessions, step-by-step guides, and accessible help resources significantly reduced anxiety and improved engagement. This indicates the importance of scaffolding digital learning experiences to accommodate diverse skill levels and backgrounds.

Professional and Career-Oriented Benefits

The study also revealed that participants perceived significant professional and career benefits from their engagement with digital learning. Mature learners reported that the skills developed through online activities, such as digital competence, problem-solving, decision-making, and collaborative teamwork, directly contributed to their employability and professional confidence (Martzoukou et al., 2020). Many participants highlighted that mastering digital tools and effectively working in virtual environments reflected the skills increasingly demanded by employers in a digitalized labor market. One of them said, “I can see how the skills I’m developing here are transferable to my job. Being able to collaborate online, manage tasks digitally, and think critically are all things my employer values. I feel more prepared for future opportunities” (Participant E).

Moreover, participants suggested that digital learning experiences fostered adaptability and lifelong learning attitudes, essential for career progression. By navigating technological

challenges, managing time effectively, and engaging in self-directed learning, mature learners felt better equipped to respond to workplace demands and rapidly changing industry contexts.

Recommendations for Institutional Support and Future Learning Design

Participants offered several recommendations for enhancing digital learning experiences for mature learners. A key suggestion was the need for ongoing institutional support, including technical training, accessible resources, and responsive tutor guidance (also in Burns, 2020). Learners stressed that clear instructions, timely feedback, and structured digital scaffolding were crucial for reducing anxiety and promoting engagement. One of the participants added that "Providing clear guidelines and support made a huge difference. I feel more confident knowing help is available when I need it, and it encourages me to participate more actively" (Participant F).

Another recommendation was the inclusion of collaborative and interactive activities that encourage peer engagement and social interaction. Mature learners valued opportunities to discuss ideas, share strategies, and mentor one another, which not only improved learning outcomes but also strengthened social connections and a sense of belonging. Participants suggested that digital learning should balance asynchronous and synchronous elements to accommodate diverse schedules and responsibilities. Finally, learners highlighted the importance of designing digital interventions that are relevant to professional contexts. Activities that simulate real-world scenarios, require problem-solving, or foster critical thinking were particularly motivating, as they allowed participants to directly connect learning with career development. This suggests that integrating practical, career-oriented content in digital learning can enhance both academic achievement and employability.

Summary of Findings

In summary, the findings indicate that mature learners perceive digital learning as highly beneficial for academic achievement, digital literacy development, and professional readiness (also in Steel et al., 2024). Engagement with online platforms and collaborative activities enhanced learners' confidence, autonomy, and sense of belonging, while also fostering transferable skills for the workplace. Participants did encounter challenges related to technology use, communication, and intergenerational differences, but these were largely mitigated through structured support, peer mentoring, and inclusive learning design. The study demonstrates that carefully designed digital learning interventions can provide mature learners with the tools, confidence, and social connections needed to succeed academically and professionally. Participants emphasized the transformative potential of these experiences for sustainable learning development, career progression, and overall engagement in Higher Education. These insights offer valuable guidance for educators, policymakers, and institutions aiming to support mature learners in increasingly digitalized educational contexts.

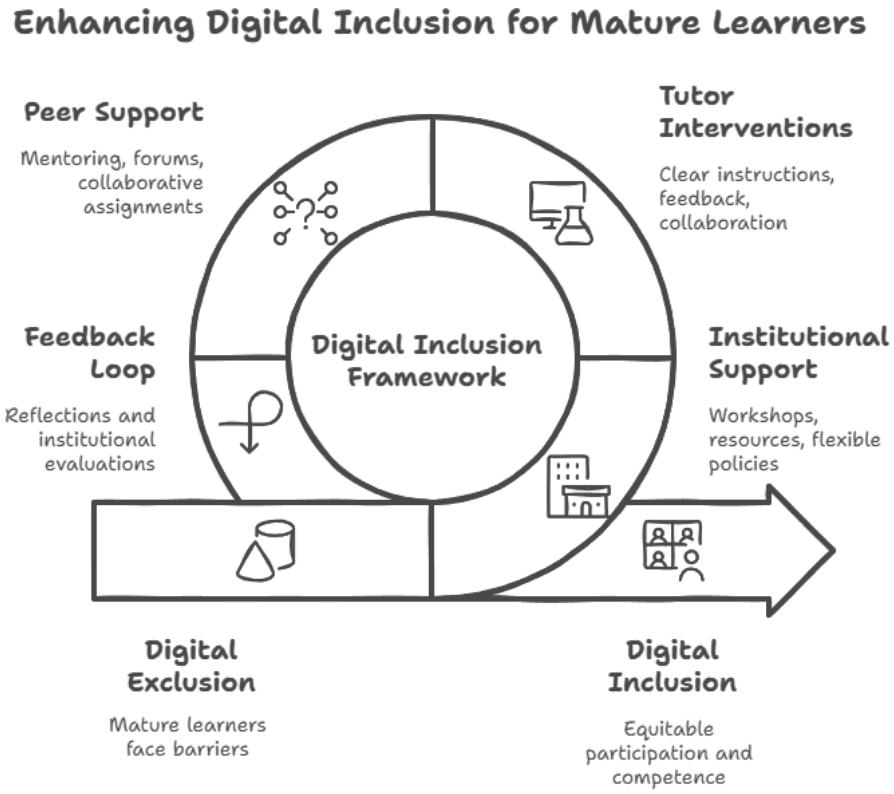
Conclusion

The present study has provided valuable insights into mature learners' experiences of social inequality stemming from digitalisation in higher education. Findings demonstrate that digital learning environments offer both opportunities and challenges for this student cohort (Mhlongo et al., 2023), whose diverse backgrounds, prior experiences, and professional responsibilities shape their engagement and outcomes. While digital technologies can facilitate access, flexibility, and collaborative learning, they may also exacerbate inequalities for learners who

face barriers such as limited digital literacy, inadequate access to devices, technological anxiety, or time constraints due to work and caregiving commitments (also in Beaunoyer et al., 2020). The findings illustrate that these challenges are not merely technical but deeply intertwined with social, cognitive, and emotional dimensions of learning. Participants consistently reported that tasks embedded in interactive digital learning, such as collaborative assignments, simulations, or problem-solving activities, enabled them to engage more deeply with theoretical concepts, develop practical skills, and foster meaningful peer interactions. These experiences often enhanced learners' critical thinking, creativity, and resilience, while also improving their self-efficacy and motivation. Importantly, collaborative digital exercises provided a space for learners to share knowledge, clarify misunderstandings, and develop interpersonal and intercultural skills, demonstrating the value of peer-supported learning in mitigating feelings of isolation and fostering inclusion (Männistö et al., 2020). However, minor challenges, such as unequal participation or language barriers within peer groups, were noted, highlighting the need for structured guidance, clear rules of engagement, and facilitator intervention to ensure equitable involvement.

Building on these findings, the study proposes a Mature Learners' Digital Inclusion Framework (Figure 1), which conceptualizes the interaction between learner characteristics, digital learning environments, barriers to engagement, support mechanisms, and learning outcomes. This framework situates learners' individual attributes, including prior digital experience, socio-economic background, and professional and caregiving responsibilities, as fundamental determinants of engagement with digital tools. These characteristics shape learners' confidence, digital skills, and willingness to participate actively in online and blended learning activities. The digital learning environment itself, encompassing platforms, tools, accessibility, and flexibility, plays a pivotal role in either enabling or constraining participation (Berezi, 2025). Well-designed, user-friendly platforms that offer interactive and collaborative features facilitate engagement, knowledge construction, and skill development. Conversely, complex interfaces, insufficient support, or rigid structures may heighten cognitive load, impede understanding, and reinforce inequality. The framework highlights that environmental affordances interact with learners' characteristics to influence their experiences and learning outcomes.

Figure 1
Mature Students' Digital Inclusion Framework



Barriers and inequalities form a central component of the framework, emphasizing the social and structural dimensions of digitalisation. Technological anxiety, lack of confidence, restricted access to devices or high-speed internet, and language or cultural differences were all reported by participants as obstacles that could hinder participation and achievement. These factors underscore that digital inclusion is not merely a question of providing access but also ensuring that learners can meaningfully engage with content and collaborative activities in a way that fosters equitable learning experiences (Pittman et al., 2021). To address these challenges, the study identifies three levels of support mechanisms. At the institutional level, digital skills workshops, accessible online resources, flexible access policies, and structured guidance can scaffold learners' engagement and reduce inequalities. At the tutor level, interventions such as clear instructions, formative feedback, facilitation of collaborative tasks, and reflective exercises are critical for enhancing both individual and group learning experiences. Peer support, through collaborative assignments, mentoring, and discussion forums, also emerged as a crucial factor in mitigating isolation, enhancing motivation, and promoting social inclusion. These support mechanisms are mutually reinforcing and, when aligned, can significantly enhance learners' confidence, competence, and sense of belonging.

The framework also emphasizes outcomes across multiple dimensions. Academically, mature learners' engagement with interactive digital tasks was associated with improved performance, better understanding of theoretical concepts, and more effective application in assignments (Capone & Lepore, 2022). From a digital competence perspective, learners reported increased confidence, autonomy, and problem-solving skills, reflecting the importance of experiential learning in digital contexts. Socially, participation in collaborative activities fostered a sense of inclusion, peer connection, and intercultural understanding, highlighting the role of digital

learning in promoting social justice. Professionally, learners developed transferable skills such as strategic thinking, communication, and teamwork, which support lifelong learning and readiness for complex, multicultural workplaces (Burns, 2020). Finally, the framework incorporates a feedback loop, recognizing that learners' reflections and institutional evaluations are essential for iterative improvements in pedagogy, resource allocation, and support strategies. Participants consistently highlighted the importance of reflection, structured debriefing, and feedback to consolidate learning and translate digital experiences into sustained skills and competencies. This cyclical process ensures that digital learning interventions remain responsive to the evolving needs of mature learners and contribute to equitable educational outcomes.

Overall, the findings underscore that digitalisation in higher education is a double-edged sword: while it can enhance flexibility, access, and engagement, it can also amplify existing inequalities if learners' individual characteristics and structural barriers are not addressed. The proposed Mature Learners' Digital Inclusion Framework provides a practical and conceptual model for educators, curriculum designers, and policymakers to design inclusive digital learning experiences that recognize and respond to these complexities. By integrating learner characteristics, digital environments, barriers, support mechanisms, and outcomes into a coherent framework, the study highlights pathways for promoting equitable participation, enhancing digital competence, and supporting sustainable learning development.

Future research should explore the framework's applicability across different disciplines, levels of study, and cultural contexts. Comparative studies could examine how variations in digital infrastructure, pedagogical design, and learner demographics influence the efficacy of digital inclusion strategies. Longitudinal research is also warranted to assess the long-term impact of inclusive digital interventions on academic performance, professional preparedness, and social inclusion. Moreover, incorporating quantitative measures of digital engagement and competence alongside qualitative reflections would strengthen the evidence base and enable more robust evaluation of digital inclusion initiatives. In conclusion, the study advances understanding of how mature learners experience social inequality in digitally mediated higher education and provides actionable insights for enhancing inclusion and engagement. By adopting a holistic, multi-level approach to digital learning design, educators can create environments that not only mitigate inequality but also empower mature learners to thrive academically, socially, and professionally. The Mature Learners' Digital Inclusion Framework offers a roadmap for translating these insights into practice, guiding future interventions that foster equitable, inclusive, and transformative digital learning experiences.

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

The author declares that no AI or AI-assisted technologies have been used to generate, refine, or correct the content in the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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Contact email: elenim@outlook.com

Teacher Protagonism in the Continuing Education of School Managers: Democracy, Dialogicity and Ethics in the Pioneer North of Paraná, Brazil 2025

David da Silva Pereira, Federal Technological University of Paraná, Brazil
Aline de Souza Sanches, Municipal Secretariat of Education-Cornélio Procópio, Brazil
Isabella Fernanda Souza Alves, Municipal Secretariat of Education-Cornélio Procópio, Brazil
Mara Peixoto Pessôa, Municipal Secretariat of Education-Cornélio Procópio, Brazil
Renata Aparecida Rossieri, Municipal Secretariat of Education-Cornélio Procópio, Brazil
Silvana Dias Cardoso Pereira, Municipal Secretariat of Education-Cornélio Procópio, Brazil

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Abstract

This is a training experience developed within the scope of a technical cooperation agreement between UTFPR and the Municipal Government of Cornélio Procópio (PMCP), a city in the northern pioneer region of Paraná, Brazil, regarding the training of managers for basic education from the professionals of this education network themselves linked to a research group from a federal public university. The dialogic process began before the actual offering of the training meetings based on democratic, dialogic and ethical training, in addition to being centered on the care of oneself as care for others. This notion was revived in the last three Michel Foucault' Courses at the Collège de France in Paris (between 1982 and 1984) and inspires a welcoming approach, empathy and deep respect for professionals in activity and in continuing education. As a result, the appreciation of education professionals, through attentive listening and analysis of everyday situations in school units. The principles of human dignity, citizenship and the appreciation of teaching work underpinned the training practice, which was organized into five fronts or modules, each with eight hours distributed across four face-to-face meetings and another equal amount of time for readings, activities and prior preparation for all: fundamentals of educational policies and legislation, strategic management, pedagogical aspects, organizational leadership and development of the Action Plan, the latter module being taught by the SEMED-CP pedagogical team. The authors-trainers would like to thank UTFPR and PMCP, through their authorities.

Keywords: protagonism, continuing education, democratic management, public school, ethics

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Introduction

This is a training experience developed within the scope of a technical cooperation agreement between UTFPR and the Municipal Government of Cornélio Procópio (PMCP), a municipality in the northern pioneer region of Paraná, regarding the training of administrators for basic education, based on the professionals of this education network themselves, linked to a research group at a federal public university. The dialogic process began before the current offering of training sessions, based on democratic, dialogic, and ethical training, in addition to being centered on self-care as care for others.

In 2024, there were general municipal elections in Brazil. The 5,570 established municipalities, through their voters, elected their leaders for the 2025-2028 term. Thus, in Cornélio Procópio, a municipality in the northern pioneer region of Paraná, the situation was no different, with a new leader taking office after eight years of the previous one (through reelection). The selection of municipal secretaries is an important step for the new administration; as agents of the elected mayor, they develop, implement, and evaluate public policies at the municipal level.

Among these professionals is a graduate of the Postgraduate Program in Teaching (PPGEN) in Human, Social and Natural Sciences at the Federal Technological University of Paraná (UTFPR), a Professional Master's degree, based in Cornélio Procópio and Londrina (two of the fourteen Paraná Campuses of this Brazilian Higher Education Institution), created in 2012 and which offered the first set of vacancies for active teachers, as a process of professional improvement through continuing education or in-service training for educators in the Northern Pioneer region of Paraná, this colleague joined the activities of the Public Policy Observatory Research Group (GPOPP) at UTFPR.

Thus, this experience enabled a dialogue with the leadership of the GPOPP, in Cornélio Procópio. A municipality with 45,206 inhabitants (IBGE, 2022), Cornélio Procópio does not have its own education system, by choice, and operates as part of the Paraná State Education System, a reality for approximately 374 of the 399 municipalities in this Brazilian state, located in the south of the country, south of São Paulo and southeast of Mato Grosso do Sul. This restricts the autonomy of the local system, which is subordinate to the operations, platforms, and commands of the Regional Education Center, a regional body headquartered in Cornélio Procópio, but which encompasses 18 other municipalities in its activities.

Initially, a relevant fact emerged from these dialogues, initially with the Advisory Board supervisor, but soon with the SEMED-PMCP management team, at which time the GPOPP-UTFPR leadership was extremely well received. To cooperate in this process, this research group received a request: to develop a training course so that active teachers could improve their skills, understand the challenges of Democratic Education Management, and be certified for the selection process by the school community in each of the 26 school units: 11 Municipal Early Childhood Education Centers (CEMEI) with children aged 0 to 3 (daycare, *Federal Law N. 9,394*, 1996) and 15 schools for the initial years of Elementary Education (ages 6 to 10) and also welcoming preschool students (ages 4 and 5). Note that, in Brazil, since 2013, mandatory enrollment by parents and guardians of children has occurred, necessarily, from the age of four. However, it is the right of children to participate in the socialization process from birth, that is, from 0 to 5 years old, in Early Childhood Education.

Faced with this challenge and having received five subtopics to work on regarding Democratic School Management, the GPOPP team, led by the Municipal Secretary of Education, agreed to

collaborate with the SEMED team of educators, to offer this training to the municipality's teachers. A central issue was the training of these professionals by their own peers—that is, professionals working at CEMEIs and local schools. This is because there are no solutions to local issues that cannot be sought by the educators themselves, in daily contact with children and families, as well as their peers.

Thus, three of the four trainers on the GPOPP team hold positions in the municipality as teachers. The first, working at the CEMEI (Early Childhood Education Center), has held the position since 2014 and is currently performing educational supervision as part of the management team of this Early Childhood Education unit (daycare). The second, a teacher working under contract in the municipality, was appointed at the beginning of 2023 as a teacher in another CEMEI in this municipality. The third, also approved in the 2020 public competition for the position of teacher, was also appointed at the beginning of 2023 to work in a school for the Early Years of Elementary Education. The last trainer is the leader of the GPOPP since July 2013, trainer and advisor of the PPGEN in the area of Teaching since May 2014, as well as a trainer of the Undergraduate Course in Mathematics since February 2013, at UTFPR-CP.

Therefore, this team of four trainers, responsible for four of the five preparatory themes for the fifth, developed by the SEMED team through two civil servants (one of whom is a member of the GPOPP) and the Municipal Secretary of Education herself, comprise the group of seven professionals responsible for the Educational Management Training for Education Professionals of the Municipality of Cornélio Procópio (FGEPEMCP), offered between July 31 and October 7, 2025, at the UTFPR headquarters in the municipality.

While still in the preparatory phase, the maturing discussion about who could participate in this training with a view to performing management roles led SEMED-PMCP to extend the invitation, originally only to professionals with three years of effective teaching experience, to those appointed in early 2023. Also in this process, the subtopics of each of the four Initial Modules were submitted to the SEMED for their consideration to function as theoretical preparation with a view to the development of Module V, developed by this team.

Thus, the Technical Cooperation Agreement and its first Amendment, relating to the negotiated specifications for this training, were signed for the offer, at no financial cost to the municipality, other than the salaries of its employees, as well as the exemption of the trainers (on days when the Training is held - sixteen dates) as well as the teachers registered to participate as course participants, but for the afternoon shift, always on Mondays and Fridays in August, September, and October (first week), over ten weeks, preceded by an initial meeting, later set for July 31, 2025.

However, the number of registrants for this training reached 162. Thus, the initial decision that such training would consist of two hours in person, followed by another two hours for reading and activities before the next meeting, transferred the shift from afternoons to evenings, that is, outside of the working hours of these educators, as well as resulting in the transfer of the meeting days, previously Mondays and Fridays, to Mondays and Tuesdays, that is, two days in a row, which certainly intensifies the effort of those enrolled, after an eight-hour workday (in the case of acting managers and teachers with two positions or extended working hours).

This decision took place in early July 2025 and required the training team (GPOPP and SEMED) to double the course hours and consequently divide the 164 into two groups: one from 6 pm to 8 pm; the other from 8 pm to 10 pm, every Monday and Tuesday, between August

4th and October 7th, through 20 face-to-face meetings lasting fifty minutes, followed by a ten-minute break and another fifty minutes, with attendance/frequency control lists at the beginning and end of each group.

Below, we describe the training methodology employed, its theoretical and epistemological assumptions articulated with teaching practice, some analytical elements of the process initiated on July 31st and continuing from August 4th to September 23rd, 2025, as well as the emerging repercussions regarding the self-formed consciousness of each of the course participants in this process of self-formation.

Methodology

The principle of horizontal training and self-training guided all dialogues with the SEMED team and all seventeen meetings with participating teachers (initial meeting and sixteen meetings of Modules I to IV, four per Module) between August 4 and September 23, 2025. Furthermore, the idea of self-care associated with adulthood, both revived by Michel Foucault (2001 and 2014; 2008 and 2018, respectively) from Classical Antiquity and Modern Philosophy, are fundamental in the conception of a training process through which education professionals emancipate themselves, form meaning, and, fundamentally, experience effectively democratic management practices.

It is crucial to have a growing awareness that serving the public means being willing to engage in dialogue with all people, from the most varied social backgrounds and socio-political positions, and that, above all, the exercise of democratic management presupposes commitment, empathy, and a willingness to listen to others.

With these concerns in mind, Module I began on August 4th, addressing the norms and policies that underpin the idea of democratic management of public schools (Paro, 2000). On the other hand, Foucault's path (Defert, 2011) was always marked by profound uneasiness and, in the Socratic style, a continuous act of questioning oneself and others regarding how we are governed and why, exactly, we allow ourselves to be governed.

In this formative journey, awareness of the role played by teachers and school administrators was evident in each meeting through generous participation in the daily lives of these educational institutions, where teachers and administrators of Early Childhood Education (recently recognized as part of national Basic Education - *Amendment Nº. 59*) and Elementary Education (mandatory basic education since 1988), considered a social and subjective right of children and adolescents, but also of all those who did not have access to it during their careers) fight for recognition, now extended from eight to nine years (Federal Law Nº. 11,274), and preceded by the preschool phase, the last stage of Early Childhood Education, in the locality, incorporated into the daily lives of schools and not of CEMEI in recent years. This was possibly due to the advancement of mandatory enrollment from six to four years, but also due to the gradual recognition of CEMEI education professionals as teachers, deserving of appreciation as such, through activity hours corresponding to one-third of the workday, a career and salary plan, and ongoing training at school or outside of school through authorization to pursue specializations and other postgraduate programs at institutions of recognized reputation and training capacity.

The training process at the meetings began with the welcome, signing of the entry list, and seating of the participants of each class in a specially designated room in a newly built block

on the UTFPR CP Campus. An entire team then reorganized the seating and equipment for the meetings. The approach to the items and subitems of each Module emphasized the advance availability of 96 hours of the base text, a fragment of this base text, challenges (evaluation activities), and topics (forums on issues). All of these activities promoted reading, note-taking and prior preparation between one meeting and another, since the same workload as the in-person workload was planned for these activities at a location and time freely chosen by the participants, included in the final certification of this Training.

In the classroom, the instructors of Modules I through IV sought to engage, provoke, and engage participants through questions, attentive listening, and activities in pairs or trios, always aiming to bring elements of everyday life into the theoretical context and consummated in *praxis*. Meeting by meeting, participants and instructors interacted, heavily influenced by local political events that impacted the very conditions of the training being conducted, the potential benefits and opportunities for students, and how the relationships between teachers and SEMED, through an employment relationship, and enrolled participants and GPOPP, through a university extension relationship—that is, a course—produced various effects on this training process.

It should be explained that the invitation extended by SEMED to the teachers emphasized the importance of this training as a means of certification, followed by future professional evaluation and an elective process in each school unit. However, elements of local culture intersected the daily life of the extra-curricular training of these workers and their trainers. The written rules for the course were continuously challenged by justifications for absences and the failure to submit activities, as well as external occurrences in the municipal political sphere, such as the discussion of a bill that would alter the Teaching Statute, the late publication of the regulations for the electoral process for choosing managers, and, finally, the definitive impediment of candidacy for current managers who had been in a management position for more than four years.

On the one hand, the incidence of such external events significantly altered the participants' morale. On the other hand, they reiterated the need for training, updating, and understanding of regulatory instruments, policies, and the exercise of powers within the local education system and its units regarding how professional governance was exercised. This was a very interesting discussion that leads to the next section, which focuses on analyzing the process and results. These reflections have a remembrance character, approaching what Ludke & André (2013) call a case study, of an exploratory nature and with ethnographic investigative traits.

Analysis of the Process and Results

Caring for others is no simple task. Professionals working daily in local schools are challenged to form a team that meets the educational demands of children ages zero to ten, as well as the needs expressed by their parents, guardians, family members, and the community. In times of constant political polarization, educational issues are permeated by behaviors that make school staff sometimes fundamental supporters of families, sometimes undervalued professionals, whose work hours and other professional regulations are not known or respected by the school community.

Regarding the power relations in the daily life of school units, they were also evident in the meetings held in Modules I to IV, given the presence of teachers and teacher-managers from the same units present side by side, and, on the other hand, sole representatives from some

other units. In some cases, the current administrators were the only ones registered to participate in the training, which is why the subsequent ban, published on August 11th, generated concerns for the teams at these units. On the other hand, there were CEMEIs and schools with five, six, and seven staff members present at the training. This, on the one hand, projected excellent expectations regarding the transformation of the daily routines of these units, but on the other, it reproduced a certain inhibition among teachers in the training sessions themselves regarding the incumbent administrators in both groups of students. Despite the heterogeneity of these two groups, at the end of Module IV, with 44 and 39 respectively, the presence of incumbent administrators was more pronounced in the first group.

In any case, exceptions to this perception occurred in both instances, resulting in intense participation in the final evaluation, which contributed to the discussion of the themes, exemplified the theory and legislation, and allowed for important updates regarding, for example, home care for students, the establishment of the forum of school councils, limits of the school day for students in Basic Education, contemporary theoretical approaches linked to democratic and strategic management, inclusion of other school educators (non-teaching and non-management staff) in discussions, deliberations, consensus building, and in the Political Pedagogical Plan (PPP), as well as the need to overcome individualism in favor of strengthening strong teams for the collective work essential to face the struggles for professional recognition and appreciation, as well as to ensure the material conditions for an education that guarantees the learning of the student, the workers, and the community.

An important aspect was reiterated in several Modules regarding the need for self-education and community education for democratic participation. This is because people from other generations, such as parents and grandparents, did not necessarily receive such training, but they have the right to actively participate in school life with a view to democratic and participatory practices that contribute to learning—a fundamental objective of the school (Paro, 2000). This also reflects the growing awareness among workers of the need for emancipation, the need to pay the price of adulthood, and the need to assume the responsibilities inherent in the roles of teachers and administrators.

The results of the training process were reflected in the classroom, but they will continue, as was the case with the recent call for school principals to serve on the council forum, established in a recent amendment to the Law of Guidelines and Bases of National Education (LDBEN) of 2023 (Brazil, 1996), art. 14. Dissatisfaction also emerged during these two months of training, through various positions regarding the political and administrative decisions that accompanied the teachers' management and educational initiatives in the municipality. This included the uprising of a group of active principals regarding the limitation of tenure in their positions, and, on the other hand, the struggle of new employees to remain in the training program, complete the probationary period and the evaluations inherent to this process, and create the conditions for presenting their own names in the future to the school communities of each of these 26 school units.

Elements of Local Culture

Among the elements of local culture, a strong attachment to leadership stands out. Perhaps, therefore, the desire to be in charge, to exercise power over others. This is understandable in times of individualism, competition, and loneliness, as opposed to collectivism, mutual support, and solidarity. Contemporary Brazil is marked by machismo, patriarchy, and asymmetry in relationships, including, unfortunately, in the public service. This distances

people from spontaneous participation, places “each person in their place,” and subjects the majority to the rule of a few.

On the other hand, Paro (2000) has already emphasized that school administration is of little use to the school's daily life and purpose. Preferring collective forms of management, this author even proposes, in the seventh chapter of this work, a management committee—that is, a plurality of coordination exercises rather than a single leader. On the other hand, to achieve the necessary conditions for such construction, it is necessary to move forward in the direction of democratic management, in understanding the role of each person and the importance of verbal expression and listening to each agent in this process.

The school is a place for professional, collective work focused on learning. Any imposition of other objectives, such as those of each employee/manager, defocuses the team, disrupts coexistence, and creates difficult situations for both leaders and those governed. Indeed, the exercise of self-governance must be continually encouraged by school team leaders, aiming to acquire successive degrees of autonomy, trust, and effective performance of duties in each position. The school is a place of care. Before children, educators act as guardians, humanized beings who contribute to the development and humanization of new generations.

Therefore, clear objectives must be agreed upon by teams, aiming to build a strong collective identity, a culture of belonging, and integration for all. Feeling part of the team is the first step to effective participation. The fight for quality education presupposes commitment, effective working conditions, and respect for the working day. Without these, discourses about love, self-giving, and dedication, typical of non-professionals, tend to dominate minds and hearts.

The Search for Emancipation and the Challenge of Adulthood in Kant According to Foucault

This notion of emancipation is an individual process, a choice made by each person. When reviving this idea from Kant, Foucault (2008; 2018), in the first class of the 1983 Course, mentions the relationship to an emblematic text, *What is enlightenment?* This, as a cultural process with manifestations about philosophizing. Kant, according to Foucault (2008, p. 25; 2018, p. 25), defines Enlightenment as “man's emergence from minority, for which he himself is responsible” and, further, minority, as “the inability to use his understanding without the guidance of others,” as a lack of decision, of courage to use his own understanding. Foucault (2017, p. 1384) stated that Kant defines the essential conditions for the home to know its mentoring – spirituality and institutions, ethics.

In the end, Foucault summarizes that adulthood, that is, governing oneself, has a price, and not everyone is willing to pay it. This provokes reflections on the behavior of the participants in the meetings: a posture of caution, care, distrust, and even passivity toward a set of concepts, ideas, and theories “that would be dumped” on them, but which, on the other hand, were gradually shared and developed through listening, dialogue, acceptance, and empathPerceiving oneself as part of one's own formative process is extremely important for professionals who play an important role in society, as intellectuals capable of driving the transformation of an unequal, unjust, violent, and extremely conservative society, driven by the desire to maintain privileges, positions, and positions of power.

Ever dissatisfied, this contemporary philosopher draws attention to the fact that it is up to the institution, not the worker, to provide the means of production—that is, the tools and working

conditions appropriate for caring for others. In this sense, teachers and administrators must see themselves as workers, as a class that needs to be united to see its struggles prosper. In another direction, the way they choose to manage the school, as a democratic community or not, matters in the educational process for themselves and for others (teacher, member of the school management team, students, parents, guardians of students and members of the community).

Foucault (2008, p. 27; 2018, pp. 27-8) summarizes that Kant had made a different philosophical discourse, a kind of prescription regarding adulthood: “have the courage to use your own understanding,” which implies “guiding yourself.” On the contrary, many choose to remain in minority, because, according to Kant apud Foucault (2008, p. 32; 2018, p. 31), “they would be afraid of falling, they would not be able to walk and cross even the easiest ditches, they would fall”. In short, Kant resumes according to Foucault's interpretation (2008, p. 32; 2018, p. 32), “laziness and cowardice are what prevent us from giving ourselves the decision, the strength and the courage to have with ourselves the relationship of autonomy that allows us to use our reason and our morality,” thus remaining guided, governed, submissive. This observation is important because it is a choice and not a natural incapacity.

Self-Care as the Pinnacle of Teacher Training for Educators/Childcare Providers

This notion of self-care was revisited in the last three Michel Foucault Courses at the Collège de France in Paris (between 1982 and 1984) and inspires acceptance, empathy, and profound respect for professionals both in practice and in continuing education.

Michel Foucault takes Socrates as an example of a philosopher, a master of self-care. He encouraged his fellow Athenians to care for themselves through continuous inquiry, which, among other effects, resulted in his own condemnation, as seen in the dialogue “Apology” (1997). Socrates is the master of self-care because he exercises self-control over his passions. In other words, he makes reason prevail over the temptation of the beauty of young men, including Alcibiades. Alcibiades, the future ruler, grew old after being seduced by older men and neglected to take care of himself. Seeking to fully govern the city, he discovers that it is impossible to care for the city without first taking care of himself.

Socrates is the one who leads this discovery, but as a temperate being, he remains immune to Alcibiades' charms. In this process, Alcibiades fails in his promise to return to himself and remains dispersed among the loves of youth. Building on the Socratic case, Foucault takes his students to another moment—the golden age of self-care—in the first and second centuries of the Christian era, a period in which self-care will expand throughout life and become recognized as a true privilege of old age, through Seneca, for example. For young people, self-care becomes a way of life, that is, it accompanies the human being throughout their existence and constitutes, for them, a kind of life armor capable of protecting them from the pitfalls and disappointments of life, changing not the events themselves, but the way in which the subject receives them, gives them new meaning and uses them in their life. Thirdly, Foucault (2001, 2014) addresses self-care as appropriated by the Christianity of the early Church fathers, giving rise to other relationships that founded practices such as confession, among others practiced by a monastic asceticism typical of the Middle Ages. This will converge the entire philosophical mode of existence toward another life, based on the continuous renunciation of self in this one.

Self-care, reinterpreted in the present for work and teaching practices, highlights the need for educators to pay attention to themselves amid contemporary syndromes that affect people's morale, especially burnout, also known as neglected caregiver syndrome. Amid a sickening

society, schools are constantly challenged to offer responses, through their professional teams, to contemporary suffering and ills. In this context, it is vital not to confuse the role of educators with that of a receiver of issues transferred by families, parents, and other agents. It is essential to be clear about the role of the school team, fulfilling it collectively and pertinently to provide conditions of emancipation for each worker, for students and for their families.

Procedural and Reflective Elements or When "The Penny Drops"

The timing of how the dialogue mode of Modules I through IV will result in participants' awareness is somewhat unclear. In any case, simply comparing this with other training courses (parallel, previous, and subsequent) may indicate that form matters as much as content. This lesson is also presented by Foucault in his courses, given his constant concern for the well-being of his listeners and the effective conditions for carrying out their work.

In several challenges, questions were created during the Training to encourage the reading of the texts made available, as well as of the fragments or excerpts of these texts in a version with fewer pages due to the weekly routine and the lack of time of these participating educators, there were many signs of awareness and effects of this Training that intended to function as a self-training of ourselves, based on acceptance, listening, empathy and deep appreciation of local basic education teaching professionals.

It is, truly, a coronelistic resentment that is reflected in school management, through groups of allies "against" other workers. Unfortunately, these conflicts also manifested themselves in the training, with extremely conservative positions that sometimes relied on the talent, profile, and anointing of certain individuals for management, when in reality, everyone can learn, including students and teachers, to participate and shape truly democratic management, not just in words, but in and through example and practice. One of the challenges for the trainers in this process was precisely to act in accordance with this democratic ideal. Enabling listening, speaking, expressing, and even expressing present dissatisfactions, so that participants could perceive, through demonstration rather than through speech, democratic action.

With the limitations of a lean team, with long workdays to meet the two training periods on Mondays and Tuesdays, it is hoped that such sharing was practiced through questions, concerns, and proposals that may or may not be appropriated, adopted, and adopted by participants today and in the future. In this sense, the effects of such School Management Training propagate over time, for each educator, in each school setting, and in interactions with peers, students, and community members.

As educators, sharing knowledge and insights is a fundamental practice in the teaching profession, always with extreme respect for the less fortunate and for the lamentable social legacies of a profoundly unequal and intolerant country that promotes constant competition. Current educational administrations focus solely on formal compliance with legal standards, without effectively committing to actions that promote broad and unrestricted democracy. This is evident in how principals were invited, but not encouraged, to nominate two members per school to serve on the school council forum within each school council.

Once again, the possible outcome does not reflect a democratic process, as the principals convened by SEMED will likely nominate themselves and another manager from the already established team, which has been in place for years, to form this forum, which would be a space

for struggle and reflection on effective representation of school boards. Despite this, at some point, “the penny will drop for each of us educators.”

Conclusion

The main result of this research is the valuing of education professionals through attentive listening and the analysis of everyday situations in school units. The principles of human dignity, citizenship, and the valuing of teaching work underpinned the training, which was organized into five modules, each lasting eight hours, in four in-person meetings and with equal time for readings, activities, and prior preparation for all: fundamentals of educational policies and legislation, strategic management, pedagogical aspects, organizational leadership, and development of the Action Plan, the last module being taught by the SEMED pedagogical team.

Through various challenges and questions created during the training to encourage the reading of the provided texts, as well as fragments of these texts, there were many manifestations of awareness and the impact of this training, which sought to function as a form of self-development based on welcoming, listening, empathy, and the profound valuing of local basic education teaching professionals.

In this context, the professional perceiving themselves as part of their formative process is extremely important for professionals who have an important role in society, as intellectuals capable of driving the transformation of an unequal, unjust, violent, and extremely conservative society in the sense of maintaining privileges, positions, and positions of power. It is hoped that the sting of democratic management has bitten the educators participating in this training, as well as ourselves, and transforms us in our daily practices.

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

The authors declare that they did not use Degenerative AI resources in the preparation of this text.

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Contact email: davidpereira@utfpr.edu.br

Developing Inferential Thinking Through Academic Listening

Yulia Tregubova, British University Vietnam, Vietnam

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Abstract

The globalisation of education has reinforced the dominance of English as the primary medium of instruction in higher education across Asia. While such countries as Hong Kong, Malaysia, and Singapore have integrated English into both secondary and tertiary education, Vietnam continues to uphold a strong tradition of delivering its national curriculum in Vietnamese. The growing popularity of international universities within Vietnam, alongside the introduction of programmes with EMI in national institutions, has revealed a pronounced gap in students' linguistic and academic skills, particularly in their ability to critically engage with academic content and comprehend oral input in English, which are essential for academic success in western educational establishments. This paper reports on strategies designed to develop inferential thinking—an essential component of both critical thinking and listening comprehension—in the context of teaching academic listening in English for Academic Purposes (EAP) classes at British University Vietnam. Most of the students at this institution come from local educational backgrounds with limited previous exposure to EMI. These instructional strategies aim to scaffold students' critical engagement with academic listening content and to improve their overall listening comprehension, thus facilitating a smoother transition to an international academic environment. The study employed a combination of quantitative analysis of students' diagnostic, formative, and summative assessments with qualitative interpretation of students' reflections on their learning experience and progress. Preliminary findings indicate that focus on inferential thinking positively contributes to improvement in both students' academic listening proficiency and their ability to critically engage with academic content.

Keywords: EAP, critical thinking, inference, inferential thinking, academic listening, metacognitive listening strategies

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Introduction

The globalisation of education has undoubtedly strengthened the position of English as the medium of instruction (EMI) in higher education (HE) in Asia (J. Huang, 2005; L. S. Huang, 2010; Miller, 2014). If some countries such as Hong Kong, Malaysia and Singapore (Miller, 2014) have a long history of integrating English into both secondary and tertiary educational levels, which supports the transition from high school to HE, others, for example, Vietnam and Thailand continue delivering the curriculum in the national language (Sahan et al., 2025).

The recent top-down policy to improve English proficiency in Vietnam (Sahan et al., 2025) has led to the increased popularity of International English Language Testing System (IELTS). Since the test has been made mandatory for both school and university graduates, this has had an impact on teaching and learning practices at both secondary and tertiary levels, which resulted in IELTS negative washback (Nguyen, 2023). Not only did this lead to learning and teaching-to-test but also affected language skills development by limiting them to IELTS task types.

The teaching context of this study is an international university in Vietnam, that provides British curricula through EMI. Students, however, mostly come from monolingual backgrounds with minimal previous exposure to EMI, which hinders students' ability to access learning through L2. Additionally, the difference in the teaching approaches, with local secondary education being more teacher- centered and rote-based and an international university environment focusing more on students and autonomous learning, creates a pronounced gap in academic skills, particularly in students' ability to critically engage with academic content, infer meaning and generally comprehend oral input in English, which are essential for academic success in western educational tradition.

Criticality in Higher Education

The ability to demonstrate critical thinking is essential for a successful academic performance in western HE tradition (Moore, 2013; Wilson, 2016). It also equips students with the skills required to be better adaptable to the fast-changing world in professional, social and interpersonal contexts (Ku, 2009) and is, therefore, a prerequisite for future employability (Andrews, 2015; Bagheri, 2015; Davies & Barnett, 2015).

Critical thinking has been widely integrated into curricula since mid-twentieth century following the release of Bloom's Taxonomy of higher-order and lower-order thinking skills (Anderson & Krathwohl, 2001; Bloom et al., 1964), which has then been adopted by educators at various educational levels and fields for assessment, material and curriculum design.

Drawing from existing approaches to critical thinking, Davies and Barnett (2015) categorise the skills into lower level, higher level, complex and metacognitive thinking skills. It appears, however, that critical thinking goes beyond just cognitive ability and includes critical reflection (Ennis, 1985) followed by informed action. This makes a broader term—criticality (Davies & Barnett, 2015)—more appropriate for HE purposes as it does not limit the role of HE to only receiving evidence of critical thinking but encourages students to form a stance and their own critical orientation in the society and the world (Davies & Barnett, 2015).

Links have been previously made to criticality and culture (Atkinson, 1997) and the ability or inability of students of certain cultures to critically engage with the content in classes. There is

a view (Bali, 2015; Floyd, 2011), however, that critical thinking through L2 is more likely to present a challenge than a student's culture.

Although in HE criticality is rarely formally taught, it has recently become part of EAP curricula (Bagheri, 2015; Benesch, 2009), a discipline supporting students from different linguistic and cultural backgrounds with the transition to the EMI HE environment. This has taken the scope of EAP beyond academic and language skills development to a broader sociopolitical and educational context.

Critical and Inferential Thinking in Language Education

Unlike critical thinking that has only recently been included in EAP training (Bagheri, 2015; Benesch, 2009), inferential thinking has a long history of studies through the prism of language learning. In the work titled "The 'method of inference' in foreign language study" (Carton, 1966), A.S. Carton writes that making inferences or "inferencing" is the process through which foreign language acquisition "extends beyond classroom". He elaborates on "inferentiability" of languages and offers practical activities for inferentiability of French. According to his research, an inferential response is when a learner encounters an unfamiliar stimulus and responds to it resorting to familiar means. This correlates with the framing theory (Minsky, 1975; Tannen, 1993), when information gaps are filled in based on previous experience or knowledge. This is the approach that has been adapted for the purposes of the current research.

In language education, inferencing has also been applied to acquisition of grammatical structures and phonological patterns known as grammatical and phonological inference respectively (Clark, 2004; De La Higuera, 2005; Horning, 1969; Leather & James, 1987; Wieczorek, 2017), as well as lexical inferencing in vocabulary teaching and learning (Paribakht & Wesche, 1999).

Apart from language systems, inferencing has also been explored through skills development, reading comprehension and writing skills in both L1 and L2 learning environments (Bagheri & Ghanizadeh, 2016; Hamada, 2009; Hutagalung et al., 2025; Kern, 1989; Niwa, 2019; Simanullang et al., 2025; Sugita, 2021).

In the context of current research, inferential thinking is seen as part of critical thinking, which is a broader scope of cognitive skills. Inferential thinking includes a cognitive process of inferencing i.e. drawing conclusions informed by previous experience or prior knowledge (top-down processing, schemata activation) or/and evidence or evaluation.

Including inferential thinking skills into teaching and learning practices allows to shift the focus form lower to higher order thinking skills, from low cognitive demand (literal) to high cognitive demand (inferential) tasks, thus moving from explanation-based to inference-based learning (Tecuci, 1994).

When presenting a constructionist theory of inference generation in narrative texts comprehension, Graesser et al. (1994) identify the following types of knowledge-based inferences: local, global, elaborative, procedural, confirmatory, and corrective. These types of inference have been adapted to and explored in the context of the current EAP research.

Academic Listening in Higher Education: The Importance of Inference

Although critical thinking training is included in EAP (Bagheri, 2015), it is often taught separately from macro skills or is introduced as a follow up activity to comprehension tasks, labeled as "critical thinking" and in a separate section. In the context of current research, critical thinking is seen as an integral part of skills development and is believed to facilitate the process.

With oral instruction traditionally being the major mode of delivery at university (Fortuño & Gómez, 2005; Lynch, 2006, 2011; Malavska, 2016; Rahimirad & Moini, 2015), academic listening is yet the least researched of the four macro skills (Lynch, 2011; Miller, 2014), which could be due to the complexity of academic discourse and the nature of the skill itself.

Listening as a skill and a process both in L1 and L2 includes four overlapping types of listening processing: neurological, linguistic, semantic, and pragmatic (Rost, 2013). Where neurological processing involves attention initiation, meaning construction and memory (Rost, 2013), and linguistic processing requires input from a linguistic source (Rost, 2013) such as prosodic features of speech, differentiation between formal and informal register, discourse and stance markers etc. A lack of such linguistic awareness might negatively affect comprehension, which is particularly important in the context of academic listening through L2. Semantic processing integrates prior knowledge into understanding oral input (Rost, 2013); this is when listeners' schemata are activated and even if there is a linguistic challenge, they are still able to construct meaning due to the background knowledge or previous experience. Schemata play a crucial role in top-down processing; they are, however, culture specific (Minsky, 1975; Tannen, 1993). This cultural element could either contribute to meaning construction or interfere with the process. In academic communication, schemata may facilitate semantic processing of novel academic genres and task types by students. For instance, students are more likely to succeed in critical thinking task completion despite the linguistic challenge, if they have been exposed to them previously through either L1 or L2. Pragmatic processing implies taking an active role in identifying relevant factors in verbal and non-verbal input and adding informed evaluation into the process of constructing meaning (Rost, 2013), this is directly linked to inferential thinking when understanding perspectives and the stance of a speaker, for example.

When it comes to teaching academic listening in EAP courses, traditional tasks often evolve around comprehension, that means targeting lower order thinking skills mainly without critical engagement with the content (Gyenes & Santos, 2021; Xu et al., 2021). Students are, however, expected to demonstrate higher order thinking skills at university in other disciplines through EMI. This exposes a gap in students' skills set and HE expectations, which needs to be addressed by EAP professionals.

To enable critically through listening to academic talks, Gyenes and Santos (2021) developed an integrated model of employing top-down and bottom-up listening and critical thinking processes. This allows tasks targeting higher order thinking skills to be embedded into the listening comprehension process. This model can be applied to teaching listening in EAP classes and allows for more scaffolded preparation for a broader context such as discipline-specific lectures.

The perceived challenges, however, may stem from the fact that EAP students usually come from various educational, oftentimes monolingual, backgrounds. By this point of their education journey, students have already developed their own metacognitive listening strategies in L2, shaped by their previous learning experience and environment. These

strategies are routinely applied to task completion, managing the learning process, planning, and concentrating (O'Malley et al., 1989). This becomes particularly important in the context of exam preparation negative backwash, which is common in countries where international proficiency tests are mandatory such as IELTS Academic module in Vietnam (Nguyen, 2023). The backwash leads to teaching-to-test practices and to limiting the language skills set of students to a range of exam question types only.

EAP students, coming from such backgrounds, are likely to have only been exposed to comprehension-based listening instruction (Xu et al., 2021), typical for exam preparation courses, which involves listening for correct answers without critical engagement with the content. Given that most international proficiency tests include only a fixed number of comprehension question types e.g., 10 question types of IELTS; students' metacognitive listening strategies would be evolve around these comprehension questions, bypassing high cognitive demand tasks. This results in students not forming relevant schemata for approaching inferential or other critical thinking task types.

Inference in academic listening through L2 is, however, crucial for academic success and for future employability. The ability to approach oral input in L2 from the perspective of meaning construction, to decipher meaning or attitude that has not been explicitly presented, is a complex process involving both bottom up (neurological and linguistic) and top-down (semantic and pragmatic processing).

Context and Methodology of the Research

The rationale for the current research is informed by the analysis of EAP students' diagnostic listening test results from 2021-2025 at British University Vietnam. During this period IELTS has been made mandatory for high school and university students in Vietnam and, therefore, there has been a shift in the EFL industry nationwide to test preparation.

The diagnostic listening test results have consistently been recording successful completion of comprehension-based tasks (low cognitive demand) and poorer performance in tasks involving various types of inferencing (e.g., inferring the meaning of a word, a stance of a speaker, elaborative inferences, etc.). A mixed-method approach to applying qualitative and quantitative research was employed to identify the reasons behind such performance. Quantitative analysis covered students' diagnostic, ongoing, and summative assessment results in academic listening and quantitative students' questionnaires as well as their guided and unguided reflections.

Quantitative Analysis Results: Diagnostic Listening Tests

This part of the research was only focusing on students' inferential skills and the task types that proved particularly challenging. These task types targeting inferential thinking could be grouped as follows:

- Local inference – i.e. identifying a meaning of a word from the context *(*e.g. What does the speaker mean by "conservationism"?*)*
- Local inference – i.e. inferring a stance (e.g., Is the speaker in favour or against globalisation?);
- Local inference – i.e. inferring a perspective (e.g., Which perspectives is globalisation presented from in the lecture?);
- Global inference – i.e. identifying a reason that was not explicitly stated (e.g., Why did they choose to research ecotourism?);

- Elaborative inference – i.e. forming judgment basing on the information provided (e.g., According the information presented in the lecture, is gloablisation more of a positive or negative phenomenon?);
- Elaborative inference – i.e. inferring relations between concepts (e.g., How does ethical consumerism influence marketing decisions of companies?);
- The questions presented above demonstrate that the challenge is mostly associated with open-ended questions involving engagement with the content i.e. the answers are not explicitly presented in the audio input.

Qualitative Analysis: Identifying the Cause

To receive students' feedback on the diagnostic test experience, a student questionnaire was designed, which invited students to reflect on the reasons why they found these specific questions difficult. The most common responses confirmed the lack of metacognitive listening strategies targeting inference-based questions. Students admitted that they were listening for the "correct answer" and that these questions are "not like IELTS", which confirms the exam negative backwash in their previous learning experience.

To mitigate the negative effects of IELTS backwash and scaffold inferential thinking development, the following steps were undertaken:

- evaluation of current teaching materials from the inference-based task perspective;
- development classroom strategies for fostering inferential thinking through academic listening;
- gathering qualitative and quantitative data for preliminary results; and
- adjust classroom interventions accordingly.

Evaluation of the Teaching Materials

At British University Vietnam the main coursebook for EAP classes for all proficiency levels is the Oxford University Press EAP series (De Chazal & Hughes, 2015; De Chazal & McCarter, 2012; Dummett & Hird, 2015), which is supplemented with in-house resources as needed. Although the listening sections include tasks targeting critical thinking and metacognitive strategies development, they are not always fully integrated into the listening comprehension process and are introduced either before or after listening. Having them included in the comprehension stage, however, would contribute to a more scaffolded and natural approach to their development.

Another interesting observation is that inference-based tasks mostly evolve around local and global inferences, especially at lower proficiency levels. For example, at the A2 level a local inference task to choose one of the two, "Which statement is a fact, and which is an opinion?" (De Chazal & Hughes, 2015, p. 94), or identifying a stance whether the speaker agrees or disagrees with a statement.

At pre-intermediate level, alongside local and global inferences, some examples of elaborative inferencing tasks can be found e.g. "Why might there be differences in calorie consumption in areas mentioned in the lecture?" (Dummett & Hird, 2015, p. 52) or e.g. "Do you think the lecturer's arguments in favour of responsible tourism are convincing?" (Dummett & Hird, 2015, p. 136). Such questions stimulate top-down processing through activating schemata and allowing students to link the content of the audio to their prior knowledge. Although more examples of elaborative inferencing can be observed at B1+ and B2 level, local and global

inferences still dominate e.g. The lecturer refers to "talents" shared by great leaders. What might these include? (De Chazal & McCarter, 2012, p. 80).

As can be seen from the material analysis, inferential thinking is mostly addressed through tasks focusing on local or global inferences, which narrows the context and does not create favourable conditions for a broader application of inferencing. This would stimulate students to connect the content of the audio input to reality and their own experience, facilitating and scaffolding a more critical engagement with content. The resources overall display a significant prevalence of questions targeting lower order thinking skills (understanding the content, applying the information from the content) and even though the language content of the listening sections provides multiple opportunities for bottom-up processing, those need to be further explored. This all demonstrates that adaptations of the existing resources and new classroom strategies need to be implemented to support students with fostering inferential thinking through academic listening.

Classroom Strategies to Fostering Inferential Thinking Through EAP Listening

The literature review together with material evaluation and students' diagnostic tests analysis have informed a comprehensive approach to fostering inferential thinking, which comprises a sequence of steps described below:

1) Scaffolding bottom-up processing to facilitate linguistic processing:
   - introduction of stance markers (interestingly, surprisingly)
   - introduction of language of perspective (historically, economically etc.)
   - introduction of hedging devices (may, unlikely etc.)
   - introduction of word families and vocabulary chunks to facilitate meaning construction from a context
2) Creating opportunities for top-down processing to scaffold semantic processing:
   - schemata activation (e.g., prediction tasks at the pre-listening stage)
   - elaborative inferences (e.g., questions prompting students to link the audio content to broader context)
3) Introduction of tasks targeting a wider range of inference types such as local, global. elaborative, procedural, confirmatory, corrective;
4) Introduction of tasks providing opportunities for linking inference to other complex thinking skills (evaluation, reasoning, problem solving);
5) Incorporating metacognitive skills (reflection on the learning experience):
   - students reflect on task completion and on their overall listening performance;
   - students complete guided and unguided reflection questionnaires;
   - students evaluate their own progress and identify potential areas for improvement; and
   - students keep reflection logs to track their progress.

Preliminary Results

The research is still in progress, and a larger number of students needs to be involved to obtain more comprehensive findings, however, some preliminary results are already available and indicative of a positive influence of inferential thinking development. The quantitative data of summative assessments have demonstrated improvements in students' performance in inference-focused task types, particularly in tasks targeting local and global inferences. There

is an indication of a positive change in response to elaborative inferencing questions, especially at higher proficiency levels.

The analysis of students' reflections has identified several points for future adaptations of the strategies. Firstly, tasks facilitating bottom-up processing have been named the most useful in developing inferencing skills. Students have also pointed out that prediction before listening helps them to complete listening tasks better. Additionally, students' reflections have confirmed that when inferencing is scaffolded, it is perceived less challenging and more as an integral part of listening comprehension. The metacognitive approach has proved to be effective as well, that is when students are aware of the skill they are practising (e.g. local inference).

Conclusions

The increasing popularity of the IELTS test in Vietnam has resulted in students, who start international degree programmes through EMI, having negative exam washback, that stems from a limited exposure to a variety of task types or tasks targeting inferential or critical thinking (high cognitive demand).

To facilitate the development of inferential thinking and a deeper critical engagement with academic audio content, a sequence of classroom interventions has been developed. The suggested scheme of work incorporates bottom-up and top-down processing to support linguistic, semantic, and pragmatic listening processing (Rost, 2013).

This approach encourages EAP students to focus on decoding linguistic elements to scaffold meaning construction and link the information to broader contexts using schemata activation (top-down processing). Some metacognitive strategies of self-reflection were incorporated to support the process of fostering inferential thinking. Although the research is still at its early stage, some preliminary findings prove that the approach facilitates better cognitive engagement with the content and equips students with the inferential thinking skills necessary for effective listening comprehension, as well as academic success beyond a standardised test performance.

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Critical Thinking Engagement in Online Environments: A Proposal of a Test for Young Mexicans

Cecilia Chávez Aguilera, UTEL University, México

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Abstract

The use of critical thinking abilities constitutes a key competence in nowadays societies. However, it has been pointed out that when it comes the turn to analyze the data we have available by means of new technologies of information, it may be necessary to reshape these abilities. In this talk, I present my work in conducting a research about applied critical thinking skills in online environments among young Mexicans aged 18–24. I translate into Spanish the free version of the Watson and Glasser critical thinking assessment, and proposed a new assessment to test critical thinking abilities applied in the context of the use of new technologies of information. My proposal is based on the structure of the Watson and Glasser test. However, its reshape includes, among others, the following aspects: items to test reasoning based on images and videos, reasoning made in belief revision, reasoning in testing different sources of information (like X, TikTok, or regular newscasts), reasoning that may hide common misconceptions about the AI. The support of these changes is based on international guidelines for the use of AI in education, existent legislation and academic studies in the topic. I administered both assessments in a pilot sample. My experiment had two random groups: one of control solved the standard test, the other my proposed test. I found good support for the conceptual validity of my proposal as well as information for further research in the factors that may interfere in a critical engagement in online environments.

Keywords: critical thinking, Watson and Glaser test, media and informational literacy, young Mexicans online engagements

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Introduction

> Éste que ves, engaño colorido,
> que, del arte ostentado los primores,
> con falsos silogismos de colores
> es cauteloso engaño del sentido;
> Sor Juana Inés de la Cruz

What would our poet have thought or written upon learning of the colorful deceptions of our era? We live interesting times, undoubtedly we are reaching discoveries that make us dream in solving major problems, at the time that they open possible threatens of the same relevance. To keep abreast of times we need to see the Janus face of some of our technological developments that are changing our daily lives.

A comparison between two pairs of common scenarios in our days can gives us a clearer idea of this.

Scenario A

One of the major American mass media companies, *The Times*, sued to *Open AI* and *Microsoft* for copyright violations. Specifically, *The New York Times* accused these organizations of having inappropriately used thousands of articles in training their automated chatbots, which now compete with the media as a reliable source of information (Grynbaum, 2023; Sánchez-Vallejo, 2023). Attorneys of *Open AI* and *Microsoft* argue that nobody uses their chatbots as a substitute of a newspaper, moreover, *The Times* is pointing a failure they had in their products and they are fixing it, and most of the contents were already public (Chadwick, 2024; Lagos, 2024). Screenwriters, actors, performers, and various film industry unions are staging a strike lasting more than three months to achieve, among other things, regulation of the use of AI in this industry in order to protect them as creators (Dalton, 2023; Porcel, 2023). More than 200 singers are getting together to sign a public manifest against the use of AI to create music and /or virtual singers, and its use to emulate an existent singer (Durán San Juan, 2024; TEC, 2023).

Scenario A'

We have legal access through the web to a huge amount of books, articles, magazines, newspapers, videos, images, etc. Sites like the Digital Public Library of America, The New York Public Library, The British Library, Getty Publications Digital Library, Cervantes Virtual or The Internet Archive, make a non-profit effort to give access to a great amount of bibliographic resources. Databases like Scilit, Springer Link, Gutenberg, Elsevier, and tools like Research Rabbit, Elicit, and many more, not only make possible to consult a huge amount of knowledge, but they give us a tool for processing huge amounts of information, so we can scan in a successful way much more many resources. Even if there can be some selection in our research – as example, Khale (2019) recall us that in that year most of the books of XX century were not online yet – digitalization of contents rise in an exponential way. Rise (2021) comment that: "To mention a few symptoms of the digitalization that has engulfed us, as of 2000, one quarter of global information was digital, but as of 2013, it was 98%" (p. 2).

Scenario B

Elon Musk sued to *OpenAI* for abandoning the non-profit spirit that the company initially had. Musk and Altman have had frictions that are mainly attributed to this debate. Musk invested in a company that started as a research laboratory and therefore its code must remain open, and Altman will have to return the money he has earned once he abandoned this approach, prioritizing commercial interests over the good of humanity (Goldman & Fung, 2024; Pascual, 2024; Satariano, 2024). *OpenAI* argues that Musk wanted to have the total control of the company (Expansión, 2024). Nontheless, some months before, in the *World Economic Forum* in Davos, Altman (2024) himself said that: "… this technology [AI] will have massive effects on the world and it could go very wrong, the technological direction that we've trying to push it is one that we think we can make it safe (...)."

Scenario B'

In the development of new techniques in the design of medicines, vaccines and various procedures, AI has played a significant role both in studying predictions of trends in possible diseases at the population level, and thus pandemics, and in assisting biomedical research. (RNSA, 2020, TechRepublic, 2020). The most recent scenario is the SARS-COV2 virus pandemic, which has provided us with a wealth of information about how this form of information processing was used to rule out possible avenues for vaccine development, thus allowing us to focus on the most likely ones in less time than previously required. AI also helped in this scenario with risk management, surveillance during the pandemic, telecare and services during lockdown, vaccine delivery and provision, automatic disinfection services, and much more, in addition to the uses that opened up new horizons during this intensive period of research (Sujan et al., 2021).

These scenarios call us to look for guidelines to act. Even though the law lags behind the events it seeks to regulate, existent legislation may keep us aware of our new rights and obligations. The so called *fourth generation rights* encapsulates key facts about our current interchange with new information technologies, and reshape many rights of the third generation like the right to privacy and the right to information, that now includes, by instance, different expectations of true to consider if we are being flawed by some information site, or the consideration that we cannot expect to think in privacy as we did before, but to take into consideration different degrees of easiness to access to some of our personal information (Hartzog & Selinger, 2013; Riofrío Martínez-Villalba, 2014; Risse, 2021).

To illustrate the relevance of this change, let's just mention that the right to information has been considered a key right, i.e. a right that is the condition to enjoy some other rights like the right of freedom of opinion, or even the right to education (Britz & Lor, 2010).

It is a noteworthy fact that the governance of the internet or the AI is a difficult, hot, current and possibly permanent debate that we as humanity must held, and we are far to come to a satisfactory agreement. However, when it comes the turn to reach agreements in matter of education we are doing it a little bit better. Consider as an example that the Budapest Convention, the first legal multilateral and binding convention on cybercrime, as of August 2025 has been signed by 83 of the 195 sovereign states recognized by the United Nations (Migration and Home Affairs of the European Union, n.d.). Meanwhile, the Beijing consensus on Artificial Intelligence and Education, as been agreed by more than 100 member

states (UNESCO, 2019). Of course, some facts may intervene in this: The Beijing consensus is a non-binding agreement, maybe cybercrime is a more sensitive topic, etc. Nonetheless, as global citizens, we need to be in this debate and take into consideration the agreements we can reach.

In addition to this aspect, we need to be aware of the always changing technical aspects that may affect our personal access to information through the internet. This includes, among others, the following aspects:

- The possible hierarchisation of results that searching algorithms make based on aspects that may depend on the history of my personal choices and/or behavior in the net and/or location, letting aside possible facts or sources that may have some other point of view than mine, creating what is known as the *bubble effect* (Burkhardt, 2017; Jackson, 2022).
- The so called infodemic, that has been typified as a threat even for the WHO, (WHO, w.d.), which is not only the flow of a great amount of misleading information during some outbreak event, but that can be considered as a phenomenon that occurs every now and then in our everyday life in which we need to take decisions. Tristan Harris, former ethic designer of Google, mention that fake news spread six times faster than verified ones (Orlowski, 2020). Baesse de Araujo et. al. (2021) express how worrying is the combination of the exponential access to the internet, the exacerbated flow of fake news and the human tendency to no verify information. Even if we had the disposition to verify something, we may not be in an easy task. Burkhard (2017) points out that:

> Researchers have studied how well humans can detect lies. Bond and DePaulo analyzed the results of more than 200 lie detection experiments and found that humans can detect lies in text only slightly better than by random chance. This means that if a bot supplies a social media user with false information, that person has just a little better than a 50 percent chance of identifying the information as false. In addition, because some bots have presented themselves and been accepted by humans as 'friends,' they become trusted sources, making the detection of a lie even more difficult. (p. 16)

Under this difficult situation, it has been explored the psychological causes that may be behind the tendency to accept something as true. However this avenue is not an easier way to attack this problem. Kanashina et. al. (2023) emphasizes that:

> According to Wisdom, Chor, Hoagwood and Horz (2014), there are about twenty theoretical frameworks that attempt to explain the reasons and precedents for the acceptance of fake news. One of the most popular is the Theory of Reasoned Action (TRA), proposed by Ajzen and Fishbein (1973), which considers attitude as one of the basic antecedents of the intention to use or accept a social behavior. Also, within the field of social psychology is Bandura's (1989) Social Cognitive Theory (SCT), which considers that part of social knowledge is learned by observing other subjects during social relations and through experience with external means. Currently, social media configures a new social framework of a virtual nature, and therefore, some of the tools used to analyze socialization processes in physical environments can be replicated in virtual ones. (Stephen, 2016, p. 537)

In Kanashina et al. (2023) it is found that one of the most difficult tendencies to combat is the one that is called “Perception of richness” which is the tendency to accept some information that comes from a source perceived as trusted. Jost (2020) found that young adults tend to share fake news when they are considered something amusing. Something remarkable is that both studies are focused in young adults, so we may expect a better critical development, and this is not the case.

Additionally, we need to be aware of the technical reports that antivirus companies, or cybersecurity companies publish. They use to offer at least annual reports that informs to the general public some tendencies and novelties in the most common threatens on the net for personal use as well as for big companies or organisms.

The troubled sea described before is more navigable with some training on analytic skills, some general knowledge of the way the algorithms we work with function, and in general with what the UNESCO calls the *media and informational literacy* (MIL), that is conceived as an umbrella concept, involving explicitly at its core critical thinking abilities. By instance, UNESCO (2023) states that “MIL empowers citizens with critical thinking and other necessary competencies to enable their informed and ethical engagement with the integration of content, institutions providing content (…) and digital technologies” (p. 6). However critical thinking abilities may not just be directly applied in a crystal-clear way on these scenarios (Burkhard, 2017; Jackson 2022; Jost, 2020; Kanashina 2023; UNESCO 2023a). The key fact that this work addresses, not pointed out in the literature revised, is a shift in the logical backbone of critical thinking. What are the core principles of an apparent diversity of conceptions of critical thinking (Zhou, 2022) are tied with a classical view of logic, giving a great weight to deduction reasoning. Nonetheless, by the aforementioned circumstances, it is needed to involve non-classical ingredients, and in my proposal I include the framework behind the non-classical logics of belief revision, which is a necessary kind of reasoning to confront the vast majority of circumstances involved in our interchange of data on any new technology of information. In addition, we need to consider that the source data of an inference, many times is now an image or a video. Even with the difficulty and reticence to consider this kind of reasoning, it is by far necessary to begin considering this circumstance. Another fact considered in this proposal, is that we need to have material considerations in the application of critical thinking abilities in these scenarios. Typical conception of the evaluation of a deduction may be confined to a formal revision, and the fundament of a standardised evaluation involves as well some abstraction of the contents of the evaluation, while the material revision is left as a matter concerned with the subject of the matter in both cases. Even though this point of view is appropriate in some circumstances, when we deal with application of the reasoning, we may be in need to consider at least some key aspects of the material of the reasoning. For instance, we may be in need to be aware of the most common phenomena that may hide misconceptions about the AI, as this phenomenon may prevent a fruitful use of it. As well, in the case of the present work, it has been noted that there were a few of more common fallacies presented in the interchange on social media in México, and the literature emphasizes the statistical fallacies.

The Local Reflect of the Global Scenario

How does the need of a critical engagement in online environments is lived in México?

Some Conceptual Remarks

The notion of critical thinking has been widely discussed and used in many different areas. For this reason, it may be thought that there is no well-defined concept, or even that there is no consensus on what is meant when we talk about critical thinking. For example, fields such as psychology and sociology emphasize or include contexts or dispositions that favor the use of analytical skills, while philosophy emphasizes working with the skills themselves and the ability to apply logic (Zhou, 2022). This last is the paradigm in which the present proposal is situated.

This paradigm is chosen because the history of the study of these areas in México is such that specialists in the field recommend adopting what is called a *narrow conception* of critical thinking (Vega Reñón, 2015), which grosso modo is the one taken in the above mentioned paradigm. This conception allows the existence of well-established test to measure critical thinking abilities (Ossa-Cornejo et al., 2017). For this project, I used Watson and Glaser tests (Glaser, 1941; Watson & Glaser, 1980) as a test for a group of control, and as a skeleton to construct my proposed test.

The Watson and Glaser (W&G) tests were originally created in English and validated in the United States without considering a particular age group or cultural contexts. Some work has been done to adapt these tests to a specific language or culture (Da Dalt de Mangione & Difabio de Anglat, 2007; Gerdts-Andersen et al., 2022; Palma-Luengo et al., 2021). Nonetheless, as far as our knowledge let us see, no work on adapting this test to an application in online contexts has been done.

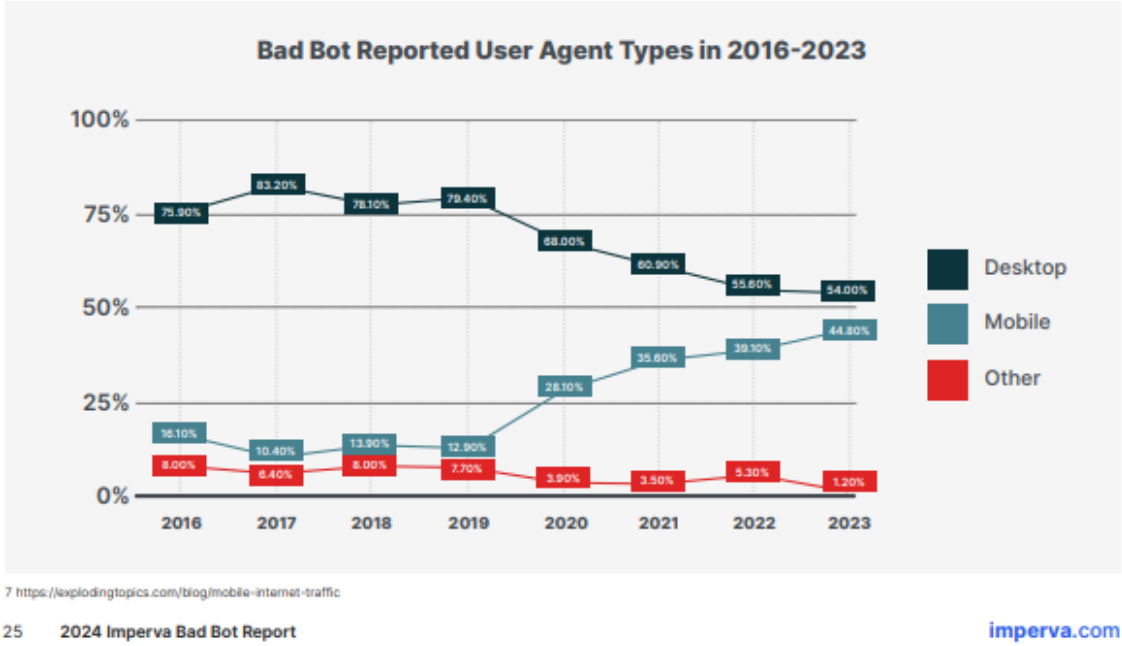
The Target Population

The participants in the pilot sample are randomly selected Mexicans aged 18 to 24 who use new information technologies. The reason to select this target population is of interest. Let´s give some context to explain it. Baesse de Araujo et. al. (2021) tell us that the vast majority of access points to fake news are intelligent mobile phones and social networks. Kanashina et al. (2023) tells us that young people spend the most time on the internet on social media:

> This environment [of circulation of large amounts of fake news] poses a great social challenge, particularly in the decision-making processes of young people, who are strongly influenced by the information distributed online, and are unaware of the volume of fake news they consume (Kim, Song, Liu, Liu & Grimm, 2018; Ng, Lee, Wong & Lam, 2020). Regarding online news consumption, data from GlobalWebIndex (GWI) reveals young people aged 16–24, are the cohort that spends the most time-consuming social media, at 58%. (GWI: Definitive Social Media Trends Report, 2023, p. 535).

They also tell us that one of the most common ways young people accept fake news is when a friend or contact suggests it to them, and they tend to get most of their information from their mobile phones. To this confluence of adverse factors, we must add that one of the biggest factors in the spread of fake news and information theft is the use of bad bots. The Imperva report (2024) tells us that the use of bad bots has increased on mobile phones:

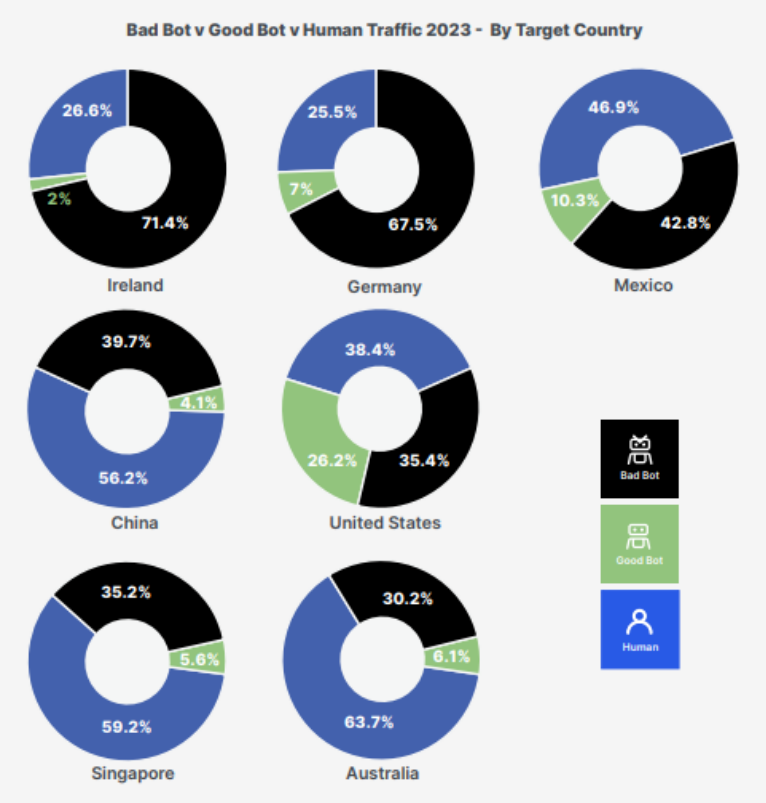
Figure 1
Bad Bot Traffic From 2016 to 2023



Source: Imperva (2024)

In addition to this, in México, the bad bot traffic is almost the same than the one of humans. Hereby the data:

Figure 2
Bad Bot, Good Bot and Human Traffic in 2023



Source: Imperva (2024)

This means that there is a very high probability that a young Mexican will come into contact with a bot that distributes fake news or manipulates what they receive or see on their social media, and that they may end up believing false or biased content.

Due to the above mentioned facts, in order to fully characterize the relevant features of the target population for this study, we will provide some data on the general population dynamics in terms of access to and use of new information technologies. See details in the appendix.

Research Design

My research is a true experiment with two random groups, one of control. For the time being, I present evidence for the validity of the conceptual construct, with evidence of content, of process, and of relation with other variables (Sánchez Mendiola & Martínez González, 2022). I administered a translation into Spanish of my own of the free version of the W&G assessment of critical thinking to a control group, and my proposed test to the other group. Both groups conform a pilot sample and were administered under same circumstances.

Some Details of My Proposed Test

Socrates already warned us that the first step to achieving knowledge is to come to know what we do not know. To guide social media users to measure their critical thinking skills will be a great first step in fostering these abilities. Having a test as the one proposed is a convenient step to improve critical thinking skills in the target population largely because there is not necessarily an awareness of the potential deficiency in these skills, or they do not even consider it relevant at times. Uiterkamp et al. (2020) mentions that many young Mexicans 13–14 years aged, despite having some awareness of the possible falsity of some content, this do not necessarily deterred them from sharing it because they do not consider its verification a priority, especially if they think the topic is relevant. For example, they might share any content about climate change without necessarily verifying the source because they consider the topic more important than the source. Jackson (2022) and Burkhardt (2017), among others, warn us about the so-called Dunning-Kruger effect, which barely speaking, consists in overestimating one's own abilities regarding a topic or a specific skill.

Critical thinking skills are acquired to some extent through knowledge, but primarily and decisively through practice. Thus, a test, in addition to raising awareness of certain weaknesses, gives us the opportunity to practice these skills in a controlled environment.

Moreover, a test has an additional advantage with respect to the target population. Adult learning requires, among other things, to detect established patterns or ideas that are inadequate, which is one aspect of incompetence in a skill. Fostering these skills in the target population can be modeled by the acquisition of a skill in adult population actively engaged in their learning process. A recurring model of this kind of skill acquisition is the one introduced by DePhillips et al. (1960), which mentions four phases in learning or acquiring skills:

> It is characterized by a passage through four stages: (1) the individual is at first in a state of *unconscious incompetence*, in which he is not even aware of his lack of knowledge; (2) when he becomes aware of his ignorance and the need to do something about it, he enters the stage of *conscious incompetence*; (3) with effort, he

> succeeds in reaching the third stage, *conscious competence*, in which his knowledge is deliberately and often woodenly applied; (4) continued effort may bring him to the level of *unconscious competence*, in which he utilizes his knowledge easily and gracefully. (p. 69)

In this sense, I designed my proposed test as an *assessment tool for learning and as learning* (Sánchez Mendiola & Martínez González, 2022). The test is designed to be implement online, so feedback in each item has been worked out as an immediate source of information about one's mistakes, including sites on the web to consult and follow the required documentation to be more critical on that specific point. So this is a tool for self and auto-regulated learning, available there where it is more needed: the new technologies of information.

Some Examples of the Items Constructed

As an example of a key change in the items constructed, we have a shift in the way we confront the information we need to take a decision or to make an inference of whichever kind in several ways. One, is given by the fact that internet users will be mostly confronted to take a decision based on information that do not fall within their radio of expertise, nonetheless, they need to do something about that information, based on what some third person says about it, an expert or an actor involved in the topic or debate. So, exercises to consider the scenario mentioned include what can be inferred from the fact that a particular person states some information.

Some other way in which we need to confront the information we have at hand, is by considering its source, and in this case we need to know whether we consider the source reliable enough to state some inference based on the information provided by that source, so the reasoning has a composed mechanism: the test of the source and the test of the inference based on the first step. So by instance, an item can provide you with an X of TikTok profile with some information, like the following, form the PROFECO (Federal Consumer Protection Agency):

Figure 3
An X Post of the PROFECO, México



So in the instructions for these kind of exercises, participants need to think whether they consider the source *reliable, barely reliable or not reliable at all* to keep the proposed inference made based on the information of the post.

As a final example, I present one item treating with the use of the AI, and testing the awareness that participants may have in possible biases of these algorithms. So, an input item has an image created with AI, and the following information: *Artificial intelligence Artguru, was asked to create an image with the following description:"Create an image of successful and happy people working collaboratively," and the result is as follows:*

Figure 4
An Image Created With Artguru



Source: Artguru

Participants are asked to think about the possible biases present in the image, as the prototypical phenotype or others.

Some Evidence of Validity of the Conceptual Construct

As for the attitude of young people when taking the tests, it should be noted that in general, their attitude was favorable and/or interested. Nonetheless, there were two cases in which the examination was left unfinished, one with the W&G translation and the other with my proposed test. It is plausible to think that this indicates that the length of the test is a significant factor for young people who are not used to reading extensively or focusing their attention on a single activity for too long, and who are more familiar with quick content. (Burkhard, 2017; Kovač & van der Weel, 2020). Some studies state that users tend to remain in a page less than a minute (Nielsen, 2011).

Regarding the relationship between the results obtained from the W&G test and my proposed test, one remarkable fact is that the section in which participants performed most poorly was the non-deductive arguments section in both tests. Conversely, the section in which they performed best was the information interpretation section in both tests. This indicates that despite the differences between the tests, these skills are adequately represented in the instruments used. In my test the section concerning non-deductive inferences, was dedicated to statistical fallacies exclusively, inferences absent in the W&G test. The section of interpreting information was totally new as is considering the sources of information.

It should be mentioned that one fact that resulted significant was the difference between rural and urban areas in the application of critical thinking skills to contexts involving the use of new technologies. I took the 27% of participants with the highest scores and the 27% with the lowest scores, and there are certain trends that should be mentioned for confirmation in future work. This percentage is used to calculate the discriminatory power of the items (Sánchez Mendiola & Martínez González, 2022). Among this number of participants, it was found that

77% of those who obtained the highest scores in my test had primarily lived in a metropolitan area, whereas for the W&G test this percentage is only 44%. As expected, the proportion of people with lower scores in my test in a rural environment is much higher than that of the W&G test, in which this variable does not seem to have any impact: 44% of participants from metropolitan areas are also among the lower scorers on the W&G test, while only 22% of metropolitan participants are among the lower scorers on my proposed test.

This variable impact as well in the measurement of the heterogeneity. The target population can be considered homogeneous with respect to both test: the measure of heterogeneity is of 12.295% in my proposed test, whereas in the W&G test is of 15.265%, less than 30% in both cases. However if we consider the homogeneity of the population only in the metropolitan areas the heterogeneity in the W&G test is much greater, while the homogeneity in my proposed test is much greater. This will undoubtedly have to be studied in future work.

This finding is quite striking, as even schooling didn't have such a significant impact. Social media use neither appear to be a determining factor at this time.

Conclusions

To close, it is important to emphasize that one of the areas where greater critical thinking skills are needed, given its prevalence and potential for negative effects, is the ability to critically engage with the news received. Within the detection of assumptions section, those concerning news biases presented the greatest difficulty for the target population. On the other hand, there is some awareness regarding specific actors that are considered reliable, such as PROFECO (the Federal Consumer Protection Agency). However, we are not so fortunate when it comes to discerning unknown sources, as there is a tendency to think that the public nature of a company or profile makes it trustworthy or less likely to engage in deception, especially in the case of corporations or profiles that "seem serious."

The data found so far makes it plausible to put forward several hypotheses that would be desirable to verify in future validation work. First, we would have to consider why the variable related to urban areas is so significant. I believe that a key factor may be the greater access to services that facilitate the everyday use of various information technologies, as this can occur even in unfavorable economic circumstances. In other words, in metropolitan areas, there can be greater access to technological resources even without necessarily being economically advantageous. This results in a greater awareness with the use of new information technologies, which could facilitate their more critical application.

On the other hand, exercises that included images or videos were generally answered correctly, which speaks about the familiarity of the target population with content transmission through these channels (Burkahard, 2017; Howarth, 2024; Kovač & van der Weel, 2020). However, it remains a factor to explore: how effectively this type of transmission can foster certain cognitive processes (Kovač & van der Weel, 2020), and therefore it is of interest to explore how skilled are users who primarily use platforms or networks whose predominant means of expression is visual (Uiterkamp et al., 2020). Among these types of networks, TikTok is undoubtedly very popular today (Howarth, 2024). A key task for future work within information processing theory is to delve deeper into how learning processes occur through these media.

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

The author declares that DeepL, an AI-assisted writing software, was used in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The author further declares that, apart from DeepL, no other AI or AI-assisted technologies have been used to generate content in writing the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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Contact email: cecilia.chavezaguilera@uem.edu.mx

Appendix

Hereby, data from INEGI & IFT (2024) about target population. This includes socioeconomic strata, level of education, type of access to new information technologies, type of device used to access them, etc.

This is the general landscape:

Table 1

Internet Users, By Age Group, From 2015 to 2023

Year	6 to 11 years	12 to 17 years	18 to 24 years	25 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 years or more
	%	%	%	%	%	%	%	%
2016	10.9	18.6	18.9	20.2	15.5	9.6	4.5	1.9
2017	10.1	17.6	18.3	20.2	16.5	10.8	4.9	1.6
2018	10.1	16.4	17.5	20.2	16.1	11.7	5.7	2.3
2019	10.1	15.0	15.9	19.3	17.3	12.8	7.1	2.5
2020	11.0	14.7	15.7	19.1	16.4	13.0	6.9	3.4
2021	10.8	14.5	15.6	18.9	15.9	13.0	7.5	3.8
2022	9.7	14.0	14.9	18.9	16.3	13.9	8.0	4.4
2023	9.3	13.2	14.9	18.2	16.2	14.0	9.1	5.0

Source: INEGI & IFT (2024)

The number of mobile phone and internet users has increased in our country, whereas the number of users of computers has decreased, showing us the tendency of the population to access to the net via mobile phone:

Table 2

Users of Computers, Internet or Mobile Phone From 2015 to 2023

Year	Computer users %	Internet users %	Mobile Phone users %
2015	51.2	57.4	71.4
2016	46.8	59.4	73.5
2017	45.2	63.7	72.1
2018	44.7	65.5	73.3
2019	42.4	69.6	74.9
2020	37.5	71.5	75.1
2021	37.4	75.6	78.3
2022	37.0	78.6	79.2
2023	37.3	81.2	81.4

Source: INEGI & IFT (2024)

Hereby the possible reasons for not having a computer. Although almost half of population mention economic reasons for not having a computer, 31.9% mention that it is because they are not interested in having one or do not need one:

Table 3

Householders Without Computer, By Principal Reasons 2023

Socioeconomic strata	Economic reasons	They are not interested or do not need one	They don't know how to use it	They use a smartphone or some other device	It is broken
	%	%	%	%	%
National	**45.8**	**31.9**	**13.1**	**7.4**	**1.0**
Low	56.7	21.9	15.7	4.1	0.6
Medium Low	45.8	32.5	12.5	7.5	0.9
Medium High	32.0	43.2	11.4	10.6	1.6
High	22.5	48.9	10.0	15.7	1.8

Source: INEGI & IFT (2024)

Meanwhile, the mobile phone is most commonly perceived as necessary. The possible relationship between computer or mobile phone use and schooling appears to be inversely proportional in agreement to the data shown: the higher the level of education, the lower the percentage of use, both for computers and mobile phones.

Table 4

Mobile Phone Users by Schooling From 2015 to 2023

Year	Primary School	Secondary school	High school	Major degree	Postgraduate degree	Other/Not specified
	%	%	%	%	%	%
2015e	24.9	29.8	23.9	17.1	1.4	3.0
2016e	24.4	30.5	22.5	18.4	1.3	2.9
2017e	22.2	30.0	22.8	21.1	1.6	2.5
2018e	21.7	30.0	23.4	20.4	1.4	3.1
2019f	20.8	29.3	25.1	20.7	1.7	2.4
2020g	20.7	29.2	23.9	21.9	1.7	2.7
2021h	21.1	28.4	24.9	21.7	1.6	2.3
2022f	20.3	29.0	24.5	22.1	1.6	2.4
2023f	20.7	28.4	24.8	21.6	1.7	2.8

Source: INEGI & IFT (2024)

Table 5

Computer Users by Schooling From 2015 to 2023

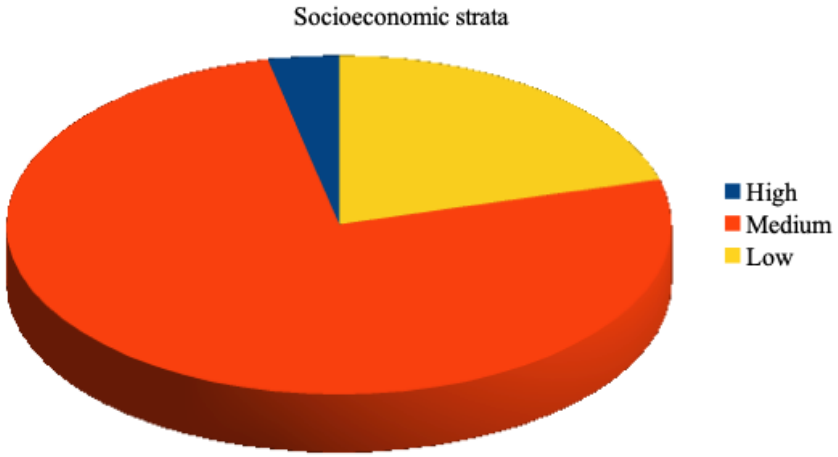
Year	Primary school	Secondary school	High school	Major degree	Postgraduate degree	Other/Not specified
	%	%	%	%	%	%
2015	21.4	24.4	27.2	22.8	2.0	2.3
2016	20.2	23.3	25.5	26.2	2.0	2.7
2017	18.3	22.0	25.4	29.6	2.4	2.4
2018	17.4	21.6	26.2	29.8	2.3	2.7
2019	15.9	20.2	28.1	31.9	2.9	1.0
2020	14.0	18.4	26.2	36.7	3.2	1.6
2021	12.9	16.6	28.7	37.5	3.3	1.1
2022	11.5	16.9	27.8	38.8	3.4	1.7
2023	11.6	16.2	27.8	39.1	3.5	1.7

Source: INEGI & IFT (2024)

Finally, to close this section, hereby some information about the composition of the participants in the pilot sample, in agreement with the assessing variables mentioned in

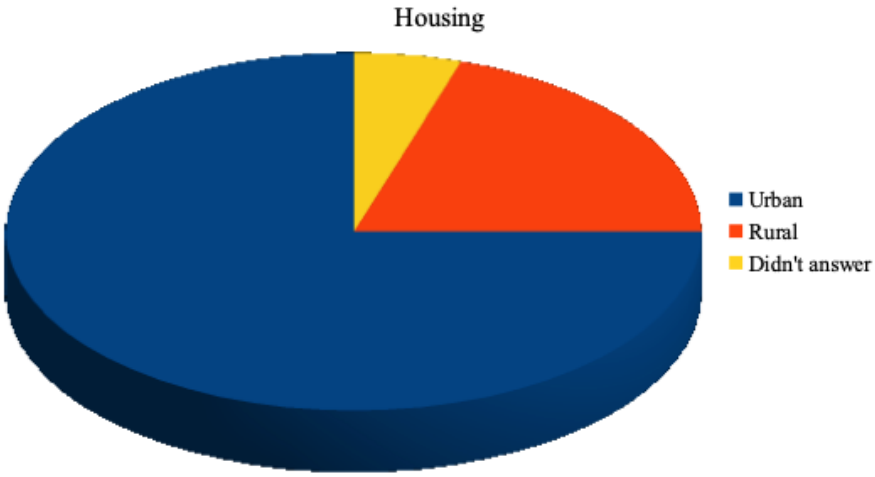
literature. Brithplace of the participants were the following. *Ciudad de México*: Xochimilco, Iztapalapa, Benito Juárez, Coyoacán and Gustavo A. Madero. *Estado de México*: Tultitlán, Tenayuca, Nicolás Romero and Ixtapaluca. *Hidalgo, Zacatecas*: Jerez, Guadalupe, Trancoso, Morelos and Zacatecas. The composition is the following:

Figure 5
Socioeconomic Strata of Pilot Sample



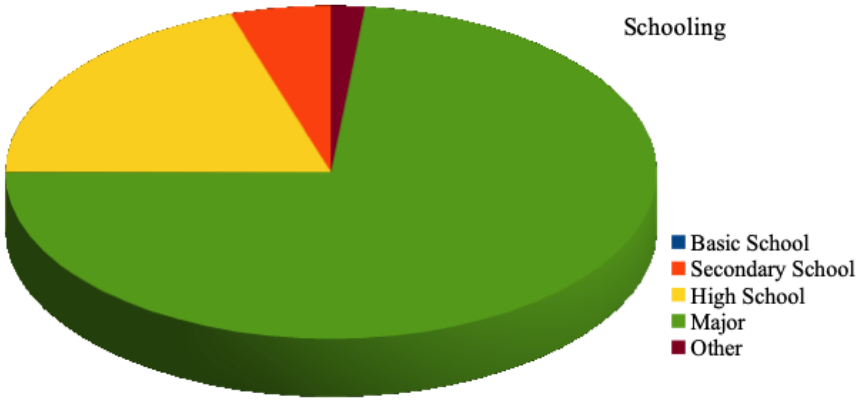
Own elaboration

Figure 6
Housing of the Pilot Sample



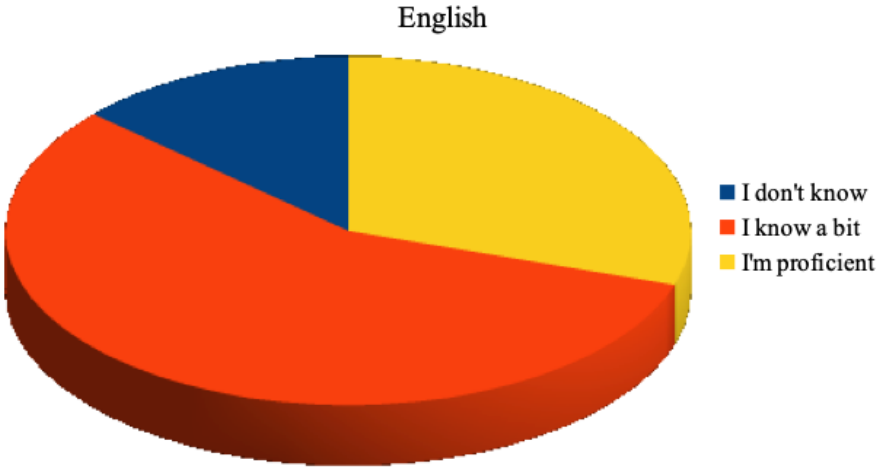
Own elaboration

Figure 7
Schooling of the Pilot Sample



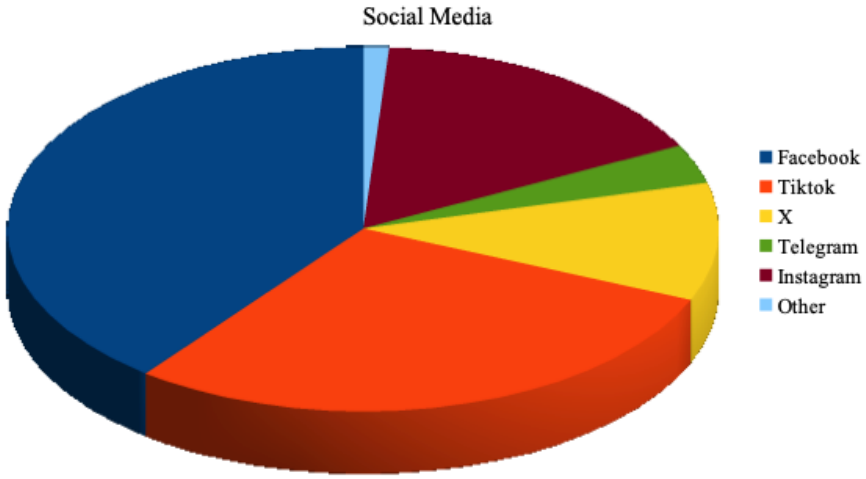
Own elaboration

Figure 8
Knowledge of English



Own elaboration

Figure 9
Principal Social Media Used by the Pilot Sample



Own elaboration

Inclusive Education and Personalized Neurological Stimuli: Psychogenetics Applied to the Development of Digital Tools

Waldir Siqueira Moura, Federal University of Rio de Janeiro, Brazil
Edgar Delbem, Federal University of Rio de Janeiro, Brazil
Tainá Guimarães de Souza, Fluminense Federal University, Brazil
Juliana Baptista dos Santos França, Federal University of Rio de Janeiro, Brazil
Angélica Fonseca da Silva Dias, Federal University of Rio de Janeiro, Brazil

The Barcelona Conference on Education 2025
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Abstract

This article presents an investigation into the application of the Educational Psychogenetics theory developed by Fr. Joaquim Ferreira Xavier Júnior, sjr, through technologies aimed at supporting the development of neurodivergent students. The research contextualizes Psychogenetics as a theoretical framework that promotes a holistic understanding of human development, grounded in neuroplasticity, respect for individual cognitive, emotional, and motor differences, and the implementation of personalized educational interventions. Based on these principles, high school students developed a digital tool focused on educational inclusion, specifically designed for children and adolescents with conditions such as Autism Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), cerebral palsy, among others. The application integrates educational games, sensory exercises, musical activities, and adaptive challenges, and has been tested with inclusion students from the school itself. Results demonstrated improvements in attention, participation, motor coordination, and autonomy. The tool's structure was built around the "dynamic steps" of Psychogenetics, allowing for continuous adaptation in response to user progress. Partial findings indicate that technologies grounded in robust educational theories, such as Fr. Xavier's Psychogenetics, significantly contribute to student engagement, personalized learning, and the promotion of diversity in school settings. This experience underscores the importance of integrating theory, practice, and student leadership in interdisciplinary projects that connect science, education, and inclusion.

Keywords: organizational alignment, private education network, key performance indicators (KPIs), business process modeling (BPMN)

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Introduction

The growing complexity of contemporary educational contexts demands the design of interventions that integrate theory, technology, and human diversity, especially when addressing the inclusion of neurodivergent students. Within this framework, it becomes essential to adopt theoretical foundations that overcome psychosocial or biomedical reductionisms, embracing more integrative understandings of human development. In this sense, the Educational Psychogenetics theory, developed by Fr. Joaquim Ferreira Xavier Júnior, sjr., emerges as a promising framework, as it emphasizes neural plasticity, the uniqueness of cognitive, emotional, and motor profiles, and the need for individualized educational interventions throughout the life course.

In the field of educational technologies, there is a growing effort to combine games, sensory exercises, musical activities, and adaptive progressions—resources that have the potential to foster engagement, attention, and autonomy in learning processes. In studies addressing neurodevelopmental disorders such as Attention Deficit Hyperactivity Disorder (ADHD), such technologies have been investigated for their ability to support both diagnosis and treatment, although they still face methodological and practical challenges. Moura et al. (2022) point out that computational tools can expand therapeutic and diagnostic alternatives, but that this potential requires greater interdisciplinary rigor and empirical contextualization. Similarly, Souza et al. (2022) identify trends, limitations, and challenges of digital technologies applied to ADHD, highlighting issues such as the risk of overfitting in studies with small datasets and the persistent lack of reliable biomarkers.

At the organizational and institutional level, the articulation between strategy, processes, and performance indicators has also become a topic of interest in the field of computer science applied to education. Moura Siqueira et al. (2025) explore how the use of Business Process Modeling Notation (BPMN) and Key Performance Indicators (KPIs) can enhance the strategic alignment of branches within a private educational network, reinforcing the importance of structured metrics and process flows in educational institutions. In another instance, Moura et al. (2020) present ColabSaber, a pedagogical framework that supports the collaborative construction of knowledge through digital technologies, demonstrating the convergence between mediated educational processes and student protagonism.

This research aims to integrate these different dimensions—Educational Psychogenetics, adaptive technologies, and student protagonism—through the development and implementation of a digital tool designed for the inclusion of students with ASD, ADHD, cerebral palsy, and other conditions. The intervention was guided by the “dynamic steps” of Psychogenetics, allowing continuous adaptation according to user progress. The prototyping and experimentation took place in the school environment itself, with high school students acting as developers and mediators. Although still partial, the initial results reveal significant improvements in attention, participation, motor coordination, and autonomy.

By articulating theory and practice, this study seeks to contribute to the body of evidence on how theoretically grounded technologies can promote inclusion and diversity in school contexts. Furthermore, it highlights the importance of student leadership and interdisciplinarity in the development of educational innovations.

Academic Relevance

This research is situated at the intersection of psychogenetic theory, neuroeducation, and inclusive technology, proposing an integration between theoretical foundations and digital solutions aimed at the personalization of learning. Its academic relevance manifests in multiple dimensions—theoretical, methodological, empirical, and social—contributing both to the advancement of educational sciences and to the consolidation of applied models that foster inclusion and student protagonism.

A considerable portion of studies on educational technologies for the inclusion of students with Autism Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), or cerebral palsy is grounded in fragmented approaches—cognitive, behavioral, or neurological—that often fail to consider human development in its entirety. The Educational Psychogenetics framework, developed by Fr. Joaquim Ferreira Xavier Júnior, sjr., offers an integrative understanding based on brain plasticity, the uniqueness of each individual, and the dynamic nature of formative processes.

The psychogenetic approach proposes that cognitive, emotional, and motor development occurs interdependently, requiring that individual differences be understood as developmental trajectories rather than deviations. This perspective aligns with current trends in neuroeducation, which advocate for a holistic view of learning that recognizes the interaction among affective, biological, and cultural factors. In this regard, recent studies (Samaniego et al., 2025) emphasize that effective digital technologies depend on consistent theoretical frameworks capable of encompassing the totality of the human being, rather than focusing solely on measurable performance outcomes.

The field of inclusive educational technology still lacks longitudinal empirical evidence. Although recent reviews indicate significant progress, the literature continues to exhibit limitations in methodological rigor and in the measurement of real impact. The study by Navas-Bonilla et al. (2025) analyzed 159 international investigations and concluded that digital technologies promote personalization and inclusion but warned of the need for more robust and replicable evaluation instruments.

Similarly, Souza et al. (2022) highlight that digital technologies applied to ADHD can offer new therapeutic and diagnostic possibilities, yet they require interdisciplinary rigor to avoid interpretive distortions. This finding reinforces the importance of grounding technological innovation in solid theoretical structures and controlled pedagogical experimentation, as proposed by the present study.

Empirically, this research contributes by measuring indicators such as attention, motor coordination, and autonomy, connecting psychometric data to educational performance metrics. This methodological integration enhances the scientific reliability of impact assessment and strengthens the dialogue between educational practice, cognitive science, and technological design.

Development and Functioning of the Psychogenetic Educational Inclusion Application

The development of the application was grounded in the principles of Educational Psychogenetics, formulated by Fr. Joaquim Ferreira Xavier Júnior, sjr., who conceives the formative process as a sequence of "dynamic steps" through which the individual evolves from

elementary functions to higher structures of thought, sensitivity, and action. The research team—composed of scholars and instructors from the fields of technology and psychology—sought to translate these theoretical principles into an adaptive digital environment, in which each proposed activity would respond to specific cognitive, motor, and emotional stimuli.

Stages of Conception and Pedagogical Design

The development process unfolded across four integrated phases, inspired by agile development models (Design Thinking and Scrum) and adapted to the school context:

1. Analysis and Diagnostic Phase: A survey of the educational needs of students with Autism Spectrum Disorder (ASD), ADHD, and mild cerebral palsy was conducted in collaboration with the school's inclusion department. The team applied semi-structured interviews, classroom observations, and consultations with psychologists and occupational therapists. This phase aimed to identify patterns of attention, sensory response, and interaction.
2. Psychogenetic Modeling Phase: Based on Xavier Jr.'s theory, the team structured the app's content and challenges according to the dynamic steps of Psychogenetics: global perception, sensory differentiation, motor organization, symbolization, and affective-cognitive integration. Each step was translated into interactive modules designed to stimulate a distinct aspect of human development.
3. Design and Prototyping Phase: Using open-source tools such as Unity 3D and MIT App Inventor, high school students created the first functional prototypes of the application. Usability tests were conducted internally, prioritizing accessibility, low computational cost, and compatibility with Android tablets available in the school's resource rooms. The interface design emphasized soft colors, illustrative icons, and natural sounds—features recommended by research in inclusive usability (De et al., 2008).
4. Validation and Iteration Phase: Following the pilot implementation, the application was tested with a group of 12 students under pedagogical and psychological supervision. Each interaction was automatically recorded through performance metrics such as response time, accuracy rate, persistence, and level of attention. The resulting data were analyzed within the psychogenetic framework, enabling continuous refinements and adaptive adjustments throughout the experimentation process.

Table 1

Psychogenetic Modules of the Educational Inclusion Application

Module	Psychogenetic Objective	Main Activities	Stimulated Cognitive and Motor Functions
1. Global Perception	Develop attention and pattern recognition.	Sound and shape matching games.	Selective attention, auditory and visual perception.
2. Motor Coordination	Improve hand-eye coordination and rhythm.	Tactile pathways and digital tracing exercises.	Fine motor coordination and psychomotor rhythm.
3. Symbolic Association	Relate images and sounds to meanings.	Symbolic matching activities and interactive storytelling.	Symbolic language, working memory.
4. Affectivity and Emotion	Foster empathy and emotional recognition.	Facial expression games, music, and body sounds.	Emotional intelligence and self-expression.
5. Autonomy and Assessment	Stimulate decision-making and self-evaluation.	Adaptive missions and narrative-based rewards.	Autonomy, planning, and self-regulation.

Each module featured dynamic progression levels defined by a simple adaptive algorithm: when consistent performance was detected (above 80% accuracy and an average completion time below 50% of the expected duration), the system automatically unlocked new stages with greater symbolic complexity and multimodal stimuli. This structure was inspired by adaptive learning mechanisms described by Nkambou et al. (2010).

The originality of the application lies in its sensory integration: each module combined auditory, visual, and tactile elements to enhance learning outcomes.

The musical component was developed based on the research of Moura Siqueira et al. (2025), who analyzed the impact of rhythmic and melodic activities on the attentional focus of neurodivergent students. The melodies used in the motor coordination modules were composed by students from the same institution, reinforcing a sense of collective authorship and emotional relevance.

The tactile component employed low-frequency vibrations and sound feedback, allowing students with motor limitations to receive immediate responses from the system—a strategy highlighted as essential by Lopes et al. (2023).

The application also included an individual pedagogical dashboard, accessible to teachers and therapists. This dashboard displayed:

- performance indicators (accuracy rate, average response time, persistence per task);
- psychogenetic progress stages achieved by each student;
- qualitative notes from educators and specialists;
- recommendations for adaptive interventions based on each learner's cognitive and emotional profile.

Preliminary Results of the Psychogenetic Educational Inclusion Application

The experimental phase of the Psychogenetic Educational Inclusion Application lasted three months and involved a group of students with diverse neurodivergent profiles, including cases of Autism Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), and mild cerebral palsy. The observed results demonstrated consistent effects on attention, motor coordination, and autonomy, providing evidence for the effectiveness of the psychogenetic model when integrated with adaptive digital technologies.

Sustained Attention and Cognitive Engagement

The first indicator, referring to sustained attention, showed an average increase of 22% among participants, as measured through direct classroom observations and weekly pedagogical reports. This improvement was particularly evident in the Global Perception and Symbolic Association modules, in which students were challenged to recognize auditory, visual, and rhythmic patterns. From a qualitative standpoint, teachers reported longer task engagement, fewer spontaneous interruptions, and better focus control in multi-stimulus situations. These data indicate that the application's sensory and multimodal design fostered selective attention and inhibitory control, both essential components of executive functioning. This finding converges with those of Moura et al. (2022), who demonstrated that the use of interactive digital technologies leads to a significant increase in attention among students with ADHD when activities are structured progressively and contextually. According to the authors, "interaction mediated by coordinated auditory and visual stimuli generates positive

dopaminergic reinforcement and increases persistence in cognitively demanding tasks." Similarly, Navas-Bonilla et al. (2025) highlight that digitally personalized environments, based on immediate feedback and diverse symbolic stimuli, result in greater attentional plasticity and the transfer of focus to non-digital contexts, provided that the process is guided by solid theoretical and pedagogical foundations. From a psychogenetic perspective, the increase in sustained attention reflects the subject's transition from a diffuse perceptual-motor phase to a more integrated symbolic organization, confirming Xavier Jr.'s hypothesis that the development of consciousness occurs through the progressive control of attentional energy, mediated by coordinated sensory and symbolic experiences.

Fine Motor Coordination and Sensory-Motor Integration

The second result, indicating perceptible improvement in fine motor coordination in 68% of participants, was assessed through direct observation and performance records in the Motor Coordination and Global Perception modules. The activities involved tactile paths, digital tracing, and synchronization of visual and musical stimuli. The improvement was evident not only in the precision of movements performed within the application but also in daily school tasks such as handwriting, object manipulation, and cutting shapes. This transfer of skills from the digital environment to the physical space confirms the effectiveness of psychogenetic exercises focused on the coordination between perception and action. According to Lopes et al. (2023), multisensory learning environments based on haptic feedback and auditory response generate cross-sensory reinforcement, improving fine motor control and enhancing spatial perception. The authors emphasize that, for neurodivergent students, tactile stimulation synchronized with visual cues acts as an essential mediator for fine motor regulation. Within the psychogenetic framework, this progress indicates that the student transitions from a predominantly sensory phase to one of perceptual-motor and symbolic integration, in which gesture ceases to be a mere physical response and becomes an organized expression of meaning—a fundamental concept in Xavier Jr.'s formulations on the psychodynamics of motricity.

Autonomy and Emotional Self-Regulation

The third axis of analysis, primarily qualitative in nature, revealed an increase in autonomy and emotional self-regulation. This information was obtained from the records of resource room teachers, family members, and researchers' observations. Reports indicated that students began to initiate activities spontaneously, plan responses with less dependence on direct mediation, and demonstrate greater tolerance for frustration when facing errors or challenges. The Affectivity and Emotion module was decisive in this regard, as it integrated facial recognition games, environmental sounds, and musical sequences associated with basic emotions (joy, calm, surprise). These elements acted as symbolic mediators of affectivity, fostering the development of emotional awareness and behavioral regulation. These findings are supported by evidence from Godsk and Møller (2025), who demonstrate that the use of educational technologies mediated by positive emotions significantly enhances self-efficacy and persistence in complex tasks, especially when associated with symbolic rather than competitive rewards.

In addition, recent studies in emotional neuroeducation indicate that multimodal processing of affective stimuli strengthens cortico-limbic circuits related to intrinsic motivation and emotional control (Haghighi et al., 2023).

From a psychogenetic standpoint, autonomy is understood as the stage in which the subject ceases to depend on external impulses and begins to organize their own conduct, guided by internally constructed goals and meanings. The progress observed in this study suggests that the digital tool functioned as a mediating instrument, allowing students to gradually internalize criteria for self-assessment and self-management.

Interpretative Synthesis

The three analyzed axes—attention, motor coordination, and autonomy—indicate that the application successfully fulfilled its role as a theoretical-practical transposition of Psychogenetics into the technological field, demonstrating that the "dynamic steps" formulated by Xavier Jr. can be effectively translated into interactive environments without conceptual loss.

Quantitatively, the observed improvements (22%, 68%, and qualitative reports of autonomy) suggest educational effectiveness, even within a limited sample. Qualitatively, the main advancement lies in the internal coherence among theory, practice, and observation: each behavioral progress observed could be mapped onto one of the developmental levels predicted by Educational Psychogenetics.

As Luckin (2018) affirms, truly educational technologies "do not replace the teacher but expand the learner's capacity to become aware of their own learning process." Thus, the developed application is not presented as a mere training tool but as a formative device that enables the emergence of consciousness through sensory, cognitive, and emotional interaction.

Conclusion

This research investigated the application of the Educational Psychogenetics theory developed by Fr. Joaquim Ferreira Xavier Júnior, sjr., in the creation of an inclusive digital application aimed at the development of neurodivergent students. Grounded in the idea that learning results from the interaction between emotion, cognition, and motor activity, the study sought to translate the "dynamic steps" of Psychogenetics into an interactive and adaptive environment, integrating games, musical activities, tactile stimuli, and progressive challenges. The tool was developed by high school students under the guidance of teachers and researchers, consolidating a model of pedagogical co-creation that brought together theory, technology, and youth protagonism.

Over three months of implementation, the application demonstrated significant improvements in sustained attention (22%), fine motor coordination (68%), and emotional and cognitive autonomy among participants. Qualitative data revealed greater engagement, focus, and tolerance to frustration, confirming the hypothesis that technology, when guided by solid psychopedagogical foundations, can function as a mediating instrument for integral development. The results corroborate recent studies (Moura et al., 2022; Navas-Bonilla et al., 2025) that highlight the role of personalized technologies in enhancing neuroplasticity and adaptive learning for students with ASD and ADHD.

It is concluded that educational innovation lies not merely in the adoption of digital tools but in the integration between theory and humanizing practice. Psychogenetics proved to be a framework capable of guiding the ethical and pedagogical design of inclusive technologies, contributing to teacher training policies and the democratization of access to meaningful

learning. The psychogenetic educational inclusion application, by articulating science, art, and spirituality, demonstrates that the future of education lies in humanity's ability to use technology as an extension of both mind and heart—transforming diversity into formative potential.

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Contact email: waldirsm@ufrj.br

From the School Inspection Report to Inclusive Impacts: Challenges and Leadership Perspectives in Portugal

Jennifer Silva, University of Aveiro, Portugal
Alexandre Ventura, University of Aveiro, Portugal
Diana Oliveira, University of Aveiro, Portugal

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Abstract

In Portugal, within the context of New Public Management, schools' autonomy has been strengthened and greater responsibility has been placed on school leaders to implement inclusive responses tailored to student diversity. Since 2018, the third cycle of the External Evaluation of Schools Programme (PAEE), led by the Inspectorate-General of Education and Science (IGEC), has been under way, emphasising equitable and inclusive practices aligned with the 2030 Agenda's Sustainable Development Goals. This study examines how the headteacher and the coordinator of the Multidisciplinary Team for Inclusive Education operationalise the principles of inclusive education in a school cluster in Portugal, in the light of the PAEE Reference Framework and the strengths and areas for improvement identified by IGEC. A qualitative case study design is adopted, combining document analysis (the IGEC report and the cluster's core documents) and interviews with both leaders. Thematic analysis, supported by MAXQDA, is structured around three dimensions: (i) planning and internal policies; (ii) pedagogical and support practices; and (iii) monitoring and continuous improvement. The findings indicate challenges associated with a significant increase in student numbers, with impacts on class overcrowding, specialised support and curriculum organisation. IGEC's evaluation fosters self-reflection and incremental change; however, gaps persist in internal mechanisms for follow-up and impact assessment. It is recommended that human resources and school infrastructure be strengthened, and that formal mechanisms for monitoring action plans be institutionalised to ensure the impact and sustainability of inclusive policies and practices.

Keywords: school inspection, inclusive education, school leadership, school autonomy, Portugal

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Introduction

In Portugal, reforms inspired by New Public Management have consolidated an "Evaluative-State" which, alongside the strengthening of schools' autonomy, intensifies mechanisms of responsibilisation and accountability – including the external evaluation of schools – thereby reconfiguring the role and practice of school leadership (Afonso, 2013; Rosa, 2018). This orientation is embodied in the External Evaluation of Schools Programme (PAEE), conducted by the Inspectorate-General of Education and Science (IGEC), currently in its third evaluation cycle, launched in 2018. Its Reference Framework, updated in 2023, is organised into four domains – Self-evaluation, Leadership and management, Provision of educational services, and Results – and serves as a guide for internal action and continuous improvement, including the promotion of inclusive practices (IGEC, 2023; Silva et al., 2025).

In line with this, the policy and regulatory framework has progressively reinforced the centrality of inclusive education. Decree-Law No. 54/2018 of 6 July sets out that schools should recognise diversity as an asset, "adapting teaching processes to the characteristics and individual circumstances of each student and mobilising the resources at their disposal so that all learn and participate in the life of the educational community" (Portugal, 2018a, p. 2918). The statute structures the measures to support learning and inclusion – promoting equity and equal opportunities in access to the curriculum – at three levels: universal, selective and additional, and requires that their mobilisation be grounded in evidence from monitoring and evaluation. It also establishes the Multidisciplinary Team for Inclusive Education (EMAEI), which is responsible, among other functions, for raising awareness of inclusion within the educational community; proposing measures; overseeing and monitoring their implementation; and providing pedagogical advice, ensuring the preparation of pedagogical documentation and liaison with internal and community resources (Portugal, 2018a). In addition, Decree-Law No. 55/2018 of 6 July defines the curriculum for basic and secondary education and sets out Curricular Autonomy and Flexibility (AFC) as an entitlement granted to schools to manage the curriculum on the basis of the core curriculum matrices (Portugal, 2018b). Operationally, this autonomy is realised, among other aspects, through curricular integration and articulation guided by the Students' Profile at the End of Compulsory Schooling (Portugal, 2017).

In this context, leadership plays a decisive role in translating formal autonomy into effective practices in the service of inclusion. Simões (2022) finds that, in Portuguese schools, the headteacher's transformational leadership – grounded in inspirational motivation, goal clarification and support for collaborative work – predicts the quality of the implementation of curricular autonomy and is associated with practices such as forming teaching teams, developing Domains of Curricular Autonomy (DAC), promoting formative assessment, mobilising partners and engaging students and families. This centrality of leadership aligns with the policy and regulatory regime that grants schools scope to manage the curriculum with reference to the Students' Profile at the End of Compulsory Schooling, calling on schools and teachers, endowed with pedagogical autonomy, to recontextualise the curriculum locally – a dual arrangement that combines a national common core with context-specific decisions at the school and class levels (Silva & Fraga, 2021). Thus, pedagogical leadership capable of steering curricular choices, managing time and resources, and sustaining collaborative processes constitutes an organisational condition for autonomy to become effective and genuinely promote inclusion.

Nevertheless, knowledge gaps remain regarding how leadership – particularly the headteacher and the coordinator of the Multidisciplinary Team for Inclusive Education (EMAEI) – aligns PAEE guidance with the provisions of the inclusive education framework, turning areas for improvement into decisions, monitoring arrangements and observable effects at the level of the school cluster. This study helps clarify that process by focusing on the headteacher–EMAEI coordinator dyad within a single school cluster and by triangulating leadership perceptions with documentary evidence, in a context of increasing sociolinguistic diversity and resource pressure.

A case study centred on a school cluster in Portugal was adopted, combining analysis of IGEC's external evaluation report and the cluster's core documents, and interviews with the headteacher and the coordinator of the Multidisciplinary Team for Inclusive Education (EMAEI). This design enables an understanding, in a real-world context, of how policy orientations and PAEE guidance are translated into decisions, practices and inclusive outcomes.

The research question guiding the study was: "How are the principles of inclusive education implemented in a school cluster in Portugal, and what contribution does the PAEE make, in the light of the headteacher's and EMAEI coordinator's perceptions and the documentary evidence?" Accordingly, three objectives (O) were defined: O1 – To map and analyse the areas for improvement identified by IGEC and their incorporation into the cluster's strategic planning, as reflected in its main guiding documents; O2 – To characterise and interpret the pedagogical practices and organisational arrangements that operationalise inclusion, drawing on the perceptions of the headteacher and the EMAEI coordinator; O3 – To assess the extent to which the PAEE drives effective and sustained changes in the organisation and its practices, identifying mechanisms for monitoring and continuous improvement and how they are used.

Methods

This research is grounded in the interpretivist paradigm and employs a qualitative single case study design (Strumińska-Kutra & Koładkiewicz, 2018; Yin, 2018). This design is appropriate for addressing "how" and "why" questions, capturing organisational processes and dynamics, and producing a description integrated with analysis, thereby ensuring coherence among objectives, data sources, and procedures (Strumińska-Kutra & Koładkiewicz, 2018; Yin, 2018). The choice of a case study is justified by three complementary reasons: (i) analytical relevance – the school cluster has, in recent years, undergone a demographic shift (a considerable increase in students of foreign nationality), requiring curriculum reorganisation and appropriate inclusive responses; (ii) availability of sources – access to IGEC's external evaluation report and the cluster's core documents; and (iii) access to leadership – the possibility of interviewing those responsible for decision-making and for overseeing inclusive responses.

Priority is given to triangulating sources (the IGEC report, the school cluster's core documents, and interviews), with a view to interpretative robustness (Flick, 2018). The aim is not to generalise the findings but to formulate inferences applicable to contexts with similar characteristics (Patton, 2015; Yin, 2018). This design is therefore appropriate for understanding how school leadership translates the areas for improvement identified by IGEC into decisions, practices, and monitoring arrangements and mechanisms in the service of inclusion.

In this study, fieldwork was conducted during the 2024/2025 school year. The IGEC report (2019/2020) served as the basis for analysing the areas for improvement identified at the time and for cross-checking them against subsequent implementation choices and constraints, enabling observation of changes, continuities, and challenges in the school cluster's improvement cycle.

Contextualisation of the School Cluster

The study was conducted in a school cluster located in a town in mainland Portugal. In the Portuguese education system, a school cluster is an organisational unit with its own governance and management bodies, comprising several schools under a single leadership and using common instruments for planning, monitoring and self-evaluation (Article 6 of Decree-Law No. 75/2008 of 22 April) (Portugal, 2008). The organisation under study is a public, vertically integrated cluster whose educational provision ranges from pre-school to the 12th grade of secondary education, encompassing 18 establishments (pre-school settings, basic schools for the 1st, 2nd, and 3rd cycles, and a secondary school).

In the 2024/2025 school year, according to information provided by the headteacher, around 2,500 students attended the school cluster, of whom approximately 600 were of foreign nationality (representing about 30 nationalities). School social support measures (meals, transport, and school supplies) and measures to support learning and inclusion (under Decree-Law No. 54/2018) were in place; however, based on the sources consulted, it was not possible to ascertain the percentage of students covered. The teaching staff comprised about 240 teachers. The cluster also had specialist professionals (notably therapists), linguistic and cultural mentors, and psychologists. Non-teaching staff (administrative and operational assistants) were allocated across the cluster's 18 schools, resulting in a shortfall in human resources relative to identified needs.

The pedagogical structures mentioned in the organisational documents were in operation, namely the Learning Support Centre (CAA), the school libraries, and the resource centres. Organisationally, the school year was structured into two semesters. From an infrastructural standpoint, the headteacher noted the need to refurbish the main school and other buildings in the cluster, as there is insufficient space for the exponentially growing student population.

Participants

Two leaders from the school cluster took part in the study – the headteacher and the EMAEI coordinator – who were selected through purposive, criterion-based sampling (Patton, 2015). The criteria were: (i) the strategic vision held by both leaders regarding inclusive policies and practices; (ii) direct involvement in interpreting, planning and operationalising the areas for improvement identified by IGEC; and (iii) voluntary participation with written informed consent.

Regarding the participants' profiles, the headteacher is a Physical Education teacher (third cycle and secondary education) with 20–25 years' service. In addition to a bachelor's degree, he holds a postgraduate qualification in School Organisation and Administration and has previous experience as deputy chair of the management board. The EMAEI coordinator is a Special Education teacher with approximately 30 years' service; she also serves as an adviser to the leadership and is a member of the Quality Observatory (the cluster's self-evaluation

unit). Both hold permanent appointments in the cluster and invest in continuing professional development aligned with their roles.

To ensure anonymity, the participants will hereafter be referred to as P1 (headteacher) and P2 (EMAEI coordinator).

Data Sources and Collection Procedures

The study drew on the following sources: (i) IGEC's external evaluation report (2019/2020), used as a reference point for identifying the school cluster's strengths and areas for improvement; (ii) interviews with the leaders responsible for leading the implementation of inclusive policies (P1 and P2); and (iii) the school cluster's core documents.

With regard to the school cluster's core documents, the documentary corpus comprised: the Educational Project (defining the mission, vision, values, strategic choices and institutional targets); the Headteacher's Intervention Plan (setting out and operationalising the strategic pillars, action plans and evaluation mechanisms, aligned with the PAEE); the Internal Regulations (establishing the organisational and operational framework for the technical and pedagogical services and student support); the Strategic Action Plan (setting out inclusion measures and curriculum flexibility across educational stages); the Learning Recovery Plan (prioritising areas such as reading and writing, curriculum autonomy, and inclusion/wellbeing); the Self-evaluation Report (systematically collating results and indicators, identifying strengths, areas for improvement, and priority pathways for improvement); and the Inclusive Education Procedures Manual (clarifying the mobilisation and monitoring of universal, selective and additional measures, and EMAEI's internal instruments). The documents were obtained from the school cluster's website, and the headteacher provided those that were not publicly available.

The interviews followed a common thematic interview guide, previously validated by a specialist – a professor of social sciences – and by two teachers from other school clusters who perform roles similar to those of the participants. The interviews were conducted in person between December 2024 and March 2025, scheduled to suit participants' availability. Participation was voluntary, with written informed consent (including permission for audio recording), and both participants and the organisation were anonymised. The interviews were audio-recorded, fully transcribed, and the transcripts were returned to the interviewees for verification.

Data Analysis – Procedures

Thematic data analysis (Braun & Clarke, 2022) was supported by MAXQDA, which combined a deductive–inductive framework. At the deductive level, coding was guided by three analytical dimensions aligned with the specific objectives set out in the Introduction: D1 – Planning and internal policies (O1); D2 – Pedagogical practices and support arrangements (O2); D3 – Monitoring and continuous improvement (O3). In parallel, at the inductive level, an open stance was maintained to identify data-driven codes that were not predefined, such as distributed leadership and role clarification, pedagogical differentiation, support measures and multi-tiered interventions, co-teaching, and improvement plans.

The analytical procedure comprised: i) full, repeated reading of all sources; ii) initial coding of relevant excerpts (interviews, IGEC's external evaluation report and the school cluster's

core documents); iii) review, consolidation and aggregation of codes into themes; iv) triangulation of leadership perceptions (interviews) with documentary evidence (the IGEC report and core documents); and v) development of matrices covering the dimensions (D1–D3) to cross-check the areas for improvement identified by IGEC against the actions reported, implemented and being monitored in 2024/2025.

Ethical Considerations

The ethical principles governing research with human participants were safeguarded: interviewees participated voluntarily and their participation was formalised through written, informed consent (Shamoo & Khin-Maung-Gyi, 2021).

In accordance with the General Data Protection Regulation (GDPR) – Regulation (EU) 2016/679 (European Union, 2016) – confidentiality was ensured, the right to withdraw at any time without consequences was upheld, participants and the institution were anonymised, and the recordings and their transcripts were securely stored, with access restricted to the research team and use exclusively for research purposes. The recordings were permanently deleted after transcription and validation.

The protocol for this study received a favourable opinion from the Ethics Committee of the authors' affiliated institution (Opinion No. 64-CED/2024, 6 November 2024), and authorisation from the Ministry of Education was obtained on 13 November 2024 via the School-based Survey Monitoring (MIME) platform.

Results and Discussion

In this section, the analytical structure described earlier is revisited, organised into three dimensions: D1) Planning and internal policies; D2) Pedagogical practices and support arrangements; and D3) Monitoring and continuous improvement. The analysis is grounded in the triangulation of evidence from IGEC's external evaluation report, interviews with the two leaders (P1 and P2), and the school cluster's core documents (Educational Project, Strategic Action Plan, Headteacher's Intervention Plan, Self-evaluation Report, Inclusive Education Procedures Manual, and Internal Regulations).

The analysis is organised into two stages: i) a synthesis of IGEC's report and its alignment with the PAEE Reference Framework; and ii) a comparison of the findings with leadership perceptions and the documentary evidence, highlighting convergences, tensions and implications for inclusion.

Summary of the IGEC Report

The school cluster's external evaluation took place in 2019/2020, and the IGEC report records ratings of "Very Good" for the domains Leadership and management and Provision of educational services, and "Good" for Self-evaluation and Results. The main strengths highlighted include: i) leadership capable of mobilising resources and partnerships, engaging teachers in innovative projects; ii) a diverse educational offer and participation in initiatives that consolidate curricular autonomy and flexibility, promoting collaborative work; and iii) the effectiveness of measures to promote equity and inclusion, evidenced in the results of students benefiting from measures to support learning and inclusion, and in trends in completion rates in vocational education. The school environment is described as safe,

welcoming and inclusive. However, at the upper secondary level, performance among students of foreign nationality is below the desired level.

IGEC identifies the following areas for improvement: i) to focus the school cluster's self-evaluation and align it with the Strategic Action Plan, identifying key areas of organisational development; ii) to broaden the participation of students, parents/guardians and non-teaching staff, strengthening internal and external communication; iii) to deepen the use of formative assessment and institute shared lesson observation (collaborative supervision); iv) to strengthen collaboration between mainstream and special education teachers; and v) to raise learning outcomes (particularly in the third cycle and upper secondary), reduce disparities in the 1st cycle, and strengthen the prevention of classroom disruption, especially in the third cycle, by optimising preventive measures.

Convergence is observed with the PAEE Reference Framework (IGEC, 2023), particularly in the sections relating to inclusive education and across the three dimensions: i) a focus on self-evaluation and its alignment with the Strategic Action Plan, with impact on inclusion (D1); ii) an emphasis on curricular autonomy and flexibility, collaborative work, assessment for learning (formative assessment) and shared lesson observation, consistent with the descriptors of inclusive curriculum management, pedagogical supervision and differentiation strategies (D2); and iii) evidence of results (improvements in completion rates and progress among students covered by support measures) and targets aimed at raising attainment and reducing disparities, both of which align with the descriptors for outcomes relating to equity, inclusion and excellence (D3).

Planning and Internal Policies (D1)

The Educational Project adopts inclusion as a central organising principle and defines four areas of intervention – inclusion, educational success, citizenship and development, and self-evaluation and improvement – with the Strategic Action Plan aligned to each area. IGEC confirms this framework, noting the existence of concrete measures in the operational plans (the Strategic Action Plan and the Annual Plan of Activities).

The Strategic Action Plan carries forward the priorities of the Educational Project, setting out measures and targets by area and cycle. In addition, the Learning Recovery Plan reinforces core domains (literacies, curricular autonomy, inclusion and wellbeing), serving as an instrument for prioritisation and annual reprogramming.

The Headteacher's Intervention Plan draws on IGEC's external evaluation and the school cluster's self-evaluation reports to guide action, identifying problems to be overcome and lines of intervention to address them. The Internal Regulations set out the organisational architecture and the roles of the structures linked to inclusion (EMAEI, the School Psychology and Guidance Service, and the Special Education Department), the coordination between services, and the possibility of entering into co-operation agreements (protocols) with external entities, thereby formalising responsibilities and relationships within the internal policy framework.

In the self-evaluation domain, IGEC notes that the Quality Observatory produces lengthy self-evaluation reports and that the self-evaluation team consists exclusively of teachers. This weakness is acknowledged in the Headteacher's Intervention Plan, which provides for

expanding the team to include other members of the school community (parents, students and non-teaching staff) and for strengthening internal and external communication.

In the interviews, P1 and P2 describe planning mechanisms such as regular meetings and consultation with departments, subject areas and class councils to adjust the Strategic Action Plan. From a strategic management perspective, P1 emphasises the need to align the Educational Project cycle with the headteacher's term of office; an external consultancy was engaged to support the document review and to strengthen coherence between the Educational Project, the Strategic Action Plan and the self-evaluation reports. In parallel, P1 and P2 point to structural challenges affecting planning (chiefly the growth in the number of immigrant students and poor infrastructural conditions), which require ongoing reprioritisation and resource reallocation.

Pedagogical Practices and Support Arrangements (D2)

According to P2, the EMAEI has produced an Inclusive Education Procedures Manual, which sets out the procedures to be followed across the school cluster for students who require measures to support learning and inclusion, as well as how these measures are to be operationalised and how their effectiveness is to be monitored. The document identifies the educational responses available (supports, resources and projects) and the roles responsible for their implementation.

There is also a diversification of provision and inclusive strategies that combine curricular components with activities offered by the Learning Support Centre (CAA). P1 notes the alignment between school sport and inclusive education (creating strands such as boccia, adapted swimming and adapted water sports), as well as the integration of the arts (music and visual/technological education) into the CAA's work, and the establishment of external co-operation agreements (protocols) for therapies aimed at students in the Multiple Disabilities Support Unit. These options are set out in the Manual mentioned above, which stipulates that, for students with additional measures, combined curriculum matrices are used (class-based subjects together with CAA activities), with the involvement of specialist professionals and Special Education teachers or teachers from other subject areas. Concerning the organisation of teaching and in-class support, P2 reports that, for students with selective measures, Portuguese, Mathematics and English teachers were deployed to provide advisory support and co-teaching; for students with additional measures, the cluster optimised timetabled hours of Physical Education, Visual Arts and English teachers within the Learning Support Centre (CAA). The strategic documents also confirm and frame these options. The Strategic Action Plan includes an Action Plan for Inclusion with operational targets – namely co-teaching in Portuguese and Mathematics in all classes with students identified as receiving selective measures – and monitoring indicators. The Learning Recovery Plan prioritises Inclusion and Wellbeing and provides, among other initiatives, the subject Portuguese as a Non-Native Language and the organisation of Year 6 classes by levels of language proficiency, in response to the growth in the number of students arriving from abroad and the associated demand for language support.

Monitoring and Continuous Improvement (D3)

IGEC's external evaluation recognises the existence of systematic self-evaluation procedures, led by the Quality Observatory, with regular reports on school results, national examinations and the impact of initiatives such as the Domains of Curricular Autonomy. However, it notes

that the selection of domains and variables is excessively broad – covering a large and heterogeneous set of areas and indicators, with no clear hierarchy or prioritisation criteria – which dilutes the analytical focus and makes it challenging to identify and monitor areas for improvement in teaching and learning.

In line with these guidelines, the Headteacher's Intervention Plan sets targets to: i) diversify the domains of analysis, including the longitudinal tracking of outcomes; ii) institute collaborative supervision practices; and iii) monitor the quality assurance system within the European Quality Assurance in Vocational Education and Training (EQAVET) framework. It also provides for a biennial evaluation, with a report submitted to the General Council and made publicly available, as well as an evaluation at the end of the four-year term.

In the interviews, P1 reports that the Strategic Action Plan is reviewed annually after consultation with the pedagogical structures, with the self-evaluation team (the Quality Observatory) responsible for drafting it and presenting it to the Pedagogical Council. P2 indicates that the EMAEI mainly monitors the effectiveness of learning support measures (selective and additional), drawing on assessment records and descriptive summaries. The class councils report the number of students covered and the success (or otherwise) of the measures, and these data are submitted to the Quality Observatory. Both participants mention support from an external consultancy to improve monitoring and self-evaluation processes; at the time of the interviews, surveys aimed at different members of the educational community were being prepared.

In sum, the monitoring system shows a degree of procedural maturity but also analytical dispersion. To strengthen continuous improvement, it is crucial to: i) focus monitoring on inclusion-sensitive indicators (tracking subgroups and undertaking longitudinal analysis); ii) close the data–decision–impact loop, systematically integrating EMAEI reports into self-evaluation with defined timelines, responsible persons and interim reviews; iii) institutionalise collaborative supervision, linking it to evaluation and structured feedback to teams; and iv) synchronise planning and accountability, aligning the Educational Project, the Strategic Action Plan and the headteacher's term of office, broadening the team and its representativeness within the Quality Observatory, and ensuring the regular public dissemination of results.

Conclusion

This study addressed the research question by demonstrating how the principles of inclusive education are implemented and the extent to which the PAEE contributes to this process in the school cluster under study. It found that inclusion is realised when school leadership translates IGEC's evaluation into planning decisions (D1), into pedagogical practices and support arrangements (D2), and into monitoring routines (D3). In operationalising these dimensions, teachers play a decisive role, and the EMAEI assumes a central role: it clarifies procedures, supports the implementation of inclusive practices, and produces systematic evidence on the effectiveness of learning and inclusion support measures.

The PAEE acted as both a regulatory compass and a critical mirror: it triggered self-reflection and incremental improvements; however, its effects are not automatic. It becomes a transformative lever when school leadership translates it into clear pedagogical priorities with explicit targets, appropriate resource allocation, and consistent, outcome-oriented monitoring and follow-up.

This framing is all the more necessary given the considerable increase in the number of students of foreign nationality, with impacts on class overcrowding, curriculum organisation and the management of support provision, requiring structured responses and adequate resourcing.

Future research should focus on articulating leadership decisions, organisational arrangements (notably the EMAEI), and learning outcomes within a longitudinal design, enabling a more precise and robust assessment of differential impacts, particularly for students covered by learning and inclusion support measures.

Ultimately, inclusion becomes effective when the school is able to turn data into commitment, decisions into coherent action, and monitoring into an intrinsic feature of its organisational culture. To enable such dynamics, external evaluation interventions can play a catalytic role, promoting more efficient strategic planning of available organisational resources.

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

The authors used Grammarly for linguistic corrections and ChatGPT to review clarity and textual organisation; no AI tools were used to generate data, results, or analyses. The scientific content is original and the sole responsibility of the authors.

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Contact email: jennifersilva@ua.pt

Exploring the Feasibility of Integrating Personalised AI in Project Work and Its Impact on Student Learning and Staff Load

Rana Khalife, University College London, United Kingdom
Tamas Laufer, University College London, United Kingdom
Mauryn C. Nweke, University College London, United Kingdom

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Abstract

Collaborative project-based learning can require increased staff support compared to other learning techniques but where there are limitations in staffing and staff capacity, tailored AI tools may become a solution. The aim of this work is to assess whether the emergence of more personalised AI tools could both reduce staff load and enhance student learning and experience in project work, as a means of assessing whether these tools could be more permanently integrated into the curriculum. Student learning was assessed via the use of surveys to students enrolled on the Regenerative Medicine module who partook in a team-based Design Project and impact on staff load was assessed via interviews with module staff. 100% of the students on this module partook in this study (17 students -10 male, 7 female). These students evaluated the personalised tool "Vitafluence AI", with findings indicating its positive impact on learning. Over half (53%) reported increased academic confidence, and more than half recommended its integration into formal academic support. While 47% believed it could partially substitute an educator's assistance, none viewed it as a full replacement. The data also showed that 70% of the students felt encouraged to ask more questions but this had an impact on staff workload as 88% of students still needed to ask further questions to the module leader. Whilst there was no significant difference between male and female responses, one thing of note was that female participants felt less confident in the AI tool's impact on their academic performance.

Keywords: project-based learning, personalized artificial intelligence, student learning experience, education, regenerative medicine

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Introduction

AI has rapidly become an integral part of the labour market. According to the Future Jobs Report 2025 by World Economic Forum, 39% of the core worker skills will change by 2030. The top 3 fastest growing skills will be artificial intelligence (AI) and big data, networks and cybersecurity, and technological literacy. Hence, it is highly important for educators to ensure that the students leave higher education institutions capable of using these skills in practice. The best approach to achieve this is with the integration of AI into the modules, where it is appropriate, and teaching students to use it critically, instead of banning its use in education outright.

Studies have been conducted to ascertain the impact of AI in education. Vieriu and Petrea examined the impact of Artificial Intelligence (AI) on students' academic development at the National University of Science and Technology POLITEHNICA Bucharest in 2025. Among 85 surveyed students, 95.6% reported using AI tools, primarily virtual assistants, educational platforms, and automated content generators. Most students (over 80%) believed AI improved their academic performance, efficiency, and understanding of complex topics by facilitating faster access to learning resources and supporting study organizations. Despite these benefits, participants raised concerns regarding the accuracy of AI-generated information (48.2%), reduced critical thinking, and over-dependence on technology. Students emphasized the need for structured AI integration into the curriculum, ensuring accuracy, accessibility, and ethical guidance. The authors conclude that AI holds substantial potential to enhance personalized and efficient learning, but its adoption must be balanced with human oversight, critical thinking development, and data privacy safeguards. They advocate formal educational strategies, ethical frameworks, and continued research to ensure AI supports learning rather than replacing essential cognitive and social processes (Petrea & Vieriu, 2025).

Wang et al. (2024) conducted a systematic literature review on Artificial Intelligence in Education (AIED), analysing over 2,200 studies and 125 empirical papers. They have identified four major application areas: adaptive and personalized learning, intelligent assessment and management, student profiling and prediction, and emerging technologies such as chatbots and educational robots. Most studies focused on system design (53%) and learning impact (39%), with fewer examining adoption challenges or ethical implications. Experimental methods dominated the research, and theoretical grounding drew from constructivist, cognitive, and learning style theories. Higher education emerged as the most studied context, while preschool education remained underrepresented. The authors highlight growing interest in human–AI collaboration, generative AI, and emotion-aware learning, emphasizing the need for stronger ethical frameworks and theory-driven approaches to guide future AIED development and integration (Wang et al., 2024).

Further impact studies were conducted by Walter in 2024. The research found that 95.6% of students actively use AI tools, primarily virtual assistants and educational platforms to support their studies. Most students (80–83%) believe AI enhances efficiency, understanding, and organization, with major benefits including time savings, simplified comprehension, and structured information management. However, concerns were also identified: 48% questioned the accuracy of AI-generated information, while others cited risks such as over-reliance on technology, reduced critical thinking, and potential academic dishonesty. Despite these drawbacks, the study concludes that AI significantly improves personalized learning and academic engagement when applied responsibly. It recommends integrating AI with traditional

teaching, supported by ethical guidelines, validation mechanisms, and balanced use to ensure reliability and maintain human-centered learning (Walter, 2024).

When addressing wellbeing, Pikhart and Klimova (2025) highlighted that despite the enhancement in the personalized mental health support, significant drawbacks are also identified: digital fatigue, technostress, loneliness from reduced face-to-face interactions, diminished interpersonal skills, and privacy or job-displacement concerns as AI permeates academic settings (Pikhart & Klimova, 2025).

Some students may feel hesitant to ask questions due to various EDI (Equality, Diversity, and Inclusion) considerations, such as language barriers or discomfort speaking in front of their peers. This makes it crucial to develop a tailored AI tool like Vitafluence to support students in understanding lecture and task materials, rather than relying on general AI solutions. General AI tools often struggle to provide specific and accurate answers to course-related questions. By training the software with lecture materials and relevant literature, we aim to create a tool that effectively addresses students' needs and enhances their learning experience.

Improved Student Accessibility and Confidence: By tailoring the AI tool to the specific needs of the course, we aim to create an inclusive learning environment where students, regardless of language proficiency or other EDI considerations, feel comfortable seeking help. This tool will empower students to access accurate and relevant answers independently, boosting their confidence and reducing barriers to engagement. Reduced Staff Workload and Enhanced Efficiency: The project seeks to alleviate the teaching staff's workload by enabling the AI tool to address frequently asked questions and provide on-demand support. This will allow staff to focus on more complex or personalized interactions with students and better manage their time across multiple groups. Scalable and Transferable Teaching Solutions: If successful, this AI tool could serve as a model for broader implementation across other modules and faculties. This would enhance teaching efficiency and consistency while supporting a larger and more diverse student population.

Vitafluence by LakeSai

Vitafluence is an innovative research, data, and artificial intelligence (AI) company dedicated to advancing solutions in the health and life sciences sector. The company integrates scientific research, advanced analytics, and intelligent automation to transform how health data is collected, interpreted, and applied to improve patient outcomes and healthcare delivery.

Vitafluence provides comprehensive health analytics, real-world data insights, and quality-of-life metrics that support clinical research, healthcare decision-making, and population health management. Its proprietary Lakes AI platform offers a flexible, modular architecture that can be customized to meet specific client needs, from clinical trial data management to digital health analytics and predictive modelling. The company also offers an AI-driven chatbot system that can be deployed across any module or project. The chatbot interacts intelligently with uploaded datasets, enabling users to query data, access insights, and generate automated reports efficiently.

Methodology

Research Approach

The study was conducted with third-year undergraduate students enrolled in the Regenerative Medicine Minor within the Faculty of Engineering. It took place during Term 2 (January–March 2025) over a period of approximately 10 weeks. The cohort consisted of 29 students, who worked collaboratively in groups of five on a design-based project. The module was jointly supervised by two academic staff members.

A range of investigative techniques were considered for this research, including focus groups, questionnaires, surveys, staff interviews, and direct observations. Among these, quantitative methods, specifically surveys, were selected as the primary data collection approach (Jain, 2021). As the module was structured into four components, students were asked to complete a short survey upon submission of each part to assess whether the software used supported their group work at each stage.

The survey included eight questions, and 17 students participated in completing it. In addition, semi-structured interviews were carried out with the teaching staff to capture their perspectives and reflections on the use of the software within the module.

Questionnaire Formulation and Ethical Considerations

The questions on the survey needed to reflect the intended aims and outcomes of the project.

Objectives

- The aim is to evaluate whether the tailored tool, aligned with lecture materials and resources, can effectively support students and alleviate staff workload, particularly when managing multiple student groups.
- This collaboration focuses on leveraging the “Teaching Assistant” tool to enhance the teaching activities within the Department of Biochemical Engineering.

Outputs

- Survey third year undergraduate students.
- Collecting feedback from teaching staff.

Outcomes

- An improved understanding of the impact of Vitafluence on group work and on staff workload.
- Presentation of results at the Departmental Teaching Committee (DTC) with potential implementation on other modules where relevant.

Results and Discussion

The project was aimed to assess the impact of Vitafluence AI on student learning experience and staff load. The results are detailed in the next sections.

Evaluation of Impact on Student Learning Experience

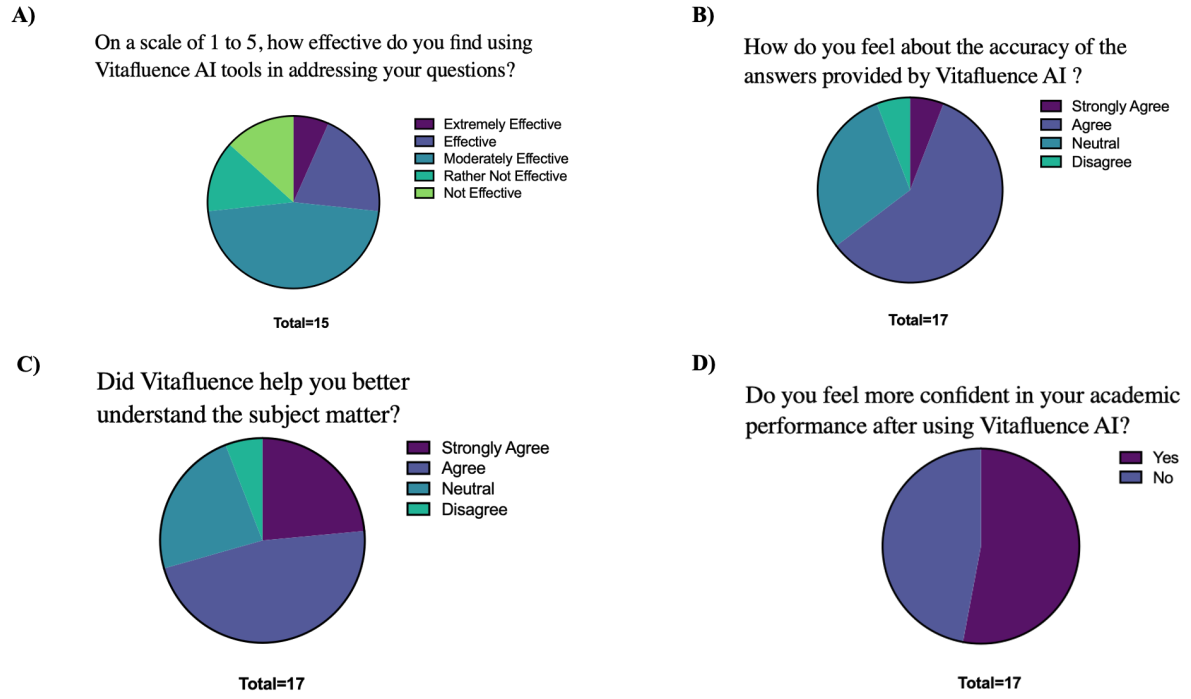
Students were surveyed following all 4 sections of the projects using 8 questions. The survey consisted of 4 questions assessing the quality of the AI support and 4 questions analysing the impact on student engagement with the academic staff. In total, 17 students filled out the survey. There was no significant difference between male and female responses, but female participants felt less confident in the impact of the AI tool.

Assessing Quality of AI Support System

First part of the survey was aimed to evaluate the quality of the Vitafluence AI support system tailored specifically for the Regenerative Medicine module. Hence, 4 factors were accounted: effectiveness, accuracy, impact on student understanding, confidence after using AI. The results are demonstrated as pie charts on Figure 1.

Figure 1

The Results of the First Part of Student Learning Experience Survey of the Regenerative Medicine Team-Based Design Project



Note. All data is demonstrated as pie charts. The first part was aimed to assess the quality of the support system provided by Vitafluence AI, accounting the following factors: **A)** Effectiveness of AI **B)** Accuracy of AI **C)** Impact of AI on student understanding **D)** Confidence after using AI.

73% of the students found the utilization of Vitafluence AI moderately or more effective. 65% of the students agreed or strongly agreed that the system is accurate. 71% of the students agreed or strongly agreed that the system helped better understanding of the subject matter. 53% of

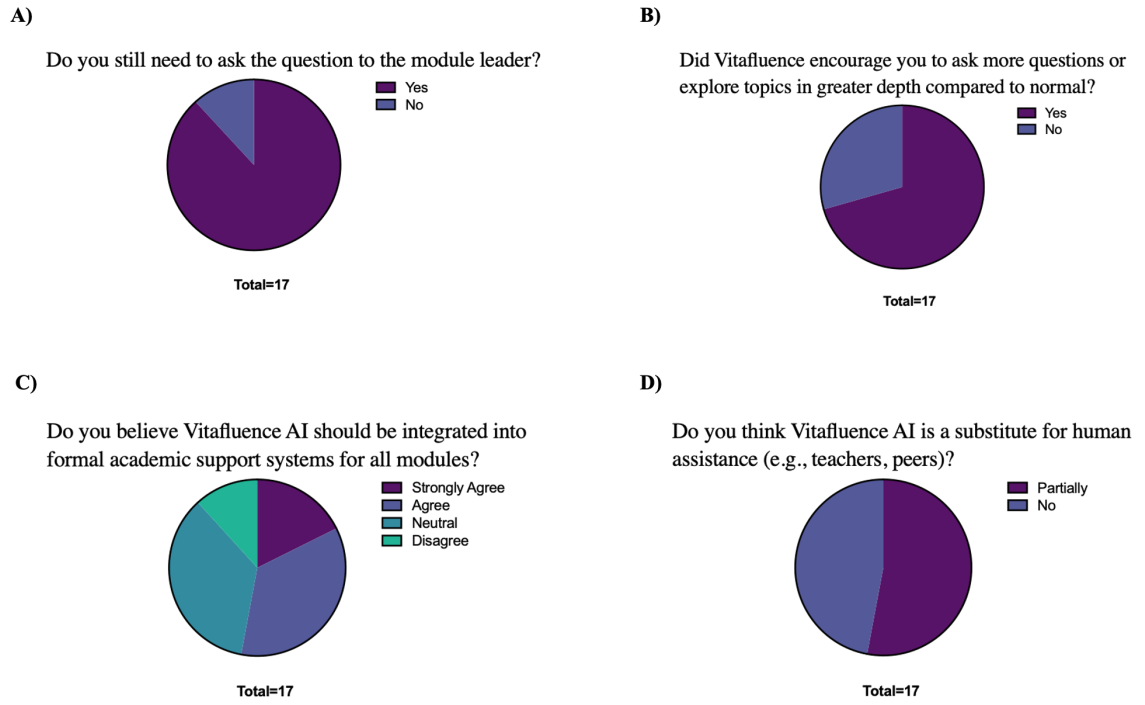
them reported increased confidence in their academic performance. The data suggests that the AI system provided quality service to the students and helped them in designing their regenerative medicine group projects.

Assessing Impact on Student Engagement With Academic Staff

The second part of the survey was aimed to evaluate the impact of the AI support system on the student engagement with the academic support stuff and the module lead. The survey incorporated the following questions: If students have further questions after using AI; If AI encourage students to ask more questions; If AI should be integrated to formal academic support systems; If it could substitute human assistance. The results are demonstrated as pie charts on Figure 2.

Figure 2

The Results of the Second Part of Student Learning Experience Survey of the Regenerative Medicine Team-Based Design Project



Note. All data is demonstrated as pie charts. The second part was aimed to assess AI's impact on student engagement and communication with the staff, accounting the following factors: **A)** If students have further questions after using AI **B)** If AI encourage students to ask more questions **C)** If AI should be integrated to formal academic support systems **D)** If it could substitute human assistance.

88% of the students still needed to ask questions from the module lead. 71% of the students felt encouraged to explore the topics in greater depth compared to normal. 54% of the students agreed or strongly agreed that the system should be integrated into the formal academic support systems for all modules, while 35% was neutral on this subject. 53% of them said AI could only partially substitute for human assistance, while 47% said it could not substitute at all.

Based on the presented survey data, the AI provides quality support system for the students, which enables them to explore the subject matter much further. Hence, more than half of the students suggested the tailored AI chatbots integration into formal academic support systems for all modules. On the other hand, as an effect of deeper research, they were encouraged to ask

more questions to the module lead, increasing the staff load of the module. In addition, all students recognised the importance of the academic staff, and no one viewed it as a full substitution. Hence, the integration of AI contributes rather to the understanding of the topic, brainstorming and encouraging the students, than teaching and supervising them.

It is important to note, that the sample size of the survey was low. To increase the scientific power of the demonstrated data, the study scale should be increased to further modules.

Evaluation of Impact on Staff Load

Based on the interview with the module lead the software helped in some sections of the report, especially in literature review and calculations (e.g. finding the growth rate, rules of thumb for bioprocessing). The software provided new ideas for project implementation and the students explored the subject in greater depth. However, due to bottlenecks in the software, further improvement and training is required from the company. In addition, the AI did not reduce the staff load. The students still asked technical format and general question related to topic. Furthermore, they wanted to check the feasibility of the project with the help of the academic staff.

Conclusion

In this report, we evaluated the integration of the Lakes AI platform by Vitafluence AI to a collaborative project-based regenerative medicine module. The results were based on student survey and interview with academic staff. The students recognised the help of the system, they were able to explore the topics in further depths and they reported increased confidence in their academic performance. On the other hand, no one viewed the system as full substitution. With increased exploration of the topics, the student had even more question to the module lead. In conclusion, the student learning experience was enhanced, while the staff load did not reduce. The current study only had limited sample size, so increase in the scale of the study is suggested. In addition, software should be further assessed for new ideas in project implementation. To enable this, further software updates and training is required from Vitafluence AI. Concurrent to this study, the company have worked on substantial improvements to the software. The next iteration of this study will look to include the software enhancements to determine whether it is something that can be integrated into the curriculum.

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

The author declares that AI-assisted writing software, was not used regularly in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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Contact email: rana.khalife.13@ucl.ac.uk

Culturally Responsive Pastoral Care: Creative Strategies for Embracing Learner Diversity

Anamua Lole, Manukau Institute of Technology, New Zealand
Krishan Mani, Manukau Institute of Technology, New Zealand

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Abstract

New Zealand Pacific peoples make up the third largest ethnic group in New Zealand, representing a significant and growing demographic playing a crucial role in the nation's future. The study highlighted that there is a lack of consistency in high-quality teaching and learning necessary for all Pasifika learners to succeed. This research project aims to identify effective pastoral care strategies to support Pasifika students to complete their tertiary studies in a culturally responsive context. The research team used a pragmatic methodology combining Pasifika and Western perspectives, starting with a literature review and beginning talanoa (conversations) through an online survey. The aim is to foster meaningful conversations to understand and improve pastoral care for Pasifika learners. The overall project phases include firstly defining pastoral care, secondly identifying best practices, and thirdly outlining its core components. The focus of this paper will be to report on the first phase of the project. Findings from the first phase identified initial key elements in effective pastoral care for Pasifika learners that included inclusivity, cultural respect, community collaboration and staff training. Additionally, the findings indicate the need for the education sector to recognize and address historical and structural inequities affecting Pasifika students and to provide additional resources and support as necessary. This study could have a significant impact, especially if it leads to culturally responsive changes to policy/practice.

Keywords: pastoral care, Pasifika learner, tertiary education

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Introduction

Pasifika learners represent a significant and growing demographic in New Zealand, playing a crucial role in the nation's future. Education policies and frameworks such as the Education Act 1989 and Te Whāriki curriculum, go only so far as to address the challenges that hinder the academic achievement and wellbeing of Pasifika learners (Ministry of Education, 2019). This research project is an exploration of the perspectives of Pasifika learners, with the aim of identifying innovative pastoral care strategies that are culturally grounded and learner-informed for enhancing educational outcomes.

Literature Review

Pacific cultures are predominantly formed on oral tradition and as such, the transmission of history and culture is done so through oral expression. This literature review is therefore representative of the written and published works pertinent to the aims and goals of this project to do with Pasifika culture and pastoral care strategies.

Physical, Social, Spiritual and Cultural Needs of Learners

Pastoral care in New Zealand schools should aim to support the overall well-being of students, addressing their physical, social, spiritual, and cultural needs. This holistic approach ensures that students feel valued and supported in their learning environment (New Zealand Qualifications Authority, 2022).

The Education (Pastoral Care of Tertiary and International Learners) Code of Practice 2021

The Education Code of Practice 2021 outlines the responsibilities of educational institutions to provide a safe and supportive environment for all learners. This includes proactive monitoring and responsive practices to ensure student well-being (New Zealand Qualifications Authority, 2021).

Inclusive and Supportive Environments for Learning

The curriculum, school culture, and physical spaces should reflect, affirm, and celebrate Pacific identities – valuing indigenous languages and cultures as vital for identity development, and enabling students to "see themselves" in their learning environment. This includes correct pronunciation of names and integrating Pacific cultural content (Alkema, 2014).

Student Voice

Pastoral care also involves the student voice – incorporating student feedback and responding to their concerns leads to more effective support systems. Actively engaging with families and communities is an essential part of maintaining reciprocal and trusting relationships with students, their parents, and families (Chu-Fuluifaga & Ikiua-Pasi, 2021).

Methodology

This study utilises Talanoa research methodology. Talanoa is a widely used methodology applied in Pacific research that provides a culturally responsive context for meaningful

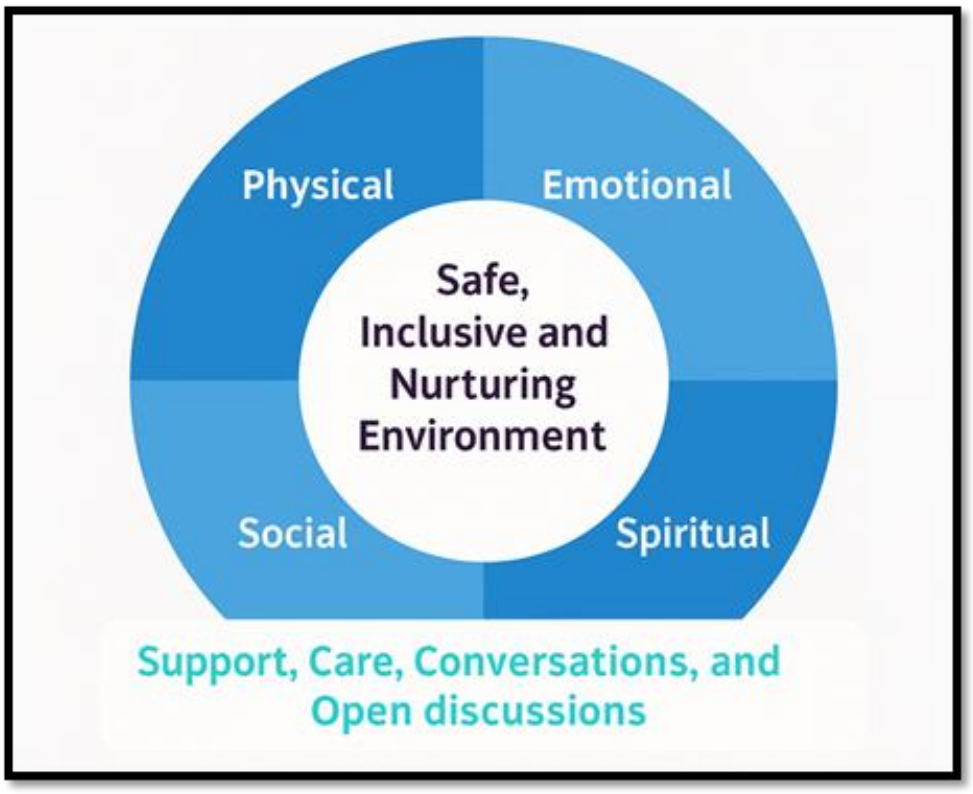
engagement and dialogue (Vaioleti, 2006). Talanoa methodology is based on Pacific cultural values and traditions that are familiar to many parts of the Pacific and enables significant conversations about important matters. Talanoa is used in this study as a dialogue-based, interactive and participatory approach to research, involving personal conversations with participants to gain insights on effective pastoral strategies for Pacific learners. Talanoa also allows for ongoing dialogue so that participants and co-researchers can revisit previous stories and points, to extract meaning or to discover ideas perhaps missed in the initial talanoa. This re-visiting or ongoing dialogue is termed "talatalanoa" (Vaioleti, 2016).

Results

Learner Perspectives on Pastoral Care

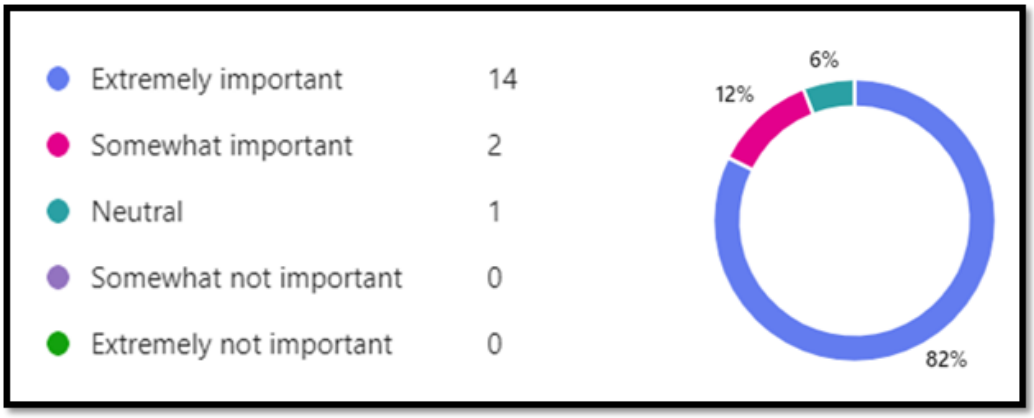
The initial survey data from 17 Pasifika learners reveals that pastoral care is conceptualised as a nurturing support system that addresses emotional, cultural, social, spiritual, and academic needs as depicted in Figure 1. When asked "What is pastoral care?" responses frequently included terms like "spiritual care" and "personal and emotional care." Learners also emphasised the importance of face-to-face interactions, one-on-one conversations, and dialogical relationships in pastoral care approaches.

Figure 1
Pastoral Care From the Perspective of Pacific Learners



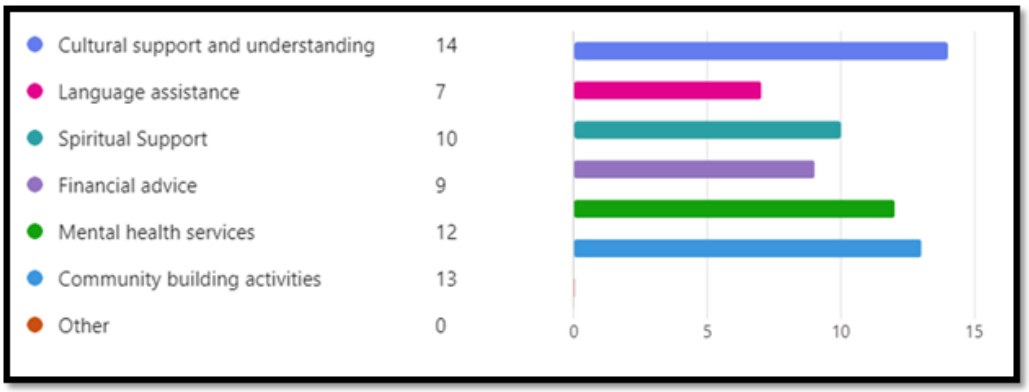
Of significance, 82% of respondents rated pastoral care as "extremely important" to their overall educational experience as depicted in Figure 2.

Figure 2
How Important Is Pastoral Care to Your Overall Educational Experiences?



The top four services identified as most important were cultural support and understanding; community building activities; mental health services and spiritual support, as ranked by Pasifika learners and depicted in Figure 3.

Figure 3
Services Identified as Most Important



These findings suggest that Pasifika learners value culturally and spiritually grounded support systems over transactional services such as financial advice or language assistance.

Key Pastoral Care Services

Cultural Support and Understanding

Pasifika learners bring rich traditions, values, and ways of knowing into the classroom. To help them feel included and respected, schools and tertiary providers need to use teaching approaches that reflect Pasifika cultures. This means training staff to be culturally competent, using Pasifika languages where possible, and including cultural practices such as ceremonies, celebrations, and storytelling in learning spaces (Fletcher et al., 2009; Hargraves, 2018). When learners see their culture valued, they feel a stronger sense of belonging and are more engaged.

Spiritual Support

Spirituality is an important part of life for many Pasifika learners. Providing spaces for prayer, connecting students with spiritual advisors, and weaving spiritual values into teaching can

support their overall wellbeing (Chu-Fuluifaga & Ikiua-Pasi, 2021). Recognising spirituality as part of holistic education helps learners feel respected and cared for.

Mental Health Services

Good mental health is vital for success. Pasifika learners may face stress, anxiety, and other challenges, so institutions need to offer professional counselling services, promote mental health awareness, and create safe spaces for peer support groups (Marshall et al., 2008). These supports help learners manage pressure and stay connected.

Community Building Activities

Building a sense of community is key for Pasifika learners. Social events, mentoring programmes, and group projects create opportunities for students to connect, share experiences, and support each other (Chu et al., 2013). These activities help learners feel part of an aiga (family) within the education setting.

Discussion

Innovative Pastoral Strategies

This study identified five innovative pastoral strategies; each aligned with relevant literature.

Cultivating Intentional, Nurturing, and Reciprocal Relationships

Strong, authentic relationships between educators and Pasifika learners are central to effective teaching and learning. Research shows that these relationships often matter more to learners than the course content itself (Chu et al., 2013; Southwick et al., 2017). When educators teach with "heart" and go the extra mile, they create culturally safe spaces that protect students from discrimination and encourage engagement (Nanai et al., 2017; Siope, 2011). These relationships are reciprocal, affirming learners' identities and supporting their sense of belonging.

Affirming Diverse Pasifika Identities, Languages, and Cultural Capital

Recognising and valuing the cultural capital Pasifika learners bring to education strengthens confidence and belonging. Culturally responsive pedagogy goes beyond acknowledging diversity—it actively draws on students' languages, traditions, and lived experiences to improve outcomes (Anderson, 2025; Easthope-Harper, n.d.; Ministry of Education, 2013). Embedding Pacific worldviews in curriculum design ensures learners see themselves reflected in their education, which fosters engagement and achievement.

Establishing Collaborative and Reciprocal Home–Educational Partnerships

In many Pasifika cultures, learning is understood as a collective responsibility. Effective pastoral care therefore includes families and communities as partners in education. Institutions can build these partnerships through culturally appropriate communication, church-based liaison activities, and workshops that demystify the education system for families (Chu, Glasgow, et al., 2013; Luafutu-Simpson, 2015). This collaboration ensures educational aspirations are shared and supported within the learner's wider network.

Implementing Targeted Mentoring, Counselling, and Peer Support Systems

Structured mentoring and academic counselling—particularly during key transition points—are linked to improved retention and achievement. Appreciative Inquiry-based mentoring focuses on students' strengths and leadership potential, creating a positive framework for growth (Chu, 2010; Madjar et al., 2010). Peer mentoring further strengthens support by fostering aiga-like (family-like) connections, enabling learners to draw on shared cultural bonds and collective resilience (Marshall et al., 2008).

Creating Culturally Inclusive and User-Friendly Learning Environments

Pasifika learners thrive in spaces that feel like a "learning village," where cultural identity and communal learning styles are visible and valued. This includes employing Pasifika staff, creating dedicated cultural spaces such as fono rooms, and embedding Pacific values within curriculum content (Alkema, 2014; Horrocks et al., 2012). Inclusive environments should be intentionally designed from the outset to reflect Pasifika ways of knowing and being, ensuring learners feel seen, respected, and supported (Hargraves, 2018).

Identifying Effective Strategies

To keep pastoral care responsive and meaningful for Pasifika learners, practical strategies are recommended:

Feedback Mechanisms

Regular feedback helps educators understand what is working and what needs improvement. Using tools such as surveys, questionnaires, and focus groups gives learners a voice and ensures their experiences shape future support. Feedback should be gathered in ways that are culturally appropriate and accessible, for example, through talanoa-style discussions that encourage open sharing.

Monitoring and Evaluation

Tracking key indicators like retention rates, academic performance, and wellbeing data are essential for measuring the impact of pastoral care initiatives. This information should be reviewed regularly and used to adjust strategies where needed. Evaluation processes must go beyond numbers and include qualitative insights to capture the lived experiences of Pasifika learners.

Learner Involvement

Pasifika learners should be actively involved in planning and decision-making about pastoral care. Their perspectives ensure that support systems reflect real needs and cultural values. This can include student advisory groups, leadership roles in cultural activities, and opportunities to co-design programmes that strengthen engagement.

Community Collaboration

Strong partnerships with Pacific communities are vital for authenticity and cultural relevance. Working alongside families, churches, and community organisations helps institutions align

their pastoral care with Pasifika values and practices. Collaboration can include community-led workshops, cultural events, and shared decision-making to build trust and mutual understanding.

Conclusion

Pastoral care for Pasifika learners needs to be holistic, culturally grounded, and shaped by the voices of learners themselves. It is not just about academic support—it is about creating environments where Pasifika students feel valued, respected, and connected. By embracing Pacific methodologies such as talanoa and talatalanoa, educators can build trust and foster meaningful relationships that go beyond the classroom. These approaches encourage open dialogue, shared understanding, and collective problem-solving, which are central to Pasifika ways of learning and being.

The findings from Phase 1 of this project highlight the critical role of cultural support, spiritual care, mental health services, and community-building activities in promoting wellbeing and success. These elements work together to create a sense of belonging and safety, which is essential for engagement and achievement. As the research moves into the next phase, these insights will guide the development of practical, evidence-based guidelines for tertiary institutions. The goal is to ensure pastoral care is not only effective but also authentic, reflecting Pasifika values and worldviews while meeting the diverse needs of learners.

Ultimately, investing in culturally responsive pastoral care is an investment in equity and inclusion. It strengthens relationships, enhances learner confidence, and contributes to better educational outcomes for Pasifika students across Aotearoa New Zealand.

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

The author declares that Grammarly and Copilot, AI-assisted writing software's, was used in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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Contact emails: anamua.lole@manukau.ac.nz
krishan.mani@manukau.ac.nz

University Management and the Inclusion of Students With Disabilities in Higher Education

Joana Maria de Moraes Costa, Universidade Comunitária da Região de Chapecó, Brazil
Tania Mara Zancanaro Pieczkowski, Universidade Comunitária da Região de Chapecó, Brazil

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Abstract

With the expansion of public policies for inclusion and the democratization of access to higher education, especially since the 1990s, there has been a growing enrollment of students with disabilities in universities, contributing to the development of new academic and professional profiles. This article derives from a Master's research in Education that investigated how the access of students with disabilities reverberates in institutional inclusion policies and university management practices. The study focused on understanding the challenges faced by managers in implementing these policies, based on narrative interviews conducted with administrators from four universities (a federal public, a state public, a community, and a private institution). The empirical material was organized into thematic clusters and analyzed through Discourse Analysis inspired by Michel Foucault. The findings reveal that although regulations establish general guidelines, management actions are strongly shaped by institutional contexts as well as by the personal and collective experiences of the managers. Their decisions reflect both possibilities of coping and the constraints imposed by cultural and institutional resistances, which give inclusion policies distinct contours in each university. It is concluded that university management for inclusion constitutes a process marked by multiple challenges, requiring the organization of priorities, modes of action, and distribution of responsibilities, thus reaffirming the importance of effective and contextually sensitive policies to ensure the rights of students with disabilities.

Keywords: university management, inclusion in higher education, students with disabilities, institutional policies, discourse analysis

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Introduction

With the expansion of public policies for inclusion and the democratization of access to higher education, especially from the 1990s onwards, there has been a growing enrollment of broader segments of the population in universities, particularly students with disabilities, a movement that has contributed to the formation of new academic and professional profiles.

This scenario imposes on university management a set of highly complex challenges, which are the focus of our investigation, as it requires the formulation and implementation of institutional policies capable of ensuring not only access, but also the permanence and academic success of these students, in dialogue with the pedagogical, structural, financial, political, and cultural demands inherent to the university context.

According to Law No. 13.146/2015 (Brazil, 2015), Article 2, which establishes the Brazilian Law for the Inclusion of Persons with Disabilities, a person with disability is defined as someone who "has a long-term physical, mental, intellectual, or sensory impairment which, in interaction with one or more barriers, may hinder their full and effective participation in society on an equal basis with others."

This definition points to a paradigm shift, in which disability is no longer understood as an attribute exclusively of the individual, but rather as a relational condition resulting from the interaction between individual characteristics and contextual barriers, whether physical, communicational, attitudinal, or institutional. It is, therefore, a matter of shifting the focus from the individual to the ways in which social spaces are organized and norms are constructed. In this context, the educational inclusion of people with disabilities is understood as a dimension of social rights, requiring the State to implement public policies and managers to implement institutional policies that ensure access, permanence, and effective learning conditions for students with disabilities.

However, the materialization of these guidelines does not occur in a homogeneous or conflict-free manner, since educational policies, even when framed within humanitarian and benevolent discourse, inherently carry structural contradictions that reflect the social disputes and historical conflicts present in the educational field. As argued by Shiroma, Moraes, and Evangelista (2002), these contradictions are not mere accidents, but rather expressions of the power relations that permeate the educational context. For Foucault (2009), truths are produced throughout history, permeated by power relations; that is, societies possess their own regime of truth depending on time and context. Thus, this study seeks to show how the legal imperatives of inclusion influence university managers, the focus of our investigation, in creating institutional policies that foster access and accessibility for students with disabilities in higher education.

This paper is based on completed research that resulted in a Master's dissertation in Education. The research problem that guided the study was formulated as follows: how does the access of students with disabilities in higher education reverberate in institutional inclusion policies and in university management practices concerning the rights of this group? The general objective of the study was to analyze how the access of students with disabilities in higher education reverberates in institutional inclusion policies and in university management practices.

From this general objective, three specific objectives were derived, among which we chose to focus the analysis on the following: to understand the challenges faced by managers in applying policies related to the inclusion of students with disabilities in the university. This is a research cutout aimed at understanding the challenges faced by university managers in implementing inclusion policies, highlighting the multiplicity of obstacles they identify in establishing and operationalizing institutional inclusion and accessibility policies. These challenges encompass academic demands, financial management, adaptations in the university's infrastructure, and personnel management, involving processes of accountability and coping with the cultural and organizational resistances specific to the university context.

Our motivation for conducting this study lies in the fact that the inclusion of people with disabilities, although a widely explored theme, has predominantly focused on teachers, the students themselves, or inclusive education policies, and less on university managers. However, the involvement of management is fundamental for institutional policies to be created and implemented.

The paper is organized into four subsections: initially, we present the methodology adopted; next democratization of higher education, we analyze and discuss the results; and finally, we present the concluding remarks, which summarize the main contributions of the study.

Methodology

For this study, managers working at four universities located in Chapecó, SC/Brazil, were interviewed: one federal public, one state public, one community, and one private institution. Although these higher education institutions (HEIs) have different legal statuses, they generally follow the same regulations regarding academic and administrative organization, since, in the field of inclusion, they are equally subject to federal regulations that must be observed by all institutions regardless of their composition.

The criterion for defining the managers interviewed was the position held within the institution, such as academic director, administrative director, or equivalent. These professionals occupied management positions with responsibilities directly related to accessibility actions and the inclusion of students with disabilities in the university. Therefore, their selection was based on their institutional roles. Initial contact and the indication of participants were mediated by the person responsible for the accessibility sector in each university. Job titles were kept according to the organizational and hierarchical structures of the institutions studied.

The empirical material for the research was generated through narrative interviews. According to Andrade (2014, p. 175), the narrative interview is "[…] a research possibility redefined within the field of post-structuralist research from an ethnographic perspective." The author emphasizes that "[…] narratives are constituted from the connection between discourses that articulate, overlap, add to one another, or, still, differ or contemporize" (Andrade, 2014, p. 181).

The interviews were organized into Thematic Groupings, considering the relevance and recurrence of the statements, and examined through Discourse Analysis inspired by Michel Foucault. From this perspective, the analysis does not aim to approach language as an abstract system, but rather to focus on its role in the production of meanings and effects. As

Sales (2014, p. 127) notes, "[...] it is about analyzing why something is said, in that way, at a given time and context, questioning the "conditions of existence" of discourse."

Democratization of Higher Education

The understanding of formal education as a universal right has been gradually constructed throughout history, influenced by national regulatory frameworks and by international organizations such as the United Nations (UN) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), which set guidelines for the global educational context, significantly impacting the Brazilian educational system.

In the so-called "knowledge era," access to education has come to be seen as an essential condition for national progress, strongly influenced by international organizations and normative documents that link educational qualification to global citizenship and economic growth. However, the analysis of educational indicators reveals that access to quality education, even at basic levels, is still far from a universal reality, especially for historically marginalized populations. In this regard, not only people with disabilities have been excluded from school systems over time, but also Indigenous, Quilombola, riverside, and peripheral populations, who, for distinct social and structural reasons, have been denied access to inclusive and quality public education. According to the Global Education Monitoring Report (UNESCO, 2020), on a global scale, many students still face significant barriers to studying:

> Many students still face major barriers to a quality education. Even before the current pandemic, one in five adolescents, youth, and children were entirely excluded from education. In addition, the existence of stigmas, stereotypes, and discrimination means that millions more are excluded within classrooms themselves. (UNESCO, 2020, p. 5).

According to Conte (2011), the 1932 Manifesto of the Pioneers of New Education already pointed out that, between the 1920s and 1940s, the illiteracy rate in Brazil exceeded 65% of the population, a figure that did not even account for the majority of Indigenous and Quilombola populations, historically rendered invisible in official statistics. In this context, the presence of people with disabilities in schools and, more recently, in universities and graduate programs, is part of a broader and more complex process of contesting exclusionary logics within Brazilian education.

The scenario of educational inequality and exclusion of various social groups, including people with disabilities, triggered throughout the 20th century and the early decades of the 21st century the publication of important normative texts. One milestone was the Salamanca Statement of 1994 (UNESCO, 1994), which established principles, policies, and practices addressing special educational needs, giving the school inclusion movement greater strength and visibility on a global scale. Also noteworthy is the Convention on the Rights of Persons with Disabilities (United Nations, 2007), considered one of the most comprehensive international documents on the subject, which, once ratified by Brazil with constitutional amendment status, reverberated in the elaboration of Law No. 13,146/2015 (Brasil, 2015), known as the Statute for Persons with Disabilities, consolidating principles of equality, non-discrimination, and accessibility in Brazil's legal framework across various social spaces, including education.

In the context of higher education, Law No. 13.409/2016 (Brasil, 2016) represented a milestone by amending Law No. 12.711/2012 (the "Quota Law"), granting people with disabilities the right to reserved places in federal higher education institutions. This measure expanded the scope of quota policies, contributing to strengthening permanence policies and promoting diversity in academic spaces. Complementarily, Law No. 14,723/2023 (Brasil, 2023) introduced new guidelines to expand access for historically excluded groups, including people with disabilities, to federal higher and technical education. In this legislation, Article 7-B, for the first time, explicitly established the legal requirement for institutions to adopt affirmative policies for people with disabilities in access to graduate programs.

This regulatory framework reinforces the Brazilian State's commitment to the democratization of higher education, while also highlighting new challenges for university management. Enforcing quotas and affirmative policies involves not only creating mechanisms for access but also managing the complexity of diverse demands that permeate higher education and students' academic lives. Among these demands are challenges related to ensuring quality academic training and internship opportunities; financial management, which involves the allocation of resources to cover adaptations and inclusive actions; and personnel management, which requires investment in continuing education, still marked by low adherence of faculty and staff to training opportunities. In addition, there is a need for adjustments in university infrastructure, with physical and organizational modifications to guarantee accessibility conditions.

Management is also faced with accountability processes, expressed in institutional and social demands for the effectiveness of inclusion, as well as with cultural and attitudinal resistances, which range from questioning the "right to be" in higher education to the effectiveness of students' permanence. In this scenario, managers are constantly required to meet multiple demands, balancing budgetary constraints, legal pressures, and social expectations regarding inclusion.

Thus, legislation functions as a regulatory framework whose effectiveness, however, depends on the articulation of financial resources, political will, and institutional engagement—elements that vary significantly according to the nature and context of higher education institutions, as well as the characteristics and level of commitment of their managers. These provisions are directly aligned with international commitments and express the growing strength of inclusion discourse as a social and political value in contemporary times. Nevertheless, even with the expansion of the normative framework for inclusion, educational indicators highlight the structural challenges in the context of higher education.

Data from the 2023 Higher Education Census (Brasil, 2024) show that the number of students enrolled at this level of education is close to 10 million. According to Table 13, "undergraduate enrollment reached a total of 9,976,782 in 2023, representing an increase of 5.6% compared to the previous edition of the Higher Education Census" (Brasil, 2024, p. 23). According to the Ministry of Education, in 2013 there were 29,221 students with disabilities enrolled in higher education, corresponding to only 0.4% of total enrollment. Ten years later, in 2023, this number rose to 92,756 students, including people with disabilities, pervasive developmental disorders, and giftedness, raising participation to 0.9% (Brasil, 2024, p. 28).

However, this percentage does not reach 1% of total enrollment in higher education across Brazil. This data highlights the deep underrepresentation of people with disabilities in higher education, demonstrating that, despite normative advances and inclusion policies, the

realization of the right to higher education still faces structural and institutional barriers that limit the participation of this social group.

The data also reveal that attending university is not a reality for the majority of people with disabilities, a result of the continuous reduction of this group throughout schooling. In 2023, the number of enrollments in special education reached 616,394 students in the early years of elementary education, but only 223,258 in secondary education (Brasil, 2024, p. 51).

This decline appears as a "funnel," marked by structural, pedagogical, and social barriers that hinder the permanence of students with disabilities and limit their chances of progressing to higher education. These indicators reveal discontinuity, interruption, or even dropout from schooling. In this sense, they expose the complexity involved in managing a higher education institution, which includes not only administering resources and meeting goals but, above all, conceiving a collective project of integral education, social inclusion, and regional development.

Analysis and Discussion of Results

The discursive recurrences show that managers do not contest the inclusion of people with disabilities, revealing their subjectivation to this unquestionable right. They acknowledge the need to implement institutional policies, even as a condition for the satisfactory evaluation of undergraduate programs, whose instruments include aspects related to inclusion and accessibility. However, as the dialogue deepens, they begin to express challenges that, at times, suggest forms of resistance.

University managers express numerous challenges in establishing and implementing institutional inclusion policies and ensuring the necessary architectural, attitudinal, communicational, methodological, and digital accessibility. *Academic demands* are broad and multifaceted, encompassing ethical and professionalization issues inherent to the objectives of higher education. They are based on the understanding that inclusion cannot be reduced to mere facilitation but must guarantee access to academic content, activities, quality education, fair assessment, and professional success. Manager A, representing the State Public University, laments:

> [...] even those who are not learning are being passed along. That is what is happening in many elementary schools. [...] You are only making that person coexist, but not contributing to their becoming independent in the future. You include in the sense that they are developing, but you exclude in the sense of knowledge. [...] In higher education, you cannot close your eyes to the objectives the student must achieve by the end of the semester. They must develop skills and competences by the end of the program [...].

Manager C, from the Federal Public University, highlights the legal imperative of inclusion as the driving force behind the creation of institutional policies, stating:

> [...] I think that if we did not have this federal-level pressure, the institution on its own would not manage. It would be just another thing left aside, forgotten. The macro legislation comes with force, it imposes. [...] The Ministry of Education requires two semester reports on what has been done.

This statement demonstrates the perception that institutional action regarding inclusion and accessibility is conditioned by the pressure exerted by the *legal apparatus* and the mechanisms of federal regulation and supervision. By declaring that "if we did not have this federal-level pressure, the institution on its own would not manage," the manager expresses a central element of public education policies: the ongoing tension between legislation and its concrete implementation in the daily life of higher education institutions.

> How can we manage such a diversity of demands in a university spread across six campuses? It is one thing to provide this in only one place. We have seven sign language interpreters and we know we do not meet the demand. And investments? Because we will be held accountable for that. But we are not the ones who determine the amount of resources transferred to the university for investment. (Manager A2)

Financial management emerges as one of the greatest obstacles to implementing inclusion policies. Managers mention the lack of specific financial resources for accessibility, particularly within community universities. Demands include investments in human resources, assistive technologies, and architectural adaptations, often costly and without targeted funding. These universities have no owners and are non-profit; their resources come mainly from student tuition fees and, when from public funding, are returned to students in the form of scholarships. Manager B, representing a Community University, explains this pressure:

> I can stress that it is a management decision to prioritize this, because for community institutions resources are scarce, the blanket is short. So, inclusion also has this side, which is often not adequately addressed, but making inclusion happen is something very expensive. In many cases, it is not just a matter of decision or attitudes. Although attitudes are the hardest aspect to change, because it is easier to build a ramp or install an elevator than to change the way people perceive the possibilities of a student with disabilities.

This manager expressed the institutional commitment to inclusion, directing resources as a priority toward accessibility, a decision that requires confrontation and the sensitization of the academic community.

In terms of *personnel management*, continuing education for faculty and staff is seen as essential to guarantee inclusive practices, although participation is not always satisfactory. Accountability also emerges as a key issue, reflecting the multiple demands placed on university management by various social actors, including faculty, students, government, and partner organizations. The recurring statement "the need to cope" reflects a perceived obligation to meet inclusive demands despite institutional limitations.

The excerpts presented here are representative of the institutions studied. The managers' narratives reveal dynamic and varied challenges, marked by a tension between achievements and resistances. In contemporary educational contexts, the notion of in/exclusion exposes the limits and discontinuities of inclusion processes, since in some situations, student insertion occurs in contexts that perpetuate exclusion.

This complexity demonstrates that inclusion is not a linear process but a field of tensions where inclusion policies and practices face structural and cultural barriers that shape the academic trajectories of students with disabilities. Nevertheless, access to university and to

professional careers derived from higher education also highlights ableism, which for a long time closed doors to people with disabilities, often generalized as incapable. For Mello (2014, p. 54), ableism is manifested through "prejudiced attitudes that hierarchize subjects according to the adequacy of their bodies to an ideal of beauty and functional capacity. Based on ableism, people with disabilities are discriminated against."

Thus, understanding the presence of students with disabilities in higher education and the practices of managers in guaranteeing their rights and demands requires recognizing the multiplicity of events that constitute the inclusion process, beyond statistical numbers, given the ongoing need to acknowledge difference as a way of being in the world. Costa and Pieczkowski (2020, p. 17) argue that the presence of students with disabilities in universities provokes reflections on "how to think and enact Higher Education, since even if students are categorized (hearing impairment, physical disability, intellectual disability, visual impairment, multiple disabilities, etc.), each one is unique and has particular demands." In other words, this challenges the naturalized idea of standardized students, curricula, times, and spaces.

Inclusion, therefore, is a multifaceted process, whose responsibility is shared by different social spheres, limiting the possibility of quick or simplistic solutions within university management. In this context, academic community representations of disability play both a social and political role: when based on generalizing views, they may reinforce practices of ableism, benevolence, welfarism, or even exclusion; while in the dynamic of recognizing difference, they may foster practices of solidarity, political engagement, and rights advocacy. This tension reveals that the movement toward inclusion is shaped not only by legal and political frameworks but also by the ability of universities and their managers to question their own practices and collectively build more equitable and transformative institutional cultures.

Conclusion

The study highlights the complexity underlying university management, involving administrative, economic, structural, and cultural issues. By analyzing the inclusion of students with disabilities in higher education through a Foucauldian lens, the study reveals processes of subjectivation and power relations that permeate management practices. These practices are marked by the effort to meet legal requirements and by the ethical commitment to inclusive education, yet they are also characterized by subtle exclusions that expose the limitations of institutional policies which, while broadening access, do not always guarantee conditions for persistence and academic success. Within the logic of education as a commodity, inclusion is transformed into a managerial objective, regulated by metrics and indicators of academic productivity, while overlooking the singularities and specific needs of students with disabilities.

Inclusion policies guide managers into conducting strategies for managing people with disabilities, who for a long historical period remained at the margins of higher education and are now inserted in this context—both by the imperative of the right to education and by strategies of security and risk minimization.

The study makes it evident that regulations establish general guidelines, but managerial actions are directed by the specific contexts in which they operate. Their choices are influenced by personal experiences, the groups and networks to which they belong, and their

capacity to confront and make decisions in light of the demands and challenges of their institutional environments.

Thus, inclusion policies take on distinct contours in each context, reflecting institutional specificities and the subjectivities involved in the process of university management. University management for inclusion is marked by the organization of priorities and modes of action that guide decisions and allocate responsibilities within an agenda traversed by multiple challenges, while cultural and institutional resistances persist.

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

This manuscript made use of ChatGPT (OpenAI) exclusively to support the translation of the text from Portuguese into English. The use of AI was limited to language translation.

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Contact emails: joana@unochapeco.edu.br
taniazp@unochapeco.edu.br

AI-Driven Framework for Academic Program Evaluation and Accreditation Standards

Yasser E. Ibrahim Mansour, Prince Sultan University, Saudi Arabia
Ahmed Ibrahim, Prince Sultan University, Saudi Arabia

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Abstract

Academic accreditation plays a vital role in ensuring that educational programs meet high standards of quality, foster trust among stakeholders, and enhance institutional credibility. This research leverages artificial intelligence (AI) to develop a comprehensive framework for academic program evaluation and assessment to meet the accreditation standards and to provide data-driven recommendations for continuous quality improvement. To evaluate various aspects of an academic program, five key standards are considered: program management and quality assurance, teaching and learning, students, faculty, and learning resources, facilities, and equipment. Each standard is assessed using specific criteria and a clear rubric to categorize practices effectively. Following the evaluation, strength and weakness areas of the program are depicted and tailored recommendations are provided to enhance the quality of each standard based on program scores with emphasizing relevant key performance indicators (KPIs) for consideration to monitor progress within each standard. Finally, action plans on different levels are proposed to guide the leaders of the program and help them fulfill the set goals and be better prepared for the accreditation. This AI-driven framework facilitates the creation of a detailed report on the program's accreditation assessment, which can be utilized by the program leaders for self-assessment or by external evaluators to identify areas for improvement.

Keywords: artificial intelligence, accreditation, quality assurance, assessment, key performance indicators

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Introduction

Academic accreditation of an academic program plays an important role in the assessment of this program against several well-defined standards to ensure its high quality and to provide suggestions and recommendations for the continuous improvement of different aspects of the program.

The accreditation process typically involves several key steps. First, it begins with defining clear standards and criteria for evaluation. Next, institutions conduct thorough self-assessments with input from experts and practitioners to evaluate compliance with these standards. This leads to identifying strengths and areas needing improvement. Subsequently, actionable plans are developed to achieve the desired performance, utilizing specific indicators to guide progress. Finally, regular reviews are implemented to ensure that high standards are maintained within a framework of continuous improvement. This structured approach fosters accountability and encourages ongoing enhancement of educational quality. Stakeholders in the accreditation process include universities, government bodies, employers, students, and professional institutions. Quality assurance processes can occur at various levels, including internal (department or university), external (professional bodies), national (national agencies), and regional or international (international agencies) (Gray et al., 2009; WASC, 2023). In engineering education, accreditation serves as a vital quality assurance tool that promotes international mutual recognition of both academic credentials and professional experience, while also facilitating national quality assurance systems (Dodridge, 2002; Eaton, 2010). It enhances classroom and laboratory facilities by developing quality educational programs and raises institutional prestige and academic standards globally (Patil & Codner, 2007). Despite these clear objectives, significant variations exist in accreditation practices across different countries. Notable accreditation authorities for engineering education include ABET (USA), ABEEK (South Korea), JABEE (Japan), CTI (France), ASIIN (Germany), CEEAA (China), CEAB (Canada), AEAC (Australia), ECUK (England), NCAAA (KSA), and AEER (Russia). Each of these organizations applies different standards and procedures for accreditation.

In most cases, the accreditation process is rigorous and tedious, and goes through a strict, thorough, and accurate approach, and involves a lot of repetitive work. This encouraged researchers to investigate the possibility of creating a tool to automate the process and provide an overview of an academic program, considering the different standards of a specific accreditation body for self-assessment or as an external evaluator. In this regard, a tool was proposed considering the standards of NCAAA by Mansour et al. (2022).

Artificial intelligence (AI) is beginning to transform the conception, design, and management of engineering systems, enhancing the likelihood of achieving project goals. Engineering educators should make students aware of AI's potential, teach fundamental concepts, and guide them in applying these technologies to real projects as essential components of modern curricula. Moreover, “AI-aided engineering education” focuses on using AI to enhance the teaching-learning process in higher education, particularly in scientific and technological fields. Considering the accreditation of engineering academic programs and according to Steele (2018), AI could enhance the quality and quantity of reviews. By training AI with data, evidence, and past reviewer decisions, it could evolve alongside peer reviewers, comparing recommendations for final adjustments. Ultimately, AI could provide consistent identification of key improvement areas and misalignments with standards.

AI can automate administrative tasks, such as analyzing learning guides and ensuring compliance with admission rules. With suitable interfaces and centralized data, accreditation reports could be generated automatically. For this to succeed, universities must commit to digitizing their processes, like trends in Industry 4.0. This automation would provide quality managers with real-time information on accreditation compliance, allowing them to focus on problem-solving rather than identification. Moreover, AI can be utilized efficiently in several aspects of engineering education such as personalizing education and enhancing learning, sustaining teaching-learning activities, supporting educational and curricular planning, and accreditation processes (Nuñez & Lantada, 2020).

Sun and Yao investigated the application of the AI tools in the preparation for the ABET accreditation in different stages including the preparation for the documents, providing suggestions for improvement, generating action plans to achieve the set goals and address identified shortcomings to enhance the program, and proposing training plans for specific ABET criteria (Sun & Yao, 2023). It was concluded that the AI tools can significantly enhance the quality of the preparation for the ABET accreditation.

This paper presents an AI tool designed to evaluate various aspects of an academic program, including program management, quality assurance practices and levels, the teaching and learning process, student experience, faculty quality, and the adequacy of learning resources, facilities, and equipment. By utilizing this tool, programs can identify areas for improvement to better align with accreditation standards. The tool is developed in accordance with the accrediting standards established by the National Commission for Academic Accreditation and Assessment (NCAAA) in Saudi Arabia. It offers robust recommendations and effective key performance indicators (KPIs) that can be implemented to enhance compliance and meet the expectations of various stakeholders involved in the program.

Methodology

In this study, an AI assessment tool was developed to assess the readiness of an academic program to undergo academic program accreditation. The tool was designed considering the standards and sub-standards of the NCAAA that evaluate and assess the various aspects of the program. These standards are 1: Program management and quality assurance, 2: Teaching and Learning, 3: Students, 4: Faculty, and 5: Learning resources, facilities, and equipment. Although the tool is designed specifically for the NCAAA, it can be easily adjusted to evaluate academic programs based on different accreditation bodies, which could be implemented as a future enhancement.

This AI assessment tool integrates OpenAI's existing reliable model with domain expertise to generate a comprehensive evaluation and recommendation report. All NCAAA questions were added to a static file, and the tool presents those questions to the user to provide responses ranging from 1 to 4. The tool was prompted and tested intensively to generate satisfying results that successfully resemble a report generated by an accreditation professional. The reason behind utilizing OpenAI's model is that it was trained on a huge amount of accreditation literature, and using its complex architecture, it can capture deep underlying patterns between different ratings provided by the user. Therefore, the tool is able to generate an action plan that prioritizes addressing the crucial weaknesses and implementing feasible actions. To overcome any vague or generic recommendations, the tool was explicitly prompted to generate detailed and actionable recommendations in the action plan. This ensures that the academic programs receive meaningful feedback and valuable

insights. Overall, the model is able to create a workflow that streamlines the academic program evaluation process, allowing professionals to attain a comprehensive evaluation for their academic programs without consuming time or resources.

The tool starts with collecting general information such as the name of the institution and the academic program, the year of establishment, the tracks, the number of graduates, number of current enrolled students, and the year of the first batch of graduates. These questions are solely for generating a structured report, but they do not affect the program evaluation. After these general questions, the user is asked 51 specific questions, split between the different standards and sub-standards. For every question, the user is requested to evaluate the performance of the program through a well-defined rubric for four categories: 1: Non-Compliant, 2: Minimal Compliance, 3: Substantial Compliance, and 4: Full Compliance. While it may seem like a considerable burden, the process is streamlined by using a straightforward 4-point scale ranging from Non-Compliant to Full Compliance. This approach minimizes the time required for responses, allowing users to efficiently assess their compliance.

Moreover, because the assessment is designed for experts and practitioners familiar with the program, they can quickly provide informed responses. This ensures that the self-assessment not only captures the necessary information but also aligns closely with the accreditation review requirements. Ultimately, the structured format facilitates a comprehensive yet efficient evaluation process, enhancing the quality of the self-assessment while reducing the overall burden on users.

Table 1
Compliance Categories

Compliance Category	Characteristics
Non-Compliant (Score: 1) The program does not meet essential requirements	Significant deficiencies are present, leading to a failure to meet basic criteria. No evidence of policies or practices in place to support compliance. Lack of engagement with relevant stakeholders or failure to address their needs. Serious issues that could impact the quality of the program significantly.
Minimal Compliance (Score: 2) The program meets some basic requirements but has notable areas needing improvement.	Some elements are in place, but many are inadequate or outdated. Inconsistent application of policies and practices related to compliance. Limited feedback collection from stakeholders, with few actions taken based on feedback. Basic support mechanisms are available but are underutilized or poorly communicated.
Substantial Compliance (Score: 3) The program meets most standards and shows a commitment to continuous improvement.	Adequate resources and practices are generally effective, with minor gaps. Policies are mostly applied consistently and support compliance. Regular collection and analysis of stakeholder feedback, with some improvements made. Support mechanisms are accessible and used by a majority of relevant parties.
Full Compliance (Score: 4) The program fully meets all standards and demonstrates excellence in practices and outcomes.	Comprehensive availability of high-quality resources and practices. Well-defined policies that are effectively implemented to support compliance. Proactive engagement with stakeholders, with consistent actions taken based on feedback. Robust support mechanisms that are widely utilized and lead to positive outcomes.

Once the user responds to all the questions, the user's responses are sent to an existing AI model, OpenAI GPT-4. OpenAI's reliable AI model is used for analyzing the user's responses. The model is prompted to generate a structured report by analyzing the responses. The report begins with a summary of the general information about the program that the user provided. Following is an overview of the main strengths, weaknesses, and recommendations for the program as suggested by the AI model. The report also includes a more detailed analysis of the strengths, weaknesses, recommendations, and relevant KPIs Finally, the report concludes with a comprehensive action plan, which can be followed to enhance the program. The action plan has tangible suggestions to follow along with the timeline for implementing them and the priority of each suggestion. The report is displayed to the user on the website and is also available as a PDF for the user to download. The tool has been developed and is currently in the pre-launch phase, with public deployment forthcoming.

AI-Tool Standards

Program Management and Quality Assurance

In this standard, the program is assessed to ensure that it has effective leadership to apply institutional systems, policies, and regulations. Good practice here is to have a program management that plans, implements, monitors, and activates quality assurance systems to ensure continuous improvement in all aspects. Also, a supportive organizational climate is to be ensured through applying a framework of integrity, transparency, and fairness practices. This standard consists of the following sub-standards: Program Management and Program Quality Assurance.

Program Management. This substandard is responsible for assessing the alignment and consistency of the program's mission with that of the institution and is effectively utilized to guide all of its operations. An ample number of qualified staff is needed to run the administrative tasks in an effective way and to ensure the achievement of the program goals in a supportive and encouraging environment. Concepts of the integrity, fairness, and equality are assessed and ensured its application in all the aspects of the program. Different opinions of experts and stakeholders should be considered for the improvement of the program. A credible program should ensure the activation of the values of the scientific integrity, intellectual property rights, rules of ethical practices, and proper conduct in all academic, research, administrative, and service fields and activities. All the program information should be publicly disclosed to the community through reliable sources such as websites, handbooks and other official materials.

Program Quality Assurance. The program is assessed on the implementation of an effective quality assurance and management system consistent with the institutional regulations and policies. The set of KPIs utilized in monitoring the program and the decision making is evaluated. The program is supposed to use this system and the set of the KPIs to perform periodic revision of all aspects of the program for the sake of the continuous improvement.

Teaching and Learning

In this standard, the learning outcomes of the program are evaluated in terms of its definition and consistency with the program mission and the job market. Effective teaching and learning strategies and assessment methods should be appropriate to the selected learning outcomes.

The achieving of the courses' learning outcomes and the program learning outcomes is examined in this standard and a robust quality assurance system should be there for the continuous improvement of the achievements of these learning outcomes.

Learning Outcomes. In this substandard, the learning outcomes of the program are investigated to examine their alignment and consistency with the program's mission and its graduate attributes and their suitability to the job market that is continuously checked. The achievement of the intended learning outcomes is supposed to be assessed through well-defined robust strategies, tools, and rubrics.

Curriculum. The achievement of program goals and learning outcomes should be considered in the curriculum design of the program. All important aspects should be considered in curriculum design including the educational, scientific, technical, and professional advancements in the field of specialization. This curriculum must be periodically reviewed and updated to consider the updated job market, emerging technologies in the field, and feedback of different stakeholders.

Quality of Teaching and Students' Assessment. The section is utilized in assessing the performance of the program in terms of its teaching and learning strategies and assessment methods that are practiced achieving the intended learning outcomes of the program. The faculty members of the program should be capable and knowledgeable about the assessment methods of the learning outcomes. Educational experience should be enriched through the use of modern techniques, collaborative tools, and interactive learning platforms.

Students

This standard evaluates the admission criteria for program students. The number of enrolled students should align with the planned number considering the available facilities and resources, including classrooms, labs, and teaching staff. Essential information about the study plan, graduation requirements, services, and tuition fees should be publicly disclosed on the program website and brochures. There should be a clear and fair announced criteria for the transfer students admitted to the program. The program should provide orientation programs for its new enrolled students to help them well adapt. Academic guidance and support should be available at all levels. Extracurricular activities should be offered to develop skills and showcase talents. The program should monitor student progress to ensure timely graduation and provide support for students with special needs. Student representation in councils and committees is encouraged, alongside maintaining good communication with alumni.

Faculty

The performance of the program's faculty members and their periodic evaluation are assessed in this standard. An ample number of faculty members with relevant sound background is crucial to offer any academic program. A clear policy and practice should be followed in hiring qualified faculty members in the program to fulfill the program's mission and its goals. A well-designed orientation program should be provided to the new recruited faculty. All program's faculty members are supposed to have continuous professional development plans and activities to fulfill their intended performance in all aspects of teaching, research, and administrative duties.

Learning Resources, Facilities, and Equipment

The program must provide an effective learning environment with adequate classrooms and technological resources. Laboratories and equipment should support research and meet program goals. Faculty and staff should receive training on these resources, and there should be plans for regular updates. Safety guidelines for labs must be established, including emergency contact information. The library should offer a sufficient variety of accessible resources tailored to student needs. Faculty and students should be involved in assessing these resources. A sample assessment tool is provided to evaluate the quality of this standard.

Results

The tool generates a report based on the responses given by the user. The generated report includes a summary of the general information about the institution provided by the user followed by an analysis of the strengths, weaknesses, recommendations, and relevant KPIs for every standard in the academic program. Then, the report includes a comprehensive action plan that considers all the strengths and weaknesses of the academic program. To evaluate the outcomes of the standard analysis, a set of responses was created for the 51 questions based on a hypothetical program. This example was prepared solely for testing purposes and does not represent a real program. The responses were made considering different compliance categories for the various standards to examine the areas of strength, the proposed recommendations and its relevance to the areas that are in need for improvement, proposed KPIs to be tracked to ensure improvement over a specific period, and finally the short- and long-term action plans for each standard. Table 2 shows a sample output for the report's analysis for standard 3: Students. To test the action plan generation and ensure that the action steps are not vague or generic, a different set of inputs were given to the tool to generate an action plan as shown in table 3. Note that the two tables are not linked; They represent outputs for two separate inputs.

Table 2

Outputs of the AI Tool (Standard 3: Students as an Example)

Strength	Weakness	Recommendations	Key Performance Indicators (KPI)
Comprehensive information provided to students about study requirements and services	Inadequate criteria for admission, registration, and graduation Insufficient guidance and counselling services Limited engagement with alumni Poor evaluation of student services	Develop and implement comprehensive criteria for student processes Enhance guidance and counselling services Improve mechanisms for alumni engagement Evaluate and enhance student services quality	Average of student satisfaction rate with the program services (Target: 90%) Student satisfaction with academic supervision/ counselling (Target: 85%) Percentage of new students in orientation activities (Target: 100%) Student Retention rate (Target: 95%) Percentage of students receiving awards/honours (Target: 15%)

Table 3
Generated Action Plan

Weakness	Action Step	Responsible Party	Timeline	Success Indicator
Limited stakeholder involvement	Conduct semi-annual stakeholder meetings	Program Director	Year 1 Quarter 1	4 meetings held per year
Inconsistent stakeholder feedback	Implement annual surveys for all stakeholders	Quality Assurance Team	Year 1 Quarter 2	90% stakeholder satisfaction rate
Courses with low satisfaction rates	Curriculum review and revision	Curriculum Committee	Year 1 Quarter 3	85% course satisfaction rate
High student-to-faculty ratio	Initiate faculty recruitment campaign	Human Resources	Year 1 Quarter 4	Student-to-faculty ratio of 15:1
Low faculty retention rate	Develop and launch a faculty retention program	Faculty Affairs Office	Year 2 Quarter 1	Faculty retention rate of 90%

Discussion and Conclusions

Seeking high-quality education is considered a main objective for each academic program. As a result, there is a worldwide trend of seeking national and international accreditation for different academic programs to ensure obtaining the high-quality education that enables students get the best education that helps them secure better job opportunities upon graduation. This paper presents a generic assessment tool that can be used in self-assessing or reviewing the readiness of any academic program to seek academic program accreditation. The tool is developed based on the accrediting standards developed by the National Commission for Academic Accreditation and Assessment (NCAAA) in Saudi Arabia. Based on the score received by each program through answering relevant questions about the practice and statistics, the tool provides recommendations and possible KPIs that can be adopted in order to enhance the quality of the program and make the accreditation process easier and more successful. This generic assessment tool will be available to be used through a platform that can be accessed for interested program leaders and accreditation evaluators. Results will be investigated and analyzed to plan and conduct continuous tool improvement.

This AI tool can significantly help assess the readiness of an academic program for the accreditation and spot the strength and weakness points in different aspects of the program. Also, it is a powerful tool to provide recommendations for weak areas and design action plans to overcome the shortcomings of the program to seek continuous improvement considering several proposed KPIs.

It is worth mentioning that several factors are needed to enhance and integrate the outcomes and findings of this AI tool including qualitative feedback from stakeholders, contextual factors representing the specific circumstances, conditions, and environment in which the academic program operates, and deep analysis from experts to ensure the attainment of the educational objectives and the students learning outcomes. Moreover, ensuring data security is crucial as some of the program information might be confidential.

There is a need to examine the relevance and accuracy of this proposed AI tool by assessing several academic programs to ensure the robustness and efficiency of the tool.

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Contact email: ymansour@psu.edu.sa

Reimagining Design Education: Integrating Generative AI Through the Bloom's Taxonomy for Cognitive Growth in Fashion and Interior Design

Jeannine Vail, University of North Texas, United States
Chanjuan Chen, University of North Texas, United States

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Abstract

As generative artificial intelligence (GAI) technology continues to transform the design industry, traditional design processes are being reshaped by the integration of digital tools, leading to new opportunities for creativity, efficiency, and accessibility. Educators are recognizing the urgent need to integrate GAI into the design curriculum to better prepare students for this rapidly evolving industry. This research examines a pedagogical model structured around the Revised Bloom's Taxonomy (2001) framework to support fashion and interior design students in their cognitive progression when applying generative AI. The model aligns educational activities with corresponding assessment methods. A multidisciplinary educational approach was developed in a university in the United States, beginning with an industry expert-led workshop fostering knowledge and understanding of GAI platforms among students and faculty. A design project followed, providing a staged learning experience for students to create discipline-specific design outcomes. Pre- and post-surveys, along with focus group discussions, revealed gaps in learning and highlighted the need to scaffold educational activities and objectives. The findings indicate that students require greater emphasis on foundational knowledge in GAI programs to successfully integrate it into their design process. Building on the Revised Bloom's framework, the study offers potential instructional strategies for integrating GAI into design pedagogy, enabling graduates to transfer these skills to professional practice.

Keywords: Revised Bloom's Taxonomy, generative artificial intelligence, design pedagogy, interior design, fashion design

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Introduction

The rapid rise of generative AI has sparked significant changes in how we approach teaching and learning in creative fields such as fashion and interior design (Almaz et al., 2024). Design education is often recognized as its own academic field with its unique methods, practices, and ideology (Cross, 1982). Although design disciplines may differ in focus, the essence of design lies in creating new solutions within specific contexts, a process that differs from the approaches used in science (Gregory, 1966). Both undergraduate curricula are typically structured around core studio courses and delivered progressively across academic levels (Bye, 2010). With an emphasis on a design studio over a classroom, it is described as the "heart" of the educational process (Schön, 1984), creating an environment where students engage in experiential learning through iterative design work, guided by mentor critique. The need to integrate GAI into design pedagogy becomes urgent as AI becomes part of everyday life, much like the Internet is today. Its impact will fundamentally change how businesses interact with their users (Haenlein & Kaplan, 2019), making it critical for students to gain these skills and transfer them post-graduation.

The purpose of this study is to examine a pedagogical approach to incorporate new GAI technologies into the student design process using the revised framework of Bloom's Taxonomy from 2001. Bloom's method guided the approach to facilitate design students' progression from basic foundational thinking skills to advanced cognitive development to create unique design outcomes. At the same time, this approach maintains consistency by aligning educators' teaching tasks with their evaluation methods. Applying this framework, the study outlines the progression of GAI learning activities with corresponding measurable objectives. The findings reveal gaps in knowledge and skill development and offer effective instructional strategies in the use of GAI in design pedagogy, with an objective to better prepare graduates for the transition into industry practice with this valuable skill set. The research aims to explore two questions: (1) Does the use of GAI in the student's design process contribute to the development of higher-level learning according to the Revised Bloom's Taxonomy? and (2) How can teaching activities and assessments be aligned to strengthen this model?

Literature Review

AI in Fashion and Interior Design Education

The integration of artificial intelligence (AI) technologies into creative industries has advanced rapidly in recent years, profoundly impacting the design fields (Nugroho et al., 2025). This progress has been driven by developments in areas such as machine learning, pattern recognition, algorithms, natural language processing, and the enhancement of supporting hardware (Mahendarto, 2025). Rather than crafting complete solutions, human roles in AI-powered industries are evolving to identify creative challenges, define the direction of innovation, and build the data and technological frameworks that enable AI systems to generate and refine design solutions in real time (Verganti et al., 2020).

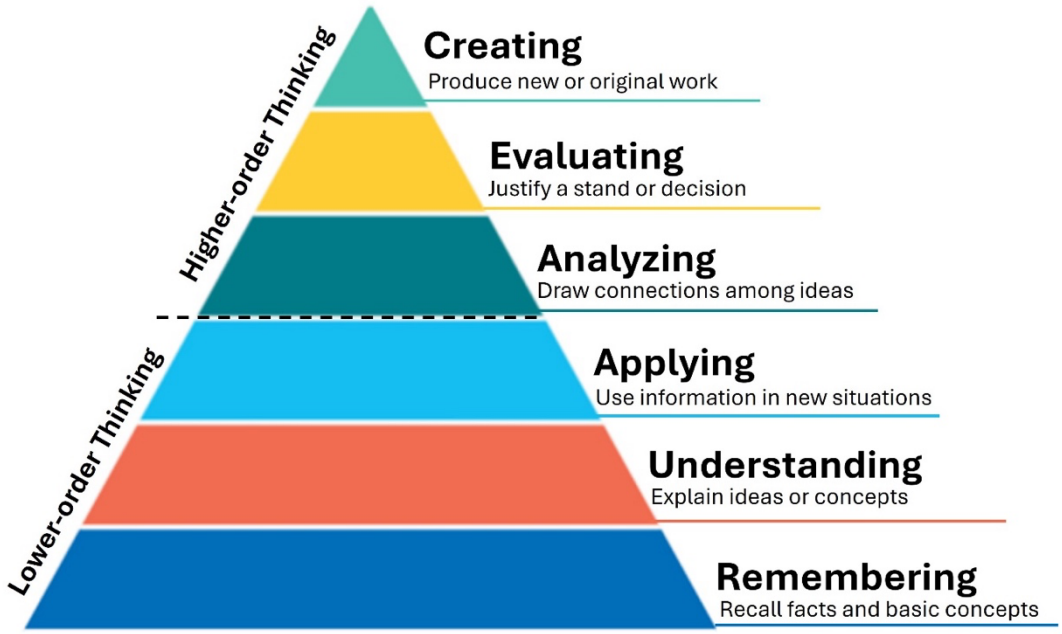
As artificial intelligence enters the design studio, it has the potential to enhance efficiency using generative algorithms, thus offering a supporting role to designers through their decision-making processes (Almaz et al., 2024). These technological shifts necessitate a reevaluation of pedagogy. One study revealed that students are open to the emerging impact of AI and concerned that, without proper guidance through education, they could not contribute to harnessing AI's potential in design (Cao et al., 2023). Another study found it important to

incorporate AI into fashion and interior design, as well as closely related design studies such as architecture, since design's intricate and multifaceted nature makes it a prime area for experimentation with AI applications (Ceylan, 2021). Several authors offer recommendations for incorporating AI technology into the curriculum. A combined approach of traditional design education alongside AI technologies integrated into practical, entrepreneurial activities will enhance students' confidence in performance (Jung & Suh, 2024) and create a more engaging learning environment (Li & Xie, 2022).

The Evolution of Bloom's Taxonomy

To establish the theoretical foundation for this research, the evolution of Bloom's Taxonomy was examined. First developed in 1956, Bloom's Taxonomy provided a framework for classifying and measuring educational objectives by levels of complexity within the cognitive, affective, and psychomotor domains. The cognitive domain was organized into six levels: knowledge, comprehension, application, analysis, synthesis, and evaluation. This enabled a gradual progression of students' learning from basic recall of knowledge to the development of intellectual abilities and skills, encouraging complex levels of thinking rather than sole memorization (Bloom et al., 1956). A revision in 2001 by Anderson and Krathwohl, as shown in Figure 1, incorporates advancements in the cognitive process dimension, supporting the use of verbs within each category: remembering, understanding, applying, analyzing, evaluating and creating, over the original corresponding nouns: knowledge, comprehension, application, analysis, synthesis and evaluation. The revision also created a hierarchical progression with less rigidity, allowing flexibility for movement between the stages. Their Taxonomy Table provides educators with opportunities to regularly review curriculum and teaching methods when they have realized missed learning goals (Krathwohl, 2002). Revisited by Churches in 2008, this modification addressed the need for a technologically enhanced approach and mapped specific digital tools and activities associated with new action verbs such as googling, discovering and linking.

Figure 1
Anderson et al.'s (2001) Revision of Bloom's Taxonomy



Revised Bloom's Taxonomy in Design Education and AI Education

Recent studies have linked both design and AI education to the Revised Bloom's Taxonomy, showing positive development of higher-order thinking skills for some participants but raising concerns for others. A study by Valsson (2022) found that Bloom's Taxonomy levels connected closely with the different stages of the design process undertaken by architecture students. The effective use of hierarchical progression helped students meet the learning objectives of their studio classes. Another study found that AI systems assisted with overcoming the challenges defined in Bloom's framework. When the AI tools were integrated into learning, they enhanced the personal educational experience and promoted interaction, stimulating cognitive processes that deepen the students' understanding and retention (Nehru et al., 2025). Further research revealed a complex picture of how AI affected the cognitive development of language learners. From a positive perspective, the participants found AI applications that guided them through the higher-order thinking stages of the Taxonomy, allowing the students to operate at more sophisticated cognitive levels. However, the study also found that participants expressed concern about their dependence on AI technology, fearing that it would weaken their independent abilities, particularly in the same critical stages of analysis and evaluation (Derakhshan & Taghizadeh, 2025). The literature review highlights the importance of closely aligning educational design activities with the hierarchical framework of Revised Bloom's Taxonomy and exercising caution when integrating AI technologies.

Methodology

Research Design

Using the Revised Bloom's Taxonomy model, this case study explores whether GAI contributes to the student's development of high-level learning and identifies how pedagogy can strengthen this model. The study involved sophomore and junior students across interior and fashion design disciplines at a public university in the United States. Participants were recruited using an approved Institutional Review Board (IRB) purposive sampling method via email invitation, and all students provided informed consent before joining the study.

The case study collected data through three sources: focus group discussions, pre- and post-survey questionnaires. Focus group discussion is a widely used qualitative approach designed to discover an in-depth understanding of social matters by collecting data from a group of purposefully selected individuals (O. Nyumba et al., 2018). The focus group was chosen as a post-project qualitative method to capture students' reflective experiences, group dynamics, and shared insights after completing their AI design projects. Therefore, the focus group discussions in this study aimed to discover the rich experiences of working with GAI Project activities to inform the research questions.

A total of six focus group sessions were conducted with 15 fashion and 16 interior design student participants, each group consisting of five to six members. Each focus group discussion was scheduled for one hour. The researchers conducted cross-interviews, allowing participants to express their thoughts freely. A meeting room in the university where the study was conducted was arranged for the focus groups. The researchers used a set of questions to guide the discussions. The data collection methods during the focus group discussions included audio recording and note-taking. The transcripts were then manually coded and analyzed for further data analysis.

The pre- and post-survey questionnaires were designed to complement the focus group discussions. The data from the pre-survey provides demographic information and a general understanding of participants' skill levels and prior GAI experience. The collected data aided in developing the GAI project design. The post-survey captured student participants' learning experiences from the project, thereby addressing the research question of how teaching activities and assessments can be aligned to strengthen this model.

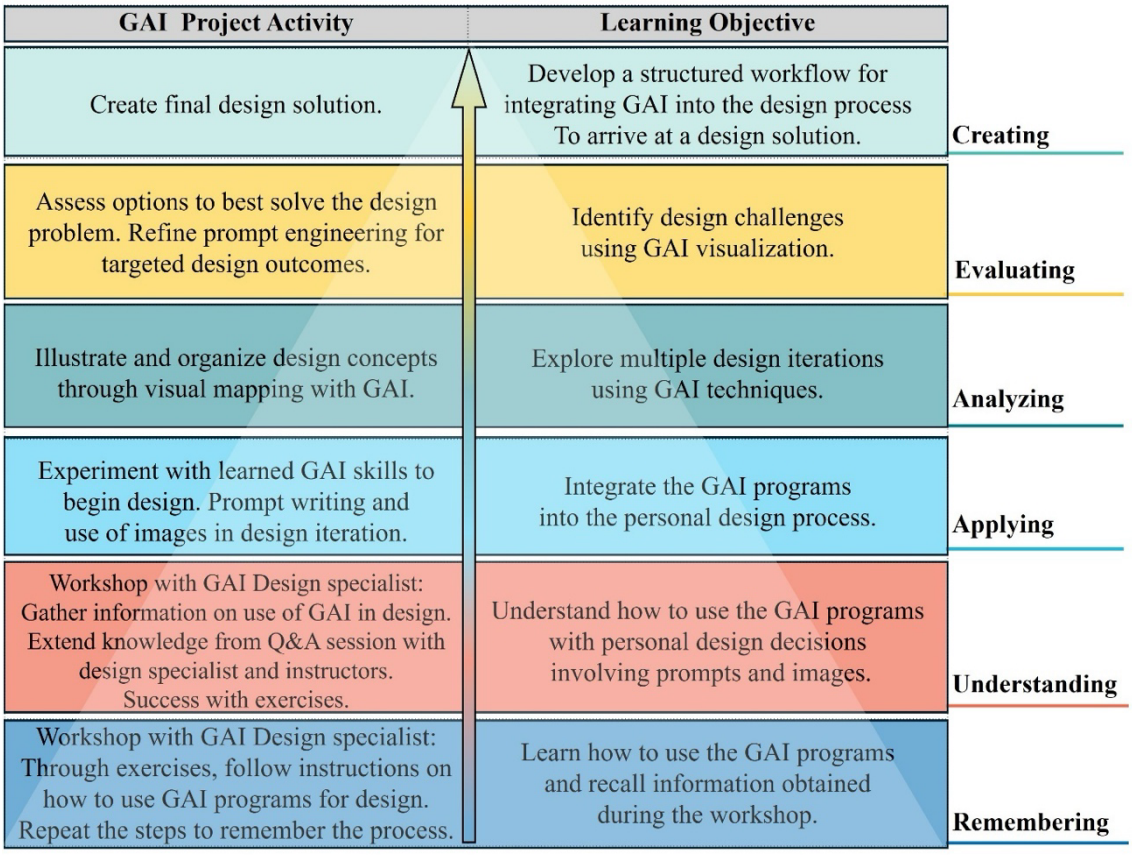
Project Development

The pre-survey questionnaire helped shape the design of the GAI project. This data revealed that all student participants are in their 2nd and 3rd studies, and most students identified with an intermediate overall skill level in their specific design field. When asked about their experience and familiarity with GAI, 91% of students had never used GAI programs, such as Midjourney or Vizcom, in their design work. Understanding that GAI was new to the majority of students, this data was used to develop teaching activities for GAI beginners, including inviting an AI expert to lead tutorials on basic GAI tools and to help students develop their GAI projects.

The study followed a structured learning intervention that aligned the GAI project activities and learning objectives with the Revised Bloom's Taxonomy, as illustrated in Figure 2, beginning with the Remembering stage.

Figure 2

Alignment of GAI Project Activities and Learning Objectives With Revised Bloom's Taxonomy



The project began with a week-long GAI expert-led workshop that introduced students to five GAI programs: ChatGPT, Midjourney, Vizcom, Tripo AI, and Luma Dream Machine. The expert provided real-time exercises for students to learn how to use the GAI programs and recall information obtained throughout the workshop. A portion of the workshop was dedicated to two question-and-answer sessions with the AI expert held outside of the structured class time. Discussions arose about the application and extent of GAI use in the professional industry, as well as the personal design decisions and implications surrounding GAI. These conversations helped the students understand the larger context of GAI and the use of these programs in the design industry. Following the workshop, students applied their new knowledge in discipline-specific projects over a three-week period. Based on a shared theme and location, interior design students created schematic design plans, elevations and material boards for a vacation home, while fashion students designed four-look resort wear collections. Following the progression of Bloom's Taxonomy, project activities and learning objectives transitioned from lower to higher-order thinking skills. Students explored multiple design iterations using GAI techniques to organize and analyze their design outputs. They then had to evaluate their design options and refine their prompts, aiming to improve their outcomes while identifying their challenges using GAI visualization. Finally, by developing their personal workflow of integrating GAI, each student created a new design solution.

Data Analysis

Student narratives from the focus group data were analyzed using a manual coding process. This process documented the use of action verbs from the 2001 Revised Bloom's Taxonomy, and given the technological nature of the GAI project, the verbs from Churches' Digital Taxonomy (2008) were also recorded. As exhibited in Figures 3 and 4, the researchers identified the action verbs, shown highlighted in color, that appeared frequently in the focus group responses. This dual-framework approach enabled the study to capture both traditional cognitive processes and digital-age learning behaviors while tracing students' cognitive progression from initial Generative AI exposure to complex design applications.

Figure 3

Students' Repeated Verbs Highlighted From the Revised Bloom's Taxonomy Action Verbs (Anderson et al., 2001)

1.Remembering	2.Understanding	3.Applying	4.Analyzing	5.Evaluating	6.Creating
Choose	Classify	**Apply**	Analyze	Agree	**Adapt**
Define	Compare	**Build**	Assume	Appraise	**Build**
Find	Contrast	Choose	Categorize	Assess	Change
How	Demonstrate	**Construct**	Classify	Award	Choose
Label	**Explain**	**Develop**	**Compare**	Choose	**Combine**
List	Extend	Experiment with	Conclusion	Compare	Compile
Match	Illustrate	Identify	**Contrast**	Conclude	Compose
Name	Infer	Interview	**Discover**	Criteria	Construct
Omit	**Interpret**	Make use of	Distinguish	Criticize	**Create**
Recall	Outline	**Model**	Divide	**Decide**	Delete
Relate	**Relate**	Organize	Examine	Deduct	**Design**
Select	Rephrase	**Plan**	**Function**	Defend	Develop
Show	**Show**	**Select**	Inference	Determine	Discuss
Spell	Summarize	**Solve**	Inspect	Disprove	**Elaborate**
Tell	Translate	**Utilize**	List	Estimate	Estimate
What			Motive	Evaluate	Formulate
When			Relationships	Explain	Happen
Where			Simplify	Importance	**Imagine**
Which			**Survey**	Influence	Improve
Who			Take part in	Interpret	Invent
Why			**Test for**	Judge	Make up
			Theme	Justify	Maximize
				Mark	Minimize
				Measure	Modify
				Opinion	Original
				Perceive	Originate
				Prioritize	Plan
				Prove	Predict
				Rate	Propose
				Recommend	Solution
				Rule on	Solve
				Select	Suppose
				Support	Test
				Value	Theory

Figure 4

Students' Repeated Verbs Highlighted From Bloom's Digital Taxonomy of Verbs (Churches, 2008)

1.Remembering	2.Understanding	3.Applying	4.Analyzing	5.Evaluating	6.Creating
Bookmarking	Advanced Search	Acting out	Advertising	Arguing	**Adapting**
Bullet pointing	Annotation	Administering	Appraising	Assessing	Animating
Copying	Associating	**Applying**	Attributing	**Checking**	Blogging
Defining	Boolean search	Articulating	Breaking down	Criticizing	**Building**
Describing	Categorizing	Calculating	Calculating	Commenting	**Collaborating**
Duplicating	Classifying	Carrying out	Categorizing	Concluding	Composing
Favouring	Commenting	**Changing**	Classifying	**Considering**	Constructing
Finding	Comparing	Charting	**Comparing**	Convincing	**Designing**
Googling	Contrasting	Choosing	Concluding	Critiquing	Developing
Highlighting	Converting	Collecting	**Contrasting**	Debating	Devising
Identifying	Demonstrating	Completing	Correlating	Defending	Directing
Labelling	**Describing**	Computing	Deconstructing	Detecting	Facilitating
Liking	Differentiating	Constructing	Deducing	Editorializing	Filming
Listening	Discussing	Demonstrating	Differentiating	**Experimenting**	Formulating
Listing	**Discovering**	Determining	Discriminating	Grading	**Integrating**
Locating	Distinguishing	Displaying	Dividing	Hypothesizing	Inventing
Matching	Estimating	Examing	Distinguishing	Judging	Leading
Memorizing	Exemplifying	Executing	Estimating	Justifying	Making
Naming	**Explaining**	Explaining	**Explaining**	Measuring	Managing
Networking	Expressing	**Implementing**	Illustrating	Moderating	Mixing/remixing
Numbering	Extending	Interviewing	Inferring	Monitoring	Modifying
Quoting	Gathering	Judging	**Integrating**	Networking	Negotiating
Recalling	Generalizing	**Editing**	**Linking**	Persuading	Originating
Reading	**Grouping**	Experimenting	Mashing	Posting	Orating
Reciting	Identifying	Hacking	Mind mapping	Predicting	Planning
Recognizing	Indicating	Loading	**Ordering**	Rating	Podcasting
Recording	inferring	Operating	Organizing	Recommending	Producing
Retelling	**Interpreting**	Painting	Outlining	**Reflecting**	Programming
Repeating	Journalling	Playing	**Planning**	Reframing	Publishing
Retrieving	Paraphrasing	Preparing	Pointing out	Reviewing	Roleplaying
Searching	Predicting	Presenting	Prioritzing	Revising	Simulating
Selecting	**Relating**	Running	Questioning	Scoring	Solving
Tabulating	Subscribing	Sharing	**Separating**	Supporting	Structuring
Telling	Summarizing	**Sketching**	**Structuring**	Testing	Video blogging
Visualizing	Tagging	Uploading	Surveying	Validating	Wiki building
	Tweeting	**Using**			Writing

Results

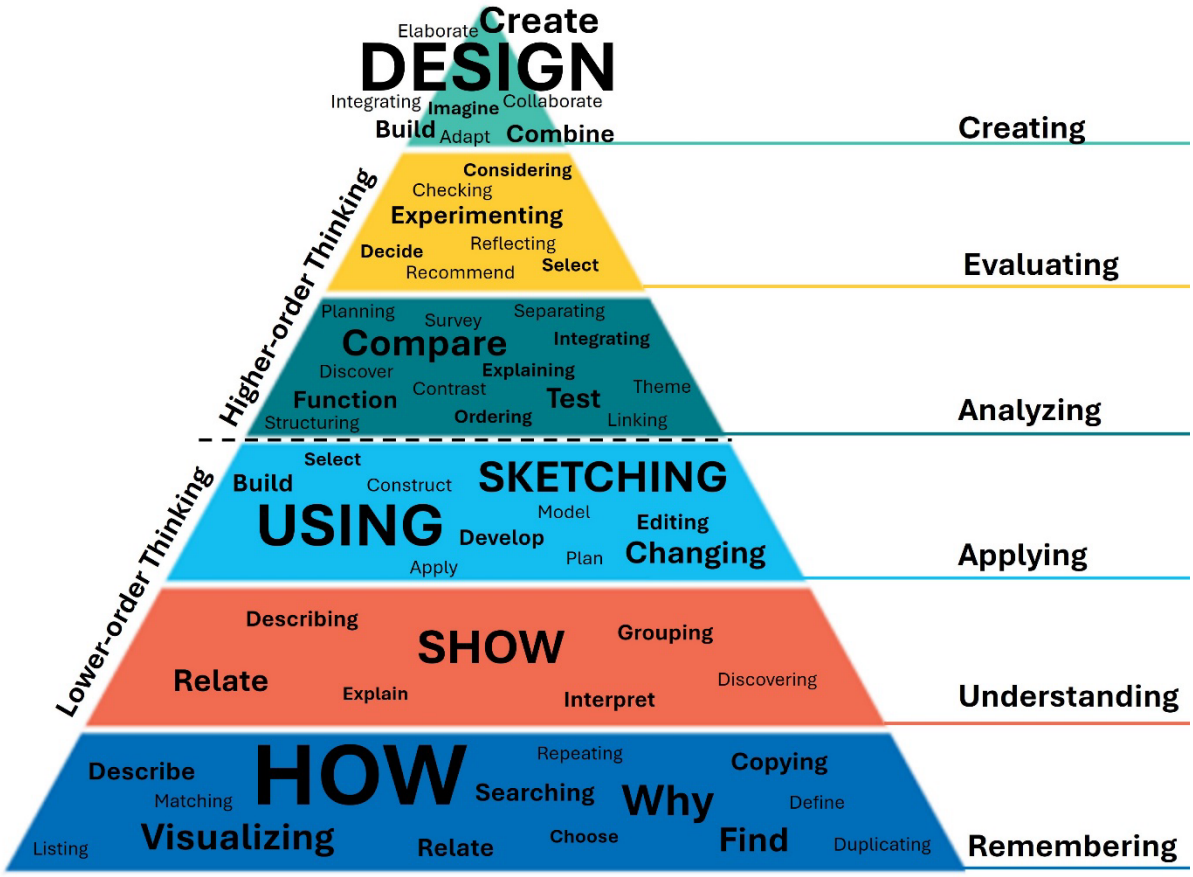
Students' Cognitive Development

The qualitative findings from the focus groups revealed patterns in how students engaged with GAI tools across Bloom's cognitive hierarchy. The frequency and distribution of the action verbs across the different levels provided clear evidence of where students were operating cognitively and revealed gaps between lower-order foundational skills and the higher-order creative thinking they were attempting to achieve using generative AI tools. The visual

representation in Figure 5 maps the action verbs students used during the focus group discussions, with word size directly correlating to frequency of use: the larger the word, the more often it was used by students.

Figure 5

Frequently Used Action Verbs by Students in Correlation With Revised Bloom's Taxonomy



At the foundational Remembering level, where the focus is on retrieving information and basic concepts from memory, the dominant use of the verbs how, why, and visualizing indicated that students were heavily focused on GAI tools discovery and recalling instruction from the expert. As the students progressed to the second stage, Understanding, the cognitive goal is to explain one's ideas and demonstrate comprehension of the learning activity. The verbs show and relate appear prominently, suggesting students were working to grasp GAI capabilities. At this level, it was also noted that the use of these verbs decreased compared to the previous stage. By the Applying level, the task is familiar to the student, and they can implement the known information in new situations. The study showed significant engagement, with an increase in the use of the action verbs, particularly using and sketching, which demonstrated hands-on tool manipulation. As lower-order thinking shifts to higher-order thinking in the Analyzing stage, the study sought evidence of organization and reflection on design iterations developed through GAI techniques, enabling the students to make new connections among their design outputs. Results noted several action verbs spoken, but with less frequent usage. Compare and test emerged most often, reinforcing this stage of analytical cognitive development. To master the Evaluating stage, students must justify their design decisions based on established criteria. This level showed even sparser activity, while the final Creating stage saw a dramatic increase, when students should be producing new designs based on the scaffolding of the developed skills. At this highest order of thinking level, the verb design is prominently used, supported by much

smaller verb use. This pattern visually highlights that students jumped to the Creating tasks without sufficient foundation-building in the lower-order thinking stages.

Student Reflections

Further qualitative findings from direct participant quotes during the focus group discussions illuminate the cognitive journey students experienced with GAI tools throughout the various stages of Bloom's taxonomy. Noted is the progression during the design process: from excitement at the Remembering stage, to frustration during the Applying and Analyzing stages, and then back to excitement in the Evaluating stage.

At the Remembering level, students expressed genuine enthusiasm: "I was excited to see how I can use it to figure out what I want." This initial curiosity continued into Understanding, "where one student noted how AI "helped to show how it actually looked like on a person." However, we observed the emergence of frustration during the critical shift at the Applying and Analyzing level. One student explicitly states: "I stopped using it in my design process because I became frustrated with it." And another, "I can make two images in one hour, far faster compared to fighting with AI." This aligns with the disproportionate word sizes captured in Figure 5 between foundational and advanced levels of thinking, which illustrate the cognitive gaps that led to the frustration observed growing at this stage. This pattern demonstrates that frustration occurs precisely when students attempt to apply GAI tools without sufficient foundational mastery. The quotes from higher stages demonstrate recovery. Students who persisted through the application challenges eventually reached sophisticated levels of evaluation and creation, with one noting AI's efficiency "compared to traditional methods." Another stated, "I was trying to experiment with the floor plan where I wish I'd started with AI, because it's so in my design process right now." And further, "For me, you have to have an open mind when it comes to designing with AI."

Upon completion of the project, post-survey metrics indicate that 42% of students were not satisfied with their Generative AI experience, and 43% did not find AI helpful for generating design ideas. With nearly half of the participants experiencing difficulties with GAI, these numbers reinforce those from the focus group narratives, revealing the challenges during the transition from lower- to higher-order thinking stages outlined in Revised Bloom's Taxonomy.

Discussion

The study reveals critical insights surrounding our initial research question on the role of GAI in design education. It explores how students incorporate these tools compared to traditional methods, highlighting important implications for aligning teaching practices with Revised Bloom's Taxonomy. First, regarding its role in the design process, the data indicates that students bypass certain stages of learning with GAI, which led to frustration with this technology. This bypass that ensued fundamentally misaligns with how learning should occur following Revised Bloom's Taxonomy. Students rushed through the learning process of GAI, advancing too quickly from basic tool recognition to complex creative tasks without building essential foundations in understanding and application. To prevent this, it is essential to recognize that this emerging technology requires extended time in the lower-order foundational stages. Educators should require demonstrated competency before allowing students to advance to a higher cognitive level. To strengthen Bloom's model and address the frustration that emerges, the answer to our second research question suggests a need to build robust support systems into teaching activities, such as peer collaboration and implementing low-

stakes practice projects. For example, implementing simple design challenges that utilize specific GAI functions would allow for skill-building without high-pressure outcomes. The study also demonstrates a gain in confidence when proper pedagogical approaches are followed, validating the potential of integrating GAI into the design process. To leverage these confidence gains, the researchers suggest that educators should celebrate early wins to motivate continued learning and incorporate structured self-reflection throughout the learning process. When comparing GAI to traditional design methods, the study found that GAI requires the same foundational learning investment as any design tool, and when properly scaffolded, students found that it "saved a lot of time compared to traditional methods." The study demonstrates that GAI is not replacing traditional design pedagogy, but rather is used alongside, thus amplifying the importance of systematic educational scaffolding through Revised Bloom's Taxonomy.

Conclusion

This multidisciplinary project yielded positive overall outcomes regarding the integration of GAI into design students' processes and the impact on their higher-level thinking through the framework of Revised Bloom's Taxonomy. The paper highlights gaps in learning and provides potential instructional strategies to fill those gaps. Integrating GAI into this learning structure enables graduates to acquire new skills and transfer them into professional practice, thereby bridging the gap between academic learning and industry application.

Given the study's limitations, including a small sample size, one should exercise caution when generalizing findings to different student populations. Future research should expand the participant pool and data collection methods to include one-on-one interviews. Additionally, future studies would benefit from testing the instructional recommendations, thereby expanding the breadth of knowledge gained through this learning framework in connection with GAI. Despite these limitations, the research provides a foundation for educators seeking to integrate emerging technologies meaningfully into design curricula.

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Contact emails: jeannine.vail@unt.edu
chanjuan.chen@unt.edu

Developing Oral Speech Skills Using Artificial Intelligence in High School Students

Lidia Fabián Acevedo, Instituto Tecnológico y de Estudios Superiores de Monterrey, México
Miriam Joanna Cossío Vallejo, Instituto Tecnológico y de Estudios Superiores de Monterrey, México

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Abstract

The incorporation of artificial intelligence (AI) in education has generated both positive and negative changes. At PrepaTec, between January and May 2025, we conducted a study to examine how AI can positively impact the development of oral skills and foster adaptive and differentiated learning within a safe environment. Fifty-seven 10th-grade students participated, aged between 15 and 16 years old (35 male and 22 female). As part of the participatory action methodology, the Microsoft Teams Speaker Progress tool was used. This facilitated the provision of fair feedback: kind, accurate, and timely feedback on tone, volume, pronunciation, use of inclusive and varied language, and body language. This allowed for personalized teaching due to adaptation to the individual needs of each student, promoting more effective learning and citizens with a global and ethical vision in the use of technology. As a result, a notable improvement in students' oral skills was observed; 80.70% obtained a grade between 90 and 95, and 83% showed motivation in completing the activities. In short, immediate feedback helped students identify specific areas for improvement and work on them more efficiently. In conclusion, AI, used ethically and responsibly, can be a valuable tool for aligning learning with the individual abilities, strengths, and interests of each student.

Keywords: artificial intelligence, oral skills, adaptive learning, high school, feedback

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Introduction

In the 21st century, education faces various challenges in preparing students for an interconnected and constantly changing world, where cognitive skills must be complemented by social and ethical competencies. Today's education, which continues to use traditional methods such as the standardization of teaching and learning methods, has proven insufficient to address the diversity of individual styles, paces, and needs of each student. That is why adaptive and differentiated learning responds to this, along with the enhancement of artificial intelligence (AI), which has emerged as a fundamental pedagogical solution. This not only optimizes the acquisition of knowledge by generating a personalization of content and evaluations, but also fosters student autonomy and motivation, laying the foundations for more effective and equitable personalized teaching. Diwan et al. (2023) e*xplain that AI-based systems can generate formative assessments that encourage learners to reflect on both content and cognitive processes.*

Currently, the educational mission goes beyond just transmitting information. It is essential to train citizens with a global and ethical vision, through education that allows students to understand and act on complex issues such as climate change, inequality, and respect for cultural diversity. Educators should view education as a fundamental tool for developing empathy, critical thinking, and a sense of social and personal responsibility. In this context, technology allows for the adaptation of content learning, while also functioning as a tool to foster civic and ethical awareness (Nussbaum, 2011).

Oral Communication Skills as a Pillar of Global Communication and Constructive Feedback

Within the framework of global citizenship, one of the essential competencies is oral communication skills. Effective communication not only requires correct verbal expression but also encompasses key elements such as tone, volume, pronunciation, the use of inclusive and varied language, and body language. Mastering these components enables individuals to convey ideas clearly and confidently, facilitating connections with diverse audiences and navigating the complexities of intercultural interaction. According to Sumiati (2025), language plays a crucial role in life. In today's global era, communication skills, such as public speaking, are essential and indispensable. Sometimes, education underestimates the importance of practicing and providing feedback on these skills, which can create a gap in students' communicative competencies. In adolescence, this gap is especially critical as it is a vital stage for the development of identity and social skills, where peer perception and emotional vulnerability impact communicative confidence and the willingness to receive and accept feedback (Blakemore & Mills, 2013; Steinberg, 2008). For the development of correct oral skills, feedback is essential. However, for maximum effectiveness, it must be fair, kind, accurate, and timely (Wiggins, 2012). Fair feedback means having transparent criteria and objectives; kindness entails delivering with empathy and respect; accuracy involves identifying specific areas for improvement rather than providing vague comments; and timely feedback refers to providing feedback to students promptly for immediate modification (Black & Wiliam, 1998; Brookhart, 2019). In summary, traditional feedback methods often lack the consistency and objectivity necessary to drive meaningful progress (Hattie & Timperley, 2007), in addition to often not being immediate, so innovative approaches are needed.

The Future of Education

AI, Skills, and Values

This article explores the convergence of these fundamental dimensions: AI-mediated adaptive learning, the formation of global citizens with ethics, and the development of oral skills. Our goal has a dual purpose: first, to demonstrate that AI systems such as Microsoft Teams' Speaker Progress provide fair and objective feedback on oral skills, analyzing elements such as fluency, coherence, and the use of non-verbal language. Secondly, to demonstrate and argue that the integration of these technological tools allows teachers to focus on a more human and ethical dimension of teaching, such as promoting critical thinking, empathy, and responsibility. Baker and Siemens (2014) point out that the interaction of AI systems with students identifies best practices in the implementation of automated feedback. Natural language processing (NLP) can offer precise and objective feedback on the technical aspects of speech, while interface designs can promote the use of inclusive language and a respectful tone. In accordance with Caukin et al. (2024), artificial intelligence is capable of providing real-time feedback to students, allowing them to identify areas for improvement and adjust their learning process accordingly. This instant feedback is crucial for autonomous learning and the continuous improvement of students. It is expected that the evaluation of this study will serve as a guide for educators, technology developers, and educational policymakers in technological innovation seeking to build more efficient, inclusive, and ethical educational systems (Gouseti et al., 2024).

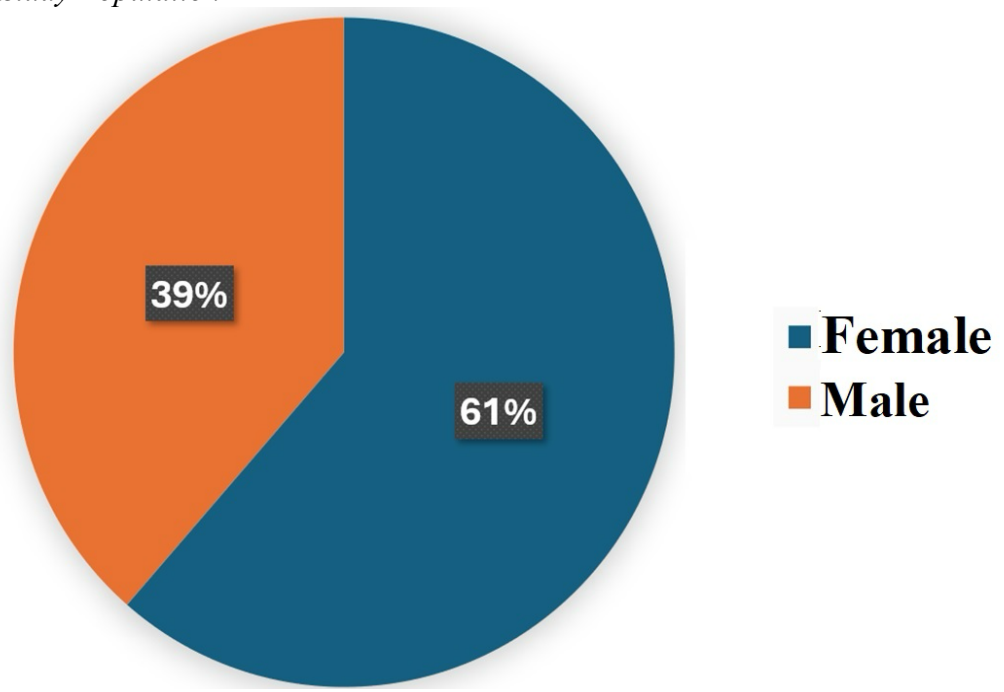
Through a literature review and the implementation of the Speaker Progress tool, this research aims to provide a theoretical and practical framework for creating a new educational paradigm. A model that combines the efficiency of technology with the richness of human interaction, preparing future generations to be not only competent professionals but also conscientious, critical, and effective global communicators.

Methodology

Type of Study

In the participatory action research study, the sample consisted of 57 students from PrepaTec, Campus Mexico City, of which 35 were female and 22 males. As shown in Figure 1, women made up a higher percentage, 61% compared to 39% men. This demonstrates an inclusive environment, a key factor in combating inequality and stereotypes at the institution to transcend discourse and become a reality (De la Cruz, 2020).

Figure 1
Study Population



Note. High school students

The only inclusion criterion was that students had Advanced English I. This allows for the development of study methods and discursive skills: effective communication, critical thinking, adaptability, and problem-solving. In other words, participants already had a certain level, so their challenge was to strengthen and enhance their ability to convey ideas, analyze information objectively, adapt to new situations, and find effective solutions to be persuasive before a general audience with their oral discourse.

Tools

During the January-May 2025 school term, Microsoft Teams' Speaker Progress AI was used, facilitating the discursive development of second-year high school students in the subjects of Spanish, art, and literature. Due to immediate feedback, it offered both students and the teacher the ability to observe their progress and the specifics of the following areas: tone and volume, pronunciation, use of inclusive language, varied language, and body language. These were observed and evaluated according to a rubric that established advanced, satisfactory, intermediate, and elementary levels. Table 1 shows the evaluated criteria designed according to the specific needs of the class.

Table 1

Rubric: Criteria and Cognitive Levels Evaluated

Speaker Progress: Communication Skills				
Criteria	**Advanced 20-18**	**Satisfactory 19-14**	**Intermediate 13-8**	**Elementary 7-0**
Tone and Volume (Pitch Variation Quotient)	Maintains a pitch variation quotient (PVQ) of 150 or higher, with appropriate variations in tone and volume to emphasize key ideas.	Maintains a PVQ of 120-149 with noticeable variations in tone and volume.	PVQ between 90-119, with some variations in tone and volume, but inconsistent.	PVQ below 90 with little or no variation in tone or volume, resulting in monotony.
Pronunciation	Pronounces all words clearly and accurately, with no errors detected by the system.	Makes a few pronunciation errors that do not affect the overall understanding of the speech.	Makes frequent errors that occasionally affect comprehension but recover quickly.	Makes numerous errors that hinder the understanding of the message.
Inclusivity	Uses fully inclusive language, avoiding culturally insensitive phrases entirely.	Uses generally inclusive language with one or two minor slips that do not seriously affect perception.	Uses several culturally insensitive phrases that could be perceived as inappropriate.	The frequent use of culturally insensitive or inappropriate phrases can significantly impact the overall perception.
Repetitive Language	Varies of language excellently, with no unnecessary repetitions.	Shows some repetitions, but they do not significantly distract.	Repeats words or phrases noticeably, affecting the fluency of the speech.	Excessive use of repetition interrupts the natural flow of the presentation.
Body Language	Maintains constant eye contact, proper distance, and an open posture, achieving a great connection with the audience.	Generally, maintain eye contact, proper distance, and a professional posture.	Inconsistent eye contact, inadequate distance, or a posture that occasionally distracts.	Little or no eye contact, inappropriate distance, or movements that significantly distract.

Note. Points per criterion

To structure the objectives of improving oral skills, topics related to the course were assigned for research, production of a script, and recording audio (see Table 2). In the research phase, the use of other artificial intelligences, such as ChatGPT, Google Bard, and Microsoft Pilot, was allowed. The information obtained from these tools had to be cross-referenced with

reliable sources, to learn to use different applications consciously and ethically. This phase was conducted outside the classroom, as was the production phase, as a course assignment. It supported the reinforcement of student self-management, responsibility, and commitment. In the production phase, each oral activity had to last between 2 and 4 minutes. Once the speech was recorded, students automatically received qualitative feedback generated by the AI, with detailed descriptions of each element and their quantitative results.

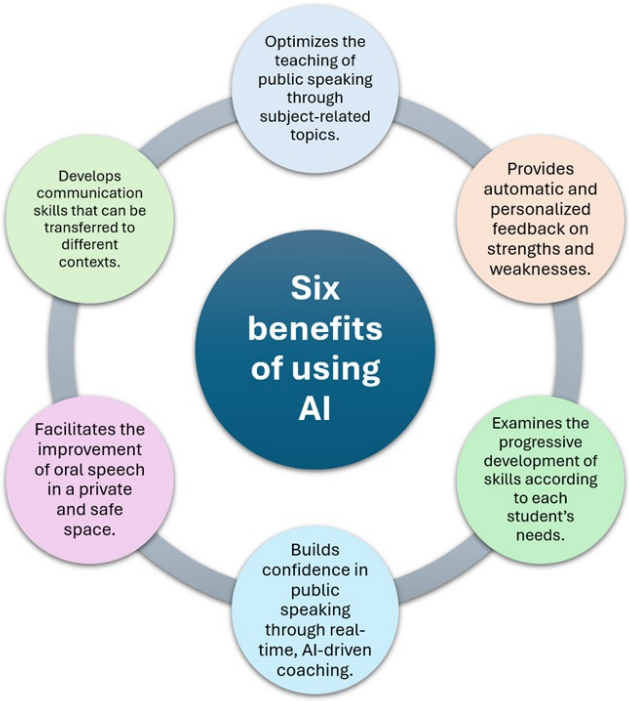
Table 2
Table of Topics

Week	Topics
Week 1	Activity 1. Symbols Activity 2. Literary topics
Week 3	Activity 3. Symbolic meaning of lion, she-wolf, and panther. What does the topic of love beyond death consist of?
Week 8	Activity 4. What does the jungle symbolize? What does the topic of the descent into the underworld consist of?
Week 13	Activity 5. What does the labyrinth symbolize? What does the concept of intertextuality mean? Indicate in which artistic or literary Works you identify the presence of the labyrinth.

Note. Activities per week

These activities in the application enhanced the strengthening and development of communication skills, optimization of work, and feedback. They also allowed for the practice of improvements and observing an immediate change in student performance (See Figure 2).

Figure 2
Six Benefits of Using Speaker Progress



Note. Oral communication skills

Results and Discussion

Data obtained from the use of Speaker Progress was generated in three stages:

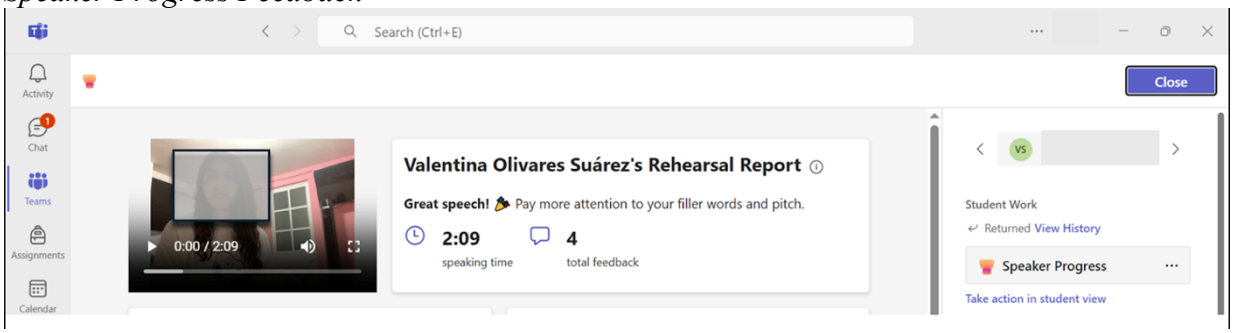
1. After students research an assigned topic and rehearse the oral presentation, they individually record the oral discourse directly in the application. They only have one chance.
2. The AI offers qualitative feedback.
3. The teacher assigns a grade and provides feedback based on the criteria previously established in the rubric. Regarding the grade, students can observe both individual and group achievement. This allows them to identify the group's average, as the group percentage is generated.

Stage 1. Oral Speech With Goal-Oriented Feedback

Feedback, undoubtedly, has the potential to powerfully influence student learning. Because of this, it should be accompanied by timely comments that promote better performance. According to Moreno (2021), feedback must be timely as it provides the basis for student autonomy. This section provides an example of the elements considered by AI to achieve information communicated with the goal of motivating continuous improvement. To ensure confidentiality, names are omitted from the example, and the rest of the participants' details are covered. Figure 3 shows motivational phrases like "Great Speech," the recording duration (2 minutes 09 seconds), and the total number of comments students find to improve their discourse.

Figure 3

Speaker Progress Feedback



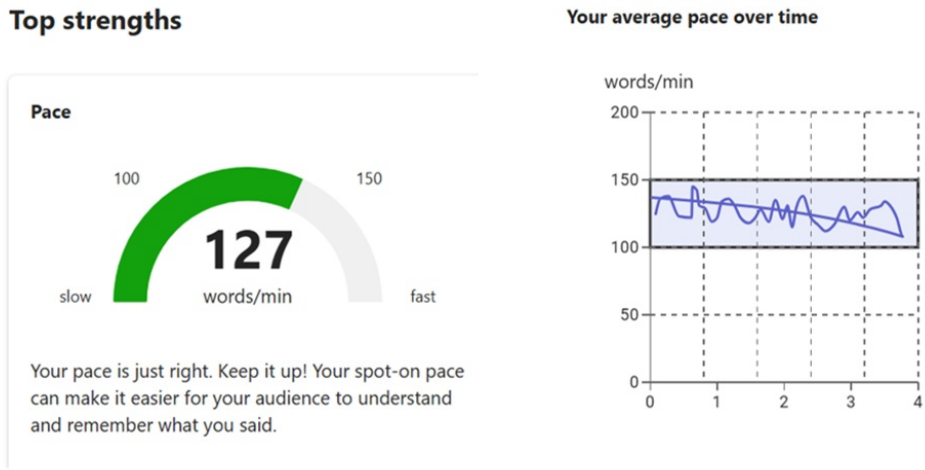
Note. Timely feedback

Stage 2. Qualitative AI Feedback

At this point, the type of qualitative feedback generated by AI can be observed, evaluating posture, whether students look at the camera, how language is handled: varied and inclusive, volume of voice, tone, and pronunciation. Always from a positive, timely, and specific perspective.

Figure 4

Feedback Aimed at Improving Voice Use

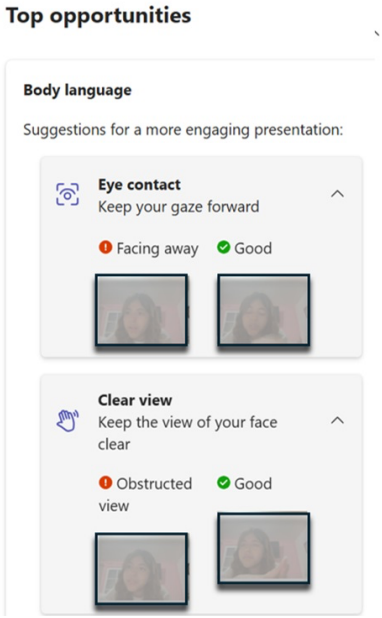


Note. Consider the skills

AI provides feedback oriented towards specific achievements in a respectful and constructive manner. This facilitates the process of reflecting on both strong and weak areas, applying what has been learned to other contexts, and developing necessary skills, knowledge, and attitudes. Figure 6 shows an example of how the AI communicated results highlighting students' "main strengths." In this case, it indicates speaking at a rate of 100 to 150 words per minute, within the ideal parameters of 100 to 165 (Microsoft, 2025). Thus, students begin reviewing results positively, focusing on achievements. According to Campuzano et al. (2021), achievement is key in learning because it is directly linked to established objectives; therefore, focusing on this contributes to students being receptive to improvement areas, facilitating decisions to practice assertive strategies positively impacting academic performance linked to methodologies and teaching resources. As a result, effective feedback provides meaningful information about areas needing improvement.

Figure 5

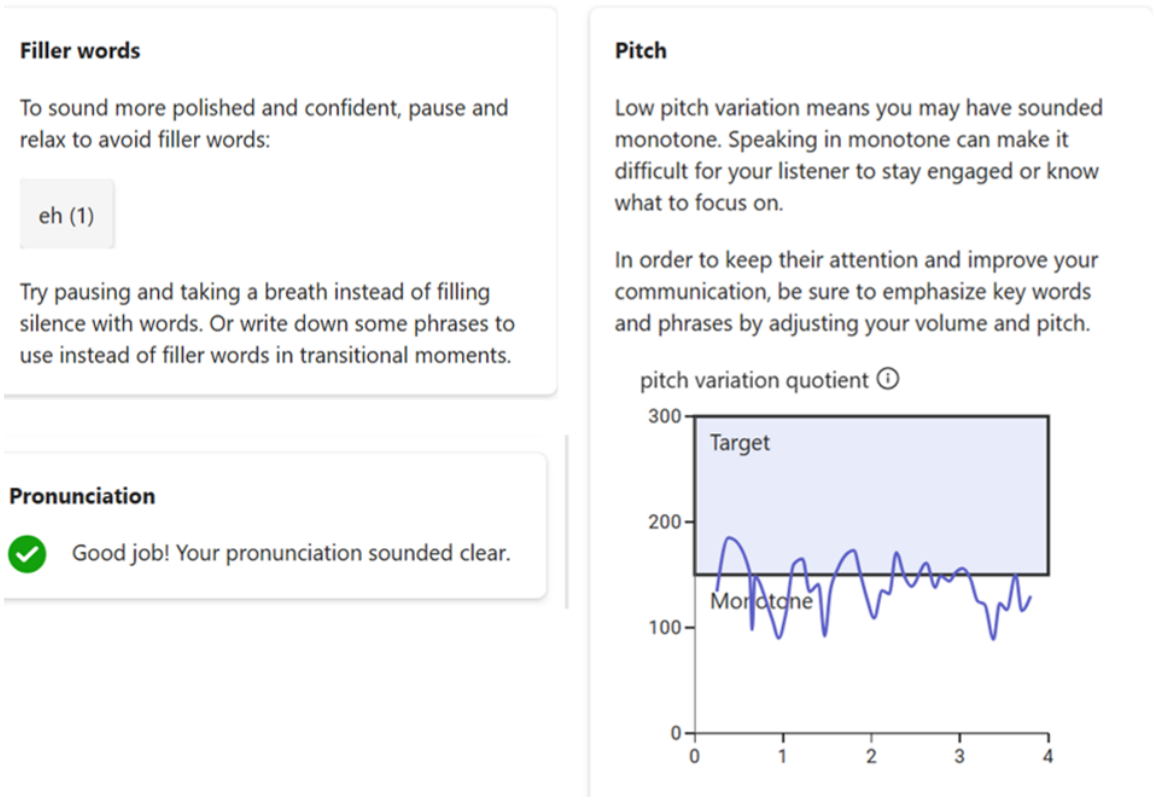
Constructive Feedback on Body Language



Note. Skills to develop

Constructive feedback (Fong et al., 2021) implies that students receive information enabling them to be aware of their learning and have the time and space to practice improving their performance. For this reason, timely feedback generated by AI from the first to the fifth activity is a new learning opportunity. This is shown in Figures 6 and 7. The first indicates correct positions regarding eye contact. AI indicates when the gaze is directed outside the camera's focal point simulating the audience and when it is accurate. It also suggests maintaining a clear view for better communication with possible interlocutors.

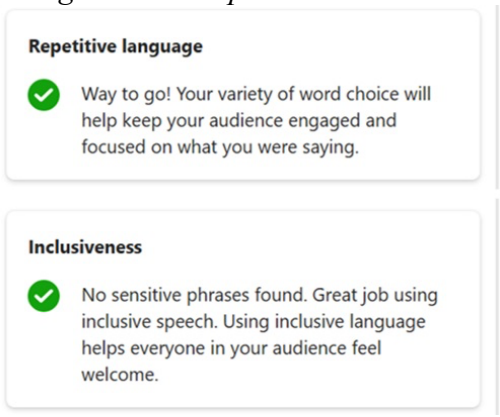
Figure 6
Use of Language and Expressions



Note. Filler words and tone as an area of opportunity.

In terms of Figure 6, it shows areas needing improvement in the use of fillers, tone, and pronunciation. Recommendations are made to achieve clear and effective speech, such as making pauses or having supporting phrases to avoid meaningless vocabulary repetition, varying the tone to keep the audience's attention, and adjusting volume and tone to emphasize certain ideas. Finally, AI indicates the importance of practicing to achieve clear pronunciation, especially if the speech includes difficult or unknown words. This type of information facilitates each student critically appropriating their learning and considering it part of their professional identity construction (López-León, 2021), since timely feedback is also a tool for learning to make decisions and being receptive to continuous improvement. In this context, another educational challenge is ensuring academic performance information serves as a strategy to empower students by recognizing their strengths.

Figure 7
Strengths That Empower



Note. Repetitive and inclusive language as a central part of the discourse

As seen in Figure 7, AI uses motivational phrases like "Well done!" for varied word usage, detailing positive aspects related to inclusive language and indicating an "Excellent job." This helps strengthen student confidence and empowers them to value learning and be receptive to improvement areas. It is noteworthy that using Speaker Progress also positively enriches language and verbal fluency.

Stage 3. Quantitative Feedback

Timely feedback from teachers remains essential; however, the descriptive and detailed evaluation by AI makes grading fair, objective, and significant, as autonomously, students understand why certain grades were assigned (Ossa & Willat, 2023). Table 3 presents results from five class activities, showing the impact of variables like application novelty and student motivation. Table 3 initially presents results from Activity 1 on two key literary analysis concepts: symbol and literary topics. This exercise reveals the novelty in application use, with 54 of 57 students completing it, indicating classroom innovation motivates learning. It also highlights topic interest, as 46 students scored between 85 and 90, and three achieved the maximum score of 100. In contrast, Activity 2 shows five students uninterested in practicing oral discourse. Nonetheless, 45 of 57 students scored between 85 and 90, two obtained top scores, and two scored 95. Therefore, disinterest decreased by 3.5% compared to the previous exercise; scores suggest easy application use with clear information on oral performance progress. In Activity 3, Table 3 shows application interest decreased by 7.02% compared to Activity 2 and 10.5% compared to Activity 1.

The percentage remains minimal compared to 89.5% completing the task. However, only 30 of 57 students scored between 85 and 90, indicating a performance drop, though two scored 100 and three 95. It's important to note that AI is adaptive, raising the cognitive challenge when initial standards are met, as AI learns, adapts, and improves with data and environment changes (González et al., 2024; Mestre & Romero, 2025), effectively distinguishing elements like discourse fluency, varied language creativity, tone and volume control, and inclusion. Activity 4 shows a 53.33% improvement over Activity 3, with 46 students scoring between 85 and 90. Additionally, the number of students not completing the oral discourse dropped to three. A five-week interval between activities suggests considerable time between tasks maintains application interest and engagement in practice, requiring research, script creation, rehearsal, recording, and critical result review.

The final activity reveals significant improvement in discourse production, with top scores of 100 and a minimum of 90. Approximately 80.70% of students scored between 90 and 95. Therefore, instructions were comprehended, achieving a high level in oral discourse generation and presentation. This success is attributed to student participation and timely, detailed AI feedback, facilitating reflection on achievements and improvement strategies. It can be said that using Speaker Progress also promoted decision-making development, as students assumed learning responsibility by deciding how to utilize AI-provided information. Descriptive feedback aids student development, as discussed in earlier sections; however, numeric evaluation allows visible progress and justified grading through clear course objectives and immediate AI feedback.

Table 3

Quantitative Activity Results. Part 1

Student	Activity 1	Activity 2	Activity 3	Activity 4	Activity 5
1	90	90	0	80	0
2	90	90	88	95	100
3	90	90	90	90	90
4	90	90	80	85	90
5	90	90	85	0	95
6	87	85	80	88	90
7	90	90	90	85	95
8	90	90	90	90	95
9	90	85	95	90	0
10	90	90	100	90	0
11	85	90	85	85	95
12	87	90	80	85	90
13	85	87	80	90	90
14	85	85	0	85	95
15	80	90	80	80	0
16	80	88	85	88	95
17	85	90	85	90	95
18	88	85	88	90	90
19	80	90	80	85	90
20	88	90	80	85	95
21	90	85	95	90	90
22	90	90	80	80	95
23	85	85	85	85	0
24	90	90	85	85	90
25	90	85	0	85	90
26	100	90	87	90	90
27	90	80	87	90	90
28	90	90	85	85	95
29	85	90	85	85	90
30	90	90	88	85	95

Student	Activity 1	Activity 2	Activity 3	Activity 4	Activity 5
31	85	95	0	0	0
32	90	90	85	85	90
33	90	90	87	95	90
34	88	80	85	90	95
35	85	100	85	85	90
36	90	90	80	85	90
37	87	0	0	85	90
38	88	90	85	88	95
39	90	95	80	80	95
40	90	90	80	80	90
41	0	0	0	95	100
42	88	90	100	90	100
43	80	90	90	90	90
44	100	100	80	88	90
45	88	85	88	85	90
46	0	0	90	85	90
47	87	90	95	85	95
48	85	80	90	85	90
49	85	85	0	0	0
50	80	0	0	90	0
51	90	90	80	85	90
52	85	85	85	90	95
53	85	85	80	80	90
54	0	0	0	85	90
55	88	85	90	85	95
56	90	90	90	90	90
57	100	90	85	90	90

Note. Activities per week

Assessment of Averages Across Five Assignments

To conclude evaluation aspects, Table 3 shows results for all participants, considering two significant variables: 1) AI is adaptive, learning, and raising challenges, striving for discourse perfection, and 2) Some students lacked motivation to complete assignments. Meanwhile, Table 4 reveals a four-point drop in overall evaluation, which may seem unfavorable; however, correlating data with numeric feedback shows maximum activity 1 scores of 100 and a minimum of 80, with only three students not completing the task. Activity 5 shows top scores of 100 and a minimum of 90, with improved learning, though eight of 57 participants did not submit, a 166.67% motivation drop, causing an average decline. Despite this, the application enhances verbal competence development, maintaining 85.96% overall motivation. Activities 2 and 4 are positively rated, with passing results in all cases.

Table 4
Group Results in Each Activity

Evaluation out of 100				
Activity 1	**Activity 2**	**Activity 3**	**Activity 4**	**Activity 5**
83%	**81%**	**72%**	**82%**	**79%**

Note. Percentage of grades

Conclusions

Challenges regarding motivation and fair, timely feedback necessitate technological tools situating students in real, global, and inclusive contexts. Consequently, Speaker Progress proves effective by providing a safe environment where students receive AI-assisted learning processes resembling reality, developing topic comprehension, decision-making, and oral communication while strengthening transversal skills. Microsoft Teams' application with mixed data collection allowed qualitative and quantitative student progress evaluation.

Kind, specific, and constructive feedback highlighted criteria like voice tone, volume, and inclusive language use, facilitating improvement area identification and autonomous learning. Results demonstrate high motivation and performance: 100% of students completed at least one activity, 76% completed all, with grades ranging from 80 to 100.

These outcomes validate AI's positive impact on adolescent communication skill development and transversal competencies, showing adaptive tools like Speaker Progress can effectively and ethically integrate into educational and professional environments. Finally, a notable improvement in students' oral skills was observed, with 80.70% scoring between 90 and 95 and motivation at 83% in activity completion. Immediate feedback helped students identify specific areas for improvement and work on them more efficiently.

In conclusion, AI, used ethically and responsibly, can be a valuable tool for aligning learning with the individual abilities, strengths, and interests of each student.

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ORCID: https://orcid.org/0000-0002-3577-3404
https://orcid.org/0009-0001-4698-9446

Elicitation of Teachers' Mind Frames: An Approach to Optimize Teaching Effectiveness

Laura Menichetti, Università degli Studi di Firenze, Italy
Silvia Micheletta, Università degli Studi di Firenze, Italy

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Abstract

Educational research highlights how teachers' characteristics and competencies can significantly impact student outcomes and motivation. International evidence highlights the effectiveness of specific teaching strategies. However, the widespread adoption of these strategies faces several challenges. On the one hand, there is cultural resistance to making classroom behaviours visible through practices such as lesson study and microteaching, as well as to accepting peer feedback. On the other, teachers' mental frameworks and deeply rooted beliefs often shape their teaching decisions, operating implicitly and hindering the application of evidence-based practices. The present study is based on the administration of a validated scenario-based questionnaire designed to identify teachers' behaviours in relation to competencies and strategies recognized as effective. The sample comprised more than 850 teachers, either currently employed in the profession or undergoing training. Data analysis revealed that many teachers do not align their practices with scientifically supported teaching strategies. Despite years of experience and university-level training, teachers' mental frameworks often remain resistant to change and, in some cases, even strengthen over time. Although minor improvements were observed with increased experience, substantial shifts in teaching practice were rare. This finding underscores the urgent need for professional development programs that are not only informative, but also foster reflection, enabling the achievement of tangible outcomes. Such programs should aim to promote knowledge of evidence-based strategies while also addressing and transforming teachers' implicit beliefs. Ultimately, the research emphasizes the importance of integrating both research-backed teaching strategies and a deeper exploration of teachers' mental frameworks into professional development initiatives.

Keywords: teachers' beliefs, evidence-based education, professional development

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Introduction

For decades now, aiming to improve academic learning and ensure the highest level of success for pupils and students of all ages, educational and teaching research has undergone a strong push towards rigorously applied and documented strategies and the synthesis of the resulting findings. From this perspective, Evidence-Based Education (EBE) constitutes a crucial reference, actively engaging on two fronts: on the one hand, promoting effective teaching based on research evidence, and on the other, encouraging the conduct of scientific studies according to explicit protocols (Mitchell & Sutherland, 2020).

Nowadays, thanks to this movement, we can understand the methods, strategies, and, more generally, the contextual – and personal – conditions that foster learning and academic success. Among these elements, the key role played by the teacher certainly stands out (OECD, 2025; Yoon et al., 2007). Scientific research has clearly highlighted how crucial ensuring the highest quality of teacher training is to achieving students' learning objectives. Improving learning through teacher education certainly means training them with the EBE movement in mind, that is, researching and documenting scientific evidence, but also – and above all – encouraging them to constantly examine the impact of their actions, evaluating it in light of established objectives and, if necessary, reconsidering their choices (Hattie & Yates, 2013). This second focus is crucial: in seeking the impact of their actions, teachers are forced to question themselves personally, but above all, to question their own mental frameworks, that is, their way of thinking and acting professionally.

To improve teachers' expertise, it is not enough to work on the level of knowledge and skills; it is also necessary to bring out and consider tacit components (Calvani & Trinchero, 2019; Polanyi, 1966). Indeed, every teacher – whether in pre-service or in-service – approaches teaching with their own repertoire of more or less explicit knowledge about what "good teaching" means and how to behave in certain situations, also in relation to their experiences, for example, in school, to models observed as students, or to models observed during their internships or the practice with other colleagues. To promote the adoption of new models, old ones must be investigated and deconstructed.

This research aims to identify the mental frameworks of two groups of teachers, one pre-service and one in-service, in order to compare them, on the one hand, with research evidence and, on the other, internally, with each other. The research questions that guided this study are the following:

- RQ1. How are the mental frameworks of teachers (pre-service and in-service) aligned with research evidence in pedagogy and teaching?
- RQ2. Are there internal differences between the groups of pre-service and in-service teachers?

The research was conducted through the administration – in person, digitally – of a questionnaire, the Effective Teaching Questionnaire.

The Research

The Effective Teaching Questionnaire (ETQ)

The Effective Teaching Questionnaire (ETQ) is a questionnaire designed to be used during the initial phase of a teacher training program, for participant self-assessment and for the trainer's contextual analysis. The resulting discussion helps to highlight stereotypes, bad practices, and misconceptions. The questionnaire has been validated in previous research with over 1,240 pre-service and in-service teachers (Calvani et al., 2021a; Menichetti et al., 2019) and has subsequently been used in further, uncontrolled courses for research purposes. It incorporates the key elements of effective teaching derived from scientific research evidence and aims to highlight the knowledge, attitudes, opinions, and mental frameworks – usually implicit in daily practice – possessed by teachers in relation to the teaching-learning process (Calvani, 2014; Calvani & Trinchero, 2019).

The questionnaire consists of a series of scenarios in which participants are asked to express their level of agreement with various statements or decisions. This method, widely established in educational research, allows respondents to be involved in realistic and practice-relevant contexts, encouraging them to make decisions that can be compared with those of industry experts (Crandall et al., 2006). The context of the scenarios and their structure are carefully defined by gathering testimonials from qualified professionals, with the aim of constructing meaningful, non-trivial, paradigmatic situations capable of authentically highlighting the participants' actual skills.

The dimensions considered in the Effective Teaching Questionnaire are considered crucial to the teaching-learning process: (i) the planning dimension, (ii) the cognitive dimension, (iii) the evaluation-formative dimension, and (iv) the management dimension (Calvani, 2014). Each of these dimensions is based on theoretical references widely validated by scientific research, presented in a concise manner in Table 1.

Table 1
The Four Dimensions of the Questionnaire and Their Main Theoretical References

Dimension	Focus	Main references
Design	Project design internal coherence between objectives and assessment and evaluation tools, but also between activities, tools, materials, strategies and times, and the role and guidance of the teacher	Gagné (1965), Merrill (2002) and Rosenshine (2009)
Cognitive	Cognitive load and the structuring of knowledge	Ausubel (1968) and Sweller (1988)
Formative-evaluative	Feedback and formative assessment	Hattie & Yates (2013) and Hattie & Timperley (2007)
Management	Classroom management (from the organization of spaces to communication methods, and from the management of behavioural problems to the responses given to the specific needs of students with special educational needs)	Gordon (1974) and Simonsen et al. (2008)

The design dimension encompasses all elements related to the planning of educational and teaching interventions, namely their internal coherence between objectives and assessment and evaluation tools, but also between activities, tools, materials, strategies, and timeframes, and the role and guidance of the teacher. The main theoretical references adopted in this dimension are the Instructional Design models of Gagné (1965), Merrill (2002), and Rosenshine (2009). The cognitive dimension examines concepts related to cognitive load, learning in the strict sense, or the structuring of knowledge. The main theories taken into consideration are Sweller's (1988) cognitive load theory and Ausubel's (1978) theory of meaningful learning.

The formative-evaluative dimension, on the other hand, concerns aspects related to feedback and formative assessment, crucial elements for ensuring progress in the learning process and the achievement of objectives. The reference literature can be summarized in the studies by Hattie and Yates (2013) and Hattie and Timperley (2007).

The management dimension, finally, concerns all elements of classroom management, from spatial organization to communication methods, from behavioural problem management to the specific needs of students with special educational needs. In this dimension, the main references are Gordon's (1974) theory of communication and effective teacher-student relationships and the effective classroom management practices emerging from the systematic review by Simonsen and colleagues (2008).

Each of the four dimensions features a series of items, all presented in the form of scenarios, illustrating typical and highly practical classroom teaching situations. For each scenario/item, four possible arguments/solutions are provided, with which the teacher is asked to express their level of agreement on a Likert scale, from "not agreeable" to "fully agreeable".

The questionnaire exists in two versions, an extended one, composed of 86 items, and a short one, composed of 38 items, divided between the four dimensions as illustrated in Table 2 (Calvani, 2014; Calvani et al., 2021a; Calvani et al., 2021b; Menichetti et al., 2019).

Table 2
The Division of the Items According to the Four Dimensions in the Two Versions of the ETQ

Dimension	**ETQ long version (86 items)**	**ETQ short version (38 items)**
Design	21	10
Cognitive	21	9
Formative-evaluative	20	8
Management	24	11
TOT.	**86**	**38**

This study used the short version of the Effective Teaching Questionnaire. Compared to the original, this version has a 5-point Likert scale. On the four-point scale, 1 corresponds to "not agreeable", 2 to "not very agreeable", 3 to "somewhat agreeable", and 4 to "fully agreeable". A fifth option, "I don't know", was added.

Results

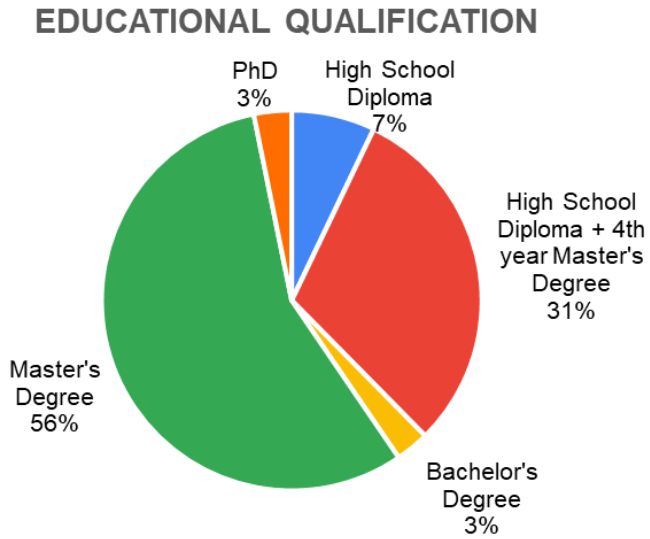
The Sample

The sample involved in this study consists of 872 people. Of these, 266 are students enrolled in the Master's Degree in Primary Education (fourth-year students of the five-year master's degree program, the entry point to the teaching profession in preschool and primary school), and 606 are students enrolled in the Specialization Course for Support Activities, a postgraduate training program aimed at training special education teachers, those who, in the Italian school system, are assigned to classes with students with certified disabilities.

The sample is made up of just over half (56%) master's degree holders (essentially the majority of teachers training to become special education teachers) and 38% secondary school graduates (Figure 1). Of these, 31% are fourth-year students in the master's degree program in Primary Education Sciences, and 7% are teachers enrolled in the Specialization Course for Support Activities, i.e., support teachers in training. Finally, 3% have a bachelor's degree and another 3% hold a PhD.

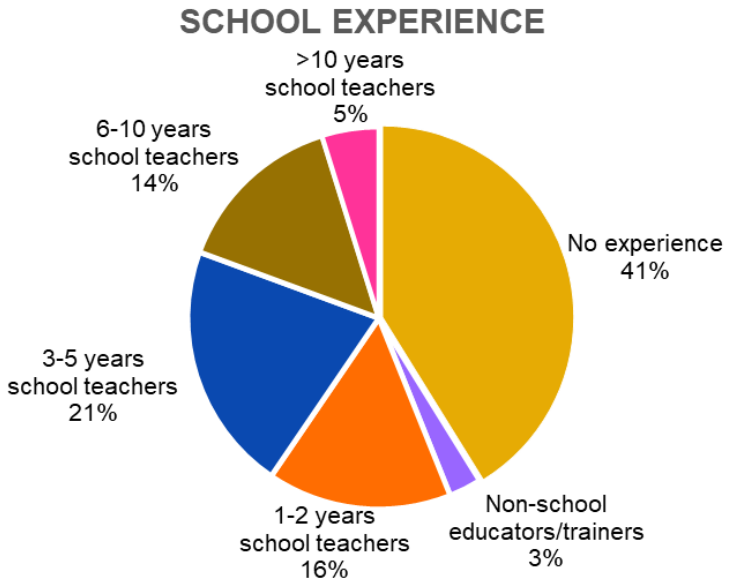
Figure 1

Education Qualification of the Sample



The sample, in close accordance with their professional aspirations and level of education achieved, presents notable differences in relation to previous teaching experience in schools of all levels.

Figure 2
Previous School Experience of the Sample



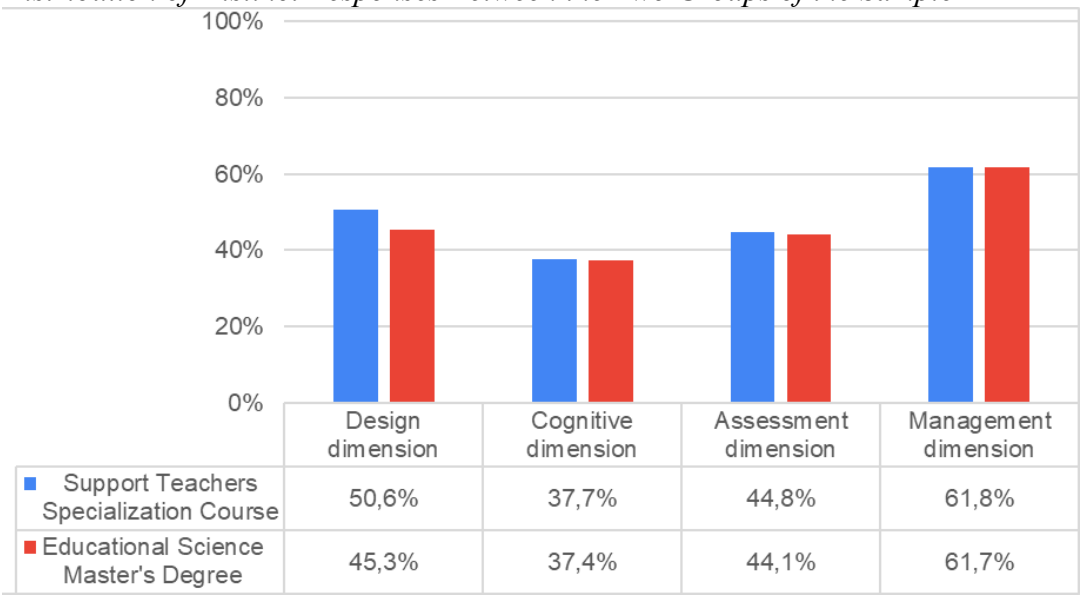
Most participants (41%) stated they had no previous teaching experience in schools (0 years of teaching), 21% had 3 to 5 years of teaching experience, 16% had 1 to 2 years of experience, 14% had 6 to 10 years of experience, 5% had more than 10 years of experience, and the remaining 3% stated they had experience as trainers/educators/teachers but outside of the school world (in public or private companies, or independently) (Figure 2). Overall, the sample was split in two: 44% of the participants in the research had no previous experience in the school world, while the remaining 56% had previous experience in schools, albeit of varying and significant duration (from 1 to over 10 years).

Results of Research on Teachers' Beliefs

The results of the research conducted using the Effective Teaching Questionnaire show a poor overall alignment with the responses expected from the effective teaching model. Both groups of teachers involved – those in their fourth year of the degree course in Primary Education Sciences and those training to become support teachers – obtained low levels of agreement: in several cases around 50% (between 37.4% and 50.6%), and in only two situations slightly above 60% (specifically: 61.7% and 61.8%) (Figure 3).

Figure 3

Distribution of Distinct Responses Between the Two Groups of the Sample



	Design dimension	Cognitive dimension	Assessment dimension	Management dimension
Support Teachers Specialization Course	50,6%	37,7%	44,8%	61,8%
Educational Science Master's Degree	45,3%	37,4%	44,1%	61,7%

The graph in Figure 3 highlights the cognitive dimension as the most critical with respect to alignment with evidence-based research, obtaining percentages of agreement with the model defined as effective, a few points lower than 40% (specifically: 37.7% in the group of teachers in training on the Specialization Course for Support Activities and 37.4% in the group of teachers in training on the Master's Degree in Primary Education Sciences). The dimension that, however, seems to achieve the best alignment for both groups is the managerial one, with percentages approaching 62% (specifically: 61.8% in the group of teachers in training on the Specialization Course for Support Activities and 61.7% in the group of teachers in training on the Master's Degree in Primary Education Sciences). The evaluation outcomes were similarly aligned between the two groups of teachers involved in the study, reaching 44.8% among trainees in the Specialization Course for Support Activities and 44.1% among trainees in the Master's Degree in Primary Education. In these three dimensions, no significant differences emerged between the two groups of teachers. The only dimension showing a difference greater than a few percentage points was the design dimension, where, it can be hypothesized, classroom teaching experience can play a crucial role in learning, understanding, and applying effective practices recognized by scientific research.

Discussion

The samples of pre-service and in-service teachers examined cannot be considered representative because they belong to a single university, however, the results recorded following the administration of the Effective Teacher Questionnaire are consistent with previous surveys (Calvani et al., 2021a; Menichetti et al., 2019).

The findings from this study lead us to recognize teachers' evident and persistent resistance to systematizing change, that is, to integrating, embracing, and applying the scientific evidence learned and studied in training programs. The low level of agreement found – between 37.4% and 61.8% - still denotes a significant distance from the effective teaching model described in the reference literature. Within this framework, two elements – opposite, but clearly interconnected – highlight a significant critical issue.

From the perspective of student self-assessment, revealing an initial cognitive conflict between what regularly occurs in school and what evidence indicates is effective is the first step towards scientifically grounded education: at least on a theoretical level, certain acquisitions must be consolidated, before the ability to implement them must be tested in the field through internships (Federighi & Boffo, 2014). Furthermore, training – both for students in the fourth year of the Master's Degree in Primary Education Sciences and for those enrolled in the Specialization Course for Support Activities – does not seem to be able to dismantle many of the false beliefs that often circulate in the world of education and training.

Conversely, the experience of some in school contexts seems to validate and reinforce certain practices, even if they are based precisely on the false beliefs mentioned above. The models that students repeatedly observe in their internships appear more resilient and difficult to deconstruct, enjoying stronger protection and dissemination, linked to cultural heritage (Menichetti & Piccioli, 2022).

Moreover, unlike what happens in other sectors, teaching is a profession that everyone has already seen practiced in their school careers of the past, when they sat at school desks, and for which there are models that everyone internalizes from childhood. Furthermore, culturally, the teaching profession has often been assimilated to a vocation, for which innate characteristics seem to be more necessary than professional training and the acquisition of principles resulting from scientifically conducted research: stereotypes, even years after previous surveys, remain difficult to dispel (Menichetti et al., 2019).

Conclusions

The findings presented in this study highlight the urgent need to radically rethink and reform teacher training courses. The complexity of the skills defined in the profiles of education and training professionals requires the adoption of learning promotion methods other than traditional ones – essentially characterized by the predominance of the verbal channel and a transmission-based approach – to better promote practical application opportunities that integrate active simulation and role-play experiences with opportunities for professional reflection, driven by feedback given and received from peers and/or an expert mentor.

Scientific research in this field has long supported teacher training methods that are based precisely on the recurrence of these key elements: examples include lesson study and microteaching, which have garnered significant evidence of effectiveness (Hattie, 2023). These methods, by reducing the intrinsic challenges of the teaching profession – for example, time constraints or student numbers – and promoting frequent and meaningful opportunities for collegial discussion, aim to gradually develop complex skills, such as planning, communication, or management, while also encouraging the acquisition of the appropriate mindset for lifelong professional development.

This study, focusing on the differences in results between the two groups of teachers in the reference sample, opens up potential further lines of research. These include: (i) an in-depth study of the individual questionnaire items, aimed at identifying any specific items that generated the greatest difficulties for the participating teachers and initiating a discussion on what makes them particularly critical, and (ii) the identification of any differences within each sample group, such as in relation to years of professional experience, year of university studies, etc., by answering questions such as: are there differences among in-service teachers between

those with few or many years of experience? Are there differences among students in training between those who have no teaching experience and those who do?

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

The author declares that no AI or AI-assisted technologies have been used to generate, refine, or correct the content in the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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How Do Indonesian Civil Society Organisations Perceive the Success of Their Counter- and Alternative Narrative Programmes?

Arum Ningsih, Coventry University, United Kingdom
Serena Hussain, Coventry University, United Kingdom

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Abstract

Indonesia, home to the world's largest Muslim population, continues to face the challenges of violent extremism. Civil Society Organisations (CSOs) respond by implementing counter- and alternative-narrative programmes to promote peace and tolerance. However, limited research has explored how these local CSOs define and assess the effectiveness of their own initiatives. This qualitative multiple case study addresses this gap by examining the perceptions of three Indonesian organisations: the Center for the Study of Religion and Culture (CSRC), Muhammadiyah, and Peace Generation. Drawing on document reviews and thirty-five semi-structured interviews, thematic analysis revealed that successful programmes are defined as more than the capacity to change knowledge, attitudes, and behaviour. CSOs prioritise building community trust, ensuring long-term engagement, and achieving sustained policy influence at institutional levels. This research contributes to the peace education field by proposing a necessary context-sensitive and relational framework for understanding programme success in countering violent extremism.

Keywords: counter-narratives, alternative narratives, peace education

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Introduction

Indonesia has been shaped by a confluence of cultures and religions, with approximately 87% of the population identifying as Muslim, making Indonesia home to the largest Muslim community globally (Hakim et al., 2019). This Islamic identity is intertwined with the nation's ethnic diversity, comprising over 300 ethnic groups, including Javanese, Sundanese, and Batak (Zein, 2018). The coexistence of various ethnicities and religions, including Christianity, Hinduism, and Buddhism, contributes to Indonesia's rich cultural tapestry but also presents challenges in terms of social cohesion and religious tolerance (Zein, 2018).

Demographically, Indonesia is the fourth most populous country in the world, with a population exceeding 270 million (Hakim et al., 2019). The youth demographic is particularly significant, as a large proportion of the population is under 30 years old (Hakim et al., 2019). This youthful population can drive innovation and development, but if not adequately engaged, it may become susceptible to extremist ideologies (Zein, 2018). The interplay between demographic trends and religious beliefs has implications for social stability, as extremist ideologies can find fertile ground among disaffected youth (Zein, 2018).

While the majority of Indonesian Muslims practice a moderate form of Islam, the country has witnessed the rise of radical groups that exploit socioeconomic grievances and political discontent to promote extremist ideologies (Ronaldi, 2023). The emergence of groups such as *Jemaah Islamiyah* and more recent factions has raised concerns about terrorism and violent extremism (Zulkifli, 2024). Terrorist violence in Indonesia has been a significant concern, with notable attacks such as the 2002 Bali bombings, the 2004 Australian Embassy bombing, and the 2009 bombing of the JW Marriott Hotel and the Ritz Carlton Hotel (Kurnia 2023; Subandi et al., 2023). These incidents resulted in numerous casualties and caused considerable concerns for security (Karyadi & Suparno, 2022).

In addition to the terrorist violence, the potential radicalisation of young adults has exacerbated the issue, posing a significant challenge to combat terrorism, facilitated by increased access to the internet and possible exposure to radical content (Hui, 2010). For example, online content that presents violence as a solution to social and political issues can attract individuals who feel marginalised or have grievances with their circumstances (Putranto et al., 2022). Research shows that in the Indonesian context, where many young people face economic and social challenges, such narratives can become particularly enticing and spark desires to engage in terrorist activities (Setiawan, 2023). The spread of extremist narratives also contributes to the normalisation of violence within society. Aprillianti et al. (2022) explain that when violent acts are justified through narratives portraying the perpetrators as heroes or champions of justice, individuals may become more inclined to engage in terrorism.

In Indonesia, extremist groups such as *Jemaah Islamiyah* and ISIS often employ narratives emphasising struggles against oppression or injustice, which can alter societal perceptions of violence by arguing that it is acceptable in certain contexts (Fitrian, 2023). Ulfa and Sugara (2022) indicate that terrorist attacks in Indonesia are often triggered by narratives presenting violence as a means to achieve ideological goals. In some cases, these attacks are carried out by individuals influenced by extremist content encountered on social media or other online platforms (Widowati & Cahyati, 2019).

Extremist narratives can also lead to greater social polarisation in Indonesia. As these narratives spread, they frequently establish boundaries between "us" and "them," exacerbating tensions

between ethnic and religious groups (Rusyidi et al., 2019). In Indonesia's multicultural context, such polarisation can incite conflict and violence, increasing the risk of terrorist attacks against groups deemed as enemies by extremists (Mubarok, 2023).

Several studies have examined how the government and civil society respond to the spread of extremist narratives. Mufida (2020) investigates how the government develops deradicalisation programmes and educational initiatives aimed at raising public awareness about the dangers of extremism. Additionally, Ahmad et al. (2021) explore how civil society organisations promote tolerance and interfaith dialogue as a means to counter extremist narratives. However, these studies primarily focus on the existence and general approaches of these programmes, without exploring whether such programmes are successful in achieving their goals.

The research presented in this paper addresses the gap in the existing literature by examining how an educational institution, an Islamic NGO, and a youth-based organisation in Indonesia build resilience against extremist ideologies. It provides an in-depth exploration of how these entities promote more positive and inclusive narratives and assesses the evidence of their success. The study focuses on three specific case studies: the Center for the Study of Religion and Culture (CSRC), Muhammadiyah, and Peace Generation. Utilising a qualitative multiple case study design, drawing on document reviews, observations, and thirty-five semi-structured interviews, the research found that success is defined not only by changing knowledge, attitude, and behaviour, but also by the ability to build community trust and policy influence. This research contributes to the peace education field by proposing a context-sensitive and relational understanding of programme success.

Exploring Literature on Countering Extremist Narratives

Counter-messaging has emerged as a strategy in preventing and countering violent extremism (P/CVE). Briggs and Feve (2013) define it as strategic communication aimed at undermining extremist ideologies, propaganda, and narratives, while simultaneously offering constructive alternatives. Such efforts are disseminated through diverse channels—social media, online forums, and conventional media—seeking to disrupt radicalisation processes, prevent the spread of extremist content, and promote peace, tolerance, and resilience. The typologies of counter-messaging can be broadly divided into government communication strategies, counter-narratives, and alternative narratives, which, although distinct, are interlinked in their aim to challenge extremism.

Government communication strategies represent formal, policy-driven efforts to counter extremist propaganda. The U.S. Department of State's campaigns, for example, have sought to clarify misconceptions, debunk conspiracy theories, and emphasise that the United States is not engaged in a conflict with Islam (Briggs & Feve, 2013; Lee, 2020). Such initiatives attempt to shape perceptions, influence public attitudes, and advance security objectives by presenting authoritative information to domestic and global audiences. These strategies are significant because of the legitimacy governments hold, but they also face credibility challenges. Scholars note that official campaigns often risk being dismissed as propaganda, especially when audiences perceive them as politically motivated (Briggs & Feve, 2013). Consequently, while governments play a role in shaping the informational environment, counter-narratives from more credible, community-based actors often resonate more effectively with at-risk audiences.

Counter-narratives represent one of the most direct tools in challenging extremist discourse. Braddock and Horgan (2016) define them as narratives explicitly crafted to refute extremist

themes, while Lee (2020zx) adds that they aim to dismantle extremist propaganda by exposing falsehoods and offering corrective perspectives. The central objective is to reduce the appeal of extremist messages and weaken their legitimacy (Bélanger et al., 2020). These narratives can take several forms. Some target ideological claims, such as extremist misinterpretations of religious texts, while others focus on pragmatic concerns by exposing the contradictions between extremist rhetoric and lived realities (Briggs & Feve, 2013). Survivors of extremist violence, for instance, can highlight the devastating human cost of attacks, thereby delegitimising extremist justifications for violence (Briggs & Feve, 2013).

Credible voices are crucial. Religious leaders, political figures, and community activists who command trust among their constituencies can powerfully refute extremist claims (Zeiger, 2016). Former extremists also play an important role by describing the harsh realities of extremist networks and the futility of violence (Bilazarian, 2020). Similarly, women—whether survivors, relatives of extremists, or professionals—bring unique perspectives that broaden the resonance of counter-narratives (Briggs & Feve, 2013). Yet research shows counter-narratives face limitations. Directly confronting extremist content may cause defensive reactions among audiences, especially those already sympathetic to radical ideologies (Schmitt et al., 2021). Such messages can sometimes generate fewer positive emotions or be less memorable than narratives framed around constructive alternatives. For this reason, scholars increasingly stress the complementary role of alternative narratives.

Unlike counter-narratives, which directly contest extremist messages, alternative narratives promote positive visions without explicitly referencing extremist content. Briggs and Feve (2013) describe them as proactive efforts to emphasise what "we support" rather than what "we oppose." These narratives often focus on themes of solidarity, shared values, and inclusive citizenship, uniting the "silent majority" against extremism. Alternative narratives are especially relevant for audiences not directly engaged with extremist propaganda but potentially sympathetic to its causes. By highlighting constructive values such as tolerance, interfaith harmony, and civic responsibility, alternative narratives strengthen resilience at the community level (Ramakrishna et al., 2021). Schlegel (2021) stresses that they amplify underrepresented voices, provide inclusive platforms, and foster dialogue across cultural divides.

Educational contexts offer fertile ground for such narratives. By encouraging critical thinking, collective storytelling, and value co-creation, educators can help students engage with diverse perspectives and develop resilience against extremist simplifications (Wieczerzycki & Deszczyński, 2022). Similarly, interfaith and inter-community networks—along with public figures such as athletes, artists, and entrepreneurs—play a central role in disseminating positive narratives (Briggs & Feve, 2013).

Methodology

This research employs a qualitative multiple case study design to explore how the Center for the Study of Religion and Culture (CSRC), Muhammadiyah, and Peace Generation understand and estimate the success or failure of their programmes promoting peace and tolerance. The multiple case study design enables the identification of both commonalities and divergences in how each organisation conceptualises effectiveness and evaluates outcomes within Indonesia's diverse socio-religious contexts. Fieldwork was conducted between December 2022 and June 2023, covering the Jakarta and West Java regions, where the organisations' programmes are most active.

The study adopts a triangulated data collection strategy combining document reviews and semi-structured interviews. This study acknowledges that such perspectives are not objective entities but are shaped by individuals' interpretations, experiences, and interactions. The reality of these concepts is therefore socially constructed through ongoing cultural and institutional processes within the three organisations studied—CSRC, Muhammadiyah, and Peace Generation. While the research is primarily grounded in constructivist philosophy, it does not adhere rigidly to a single epistemological stance; rather, it embraces methodological flexibility to capture the complexity of the phenomenon. Accordingly, the research question, which examines how these organisations understand and estimate the success or failure of their programmes, incorporates elements of objectivist reasoning through the analysis of statistical documentary data, while also engaging interpretivist approaches to explore subjective meanings and lived experiences reflected in participants' narratives.

Document reviews included internal reports, training modules, evaluation summaries, and online materials such as YouTube videos, podcasts, and social media content. These sources offered insights into the organisations' formal definitions of programme success, their evaluation procedures, and the extent to which these align with broader institutional philosophies and public narratives. Document analysis also helped trace the evolution of each organisation's approach to monitoring outcomes over time.

Semi-structured interviews formed the primary method of data collection, allowing for an in-depth exploration of organisational perceptions and evaluative frameworks. A total of thirty-five participants were interviewed across the three organisations: twelve from CSRC, thirteen from Muhammadiyah, and ten from Peace Generation. Participants were purposively selected based on their direct involvement in programme design, implementation, or evaluation, including directors, programme coordinators, trainers, and media specialists. Interview questions were designed to elicit how each participant conceptualised programme impact, what indicators they used to assess success or failure, and how these perceptions were shaped by institutional values and socio-cultural contexts.

Data were analysed using thematic analysis (Clarke & Braun, 2017), to ensure systematic data organisation and transparency. The analytical process followed six stages: familiarisation with data, generation of initial codes, identification of themes, review of thematic coherence, definition and naming of themes, and synthesis of findings. Coding was conducted inductively, allowing key patterns to emerge directly from the data rather than being imposed by pre-existing frameworks. Line-by-line coding facilitated the identification of nuanced expressions of how organisational actors described success, challenges, and unintended outcomes.

Themes were iteratively compared across the three cases to identify shared conceptualisations and distinctive institutional logics. For instance, while all organisations associated success with moral transformation and social harmony, the indicators and evaluative mechanisms they employed varied significantly. Reflexivity was integrated throughout the process to mitigate researcher bias, recognising that meaning-making is co-constructed between researcher and participants.

Five Dimensions of Counter- and Alternative Narratives

The discussion begins by examining the five dimensions of counter- and alternative narratives: the nature of these terminologies as employed by the organisations, their target audiences, the

credible voices they mobilise, the media platforms they utilise, and the challenges they encounter in implementation. Through this analysis, the discussion highlights how local actors adapt global peace education frameworks to the Indonesian socio-cultural context, demonstrating that success in counter- and alternative narrative initiatives is understood as a dynamic, contextually grounded, and socially transformative process.

The Use of Counter- and Alternative Narratives

The study demonstrates that all three organisations employ a combination of counter- and alternative narratives, but with differing emphases and objectives. Counter-narratives are typically reactive and corrective, directly addressing extremist claims, whereas alternative narratives are proactive, offering constructive values that promote inclusivity, compassion, and coexistence. Over time, the three organisations have shifted from a predominantly reactive orientation to one that foregrounds alternative narratives, suggesting a maturation in their approach to peace communication.

CSRC's work represents a structured and analytical approach to counter-narrative construction. It begins with a detailed examination of extremist narratives—particularly those related to *jihad,*[1] *khilafah,*[2] and *takfiri*[3] ideologies—and formulates responses grounded in theological and sociological reasoning. This emphasis on research-based message formulation ensures credibility and accuracy, strengthening the organisation's capacity to delegitimise extremist arguments while aligning counter-narratives with Islamic ethics.

In contrast, Muhammadiyah adopts an integrative model where alternative narratives are embedded within its broader framework of *dakwah berkemajuan* (progressive preaching). Rather than engaging extremist narratives directly, Muhammadiyah advances positive teachings that redefine Islamic devotion in modern, inclusive, and nation-building terms. This

[1] *Jihad,* usually translated as "religious struggle," encompasses multiple dimensions, including the study, practice, and teaching of religion, combating evil influences, and struggling against ungodly desires (Masruri, 2024). In Indonesia, Romadlan (2022) has identified two primary interpretations of *jihad*: the first involves physical warfare, offensive actions, and militant endeavours; the second focuses on peaceful efforts, non-physical struggles, and defensive responses. Shamsudin & Yusuf (2019) further differentiate *jihad* into internal struggles against personal desires and external engagements in the defence of faith. The concept of *jihad* has sometimes been misinterpreted as purely aggressive, often due to feelings of marginalisation and grievance (Kotia & Abdallah, 2016). However, the essence of *jihad* includes elements of spiritual and material progress, patient obedience, and readiness to sacrifice for the sake of religion (Maulana, 2022). Ali et al. (2003) argue that *jihad* is not solely about warfare but also encompasses efforts to combat poverty, disease, and others.

[2] In Indonesia, the concept of Khilafah has been the subject of interpretation and debate in the political and social spheres. Several movements seek to change the ideology of Pancasila and realise an Islamic state, known as Khilafah Islamiyyah, in the political context of the country (Gunawan et al., 2020). Jamhari & Testriono (2021) describe extremist groups in Indonesia that support the establishment of the Caliphate including Jamaah Ansharud Daulah (JAD), Mujahidin Indonesia Timur (MIT), and Muhajirin Anshar Tauhid (MAT). These groups align themselves with the ideology of the Islamic State in Iraq and Syria (ISIS) and aim to establish an Islamic political system based on the principles of the Caliphate (Jamhari & Testriono, 2021).
Extremist groups promote their ideologies, which may include the establishment of a caliphate through violent means (Glazzard et al., 2017). These narratives target individuals who may feel marginalised or alienated, exploiting their vulnerabilities to radicalise them (Bilazarian, 2019). Extremist groups leverage the idea of Khilafah to appeal to individuals disillusioned with existing governance structures, promising an alternative system based on their interpretation of Islamic principles.

[3] *Takfiri* is a term used to describe discourses that accuse others, including fellow Muslims, of apostasy (Raffie, 2012). This accusation is often used to justify violence against those deemed apostates. The concept of *takfiri* has been associated with extremist ideologies and has been a source of conflict within Muslim communities, particularly concerning interpretations of religious texts.

reflects a strategic choice to prevent ideological polarisation by focusing on moral reconstruction rather than ideological confrontation.

Peace Generation employs a flexible approach to narrative design. Its use of short videos, infographics, and interactive peace education curricula illustrates how counter- and alternative narratives can be adapted for younger, media-savvy audiences. Peace Generation's narrative style is conversational, emotive, and participatory, which distinguishes it from the more formal theological tone used by CSRC and Muhammadiyah. Its focus on empathy, self-reflection, and interpersonal harmony demonstrates how peace narratives can foster resilience against radicalisation by cultivating critical thinking and emotional intelligence.

Collectively, the findings show that these organisations employ counter- and alternative narratives as complementary strategies—counter-narratives to deconstruct harmful ideologies, and alternative narratives to construct a sustainable moral framework for peace. This duality allows them to move beyond reactive responses toward preventive and transformative interventions.

Target Audiences

A number of studies within the global literature on Preventing and Countering Violent Extremism (P/CVE) employ the classifications of "primary," "secondary," and "tertiary" audiences (Barton et al., 2021; Bhui et al., 2012; Mazerolle et al., 2020; Salter & Gore, 2020; Thijssen et al., 2022). In the Indonesian context, however, such terminology has yet to be adopted in previous research. Similarly, the three organisations analysed in this study do not explicitly refer to these categories in the design of their interventions. Nevertheless, the audience segmentation in their practices can be mapped onto the primary, secondary, and tertiary frameworks commonly used in the global P/CVE works.

Most programmes from all three organisations targeted the general public and ambivalent audiences,[4] which can be categorised as primary audiences. This approach is informed by the belief that secondary audiences can influence primary audiences, thereby contributing to collective resilience against extremist ideologies (Barton et al., 2021; Bhui et al., 2012; Salter & Gore, 2020; Thijssen et al., 2022). Primary audiences thus encompassed students (schools or Islamic boarding schools), family members, community leaders, educators, and religious leaders, who could influence the beliefs, attitudes, and actions of others. All three organisations also demonstrate an awareness that violent extremism in Indonesia involves not only men but also women. Consequently, their prevention efforts engage both male and female participants as primary audiences.

The secondary audiences—those at risk of radicalisation—receive tailored interventions. CSRC's initiatives for student organisations that espouse exclusivist views exemplify this approach. CSRC encourages participants to separate religious identity from political radicalism, fostering ideological resilience without alienation, by facilitating dialogue and critical reflection. The tertiary audiences, including individuals already associated with extremist networks, are mainly addressed by Muhammadiyah through mentoring and rehabilitation programmes. These initiatives employ alternative rather than confrontational

[4] Ambivalent audiences refer to individuals who are caught between conflicting ideologies and have to navigate complex choices. For instance, when choosing between the current system and the enforcement of Islamic law, these audiences experienced a dichotomy. They felt inclined towards supporting Islamic law while simultaneously valuing democratic principles and the existing legal structure.

narratives, recognising that moral persuasion and reintegration are more powerful than direct ideological confrontation.

Credible Voices

The success of counter- and alternative narratives depends heavily on the credibility of those delivering them. Across all three organisations, messengers are carefully selected based on their social legitimacy, moral authority, and cultural resonance with target audiences. CSRC leverages the influence of *ustadz* and *ustadzah* within *pesantren* (Islamic boarding school), recognising their pivotal role as moral guides and educators. Their religious authority enhances the legitimacy of peace messages, ensuring they are perceived as theologically sound rather than externally imposed. CSRC also engages respected public intellectuals and digital influencers to extend reach beyond religious circles, combining scholarship with accessibility.

Muhammadiyah relies on a wide spectrum of credible voices, including religious leaders, local preachers, and lay activists. Its decentralised structure allows local branches to mobilise figures who embody trust within their communities. Importantly, Muhammadiyah integrates women and youth activists into its outreach, recognising the need for diversity in moral leadership. This inclusivity not only strengthens the organisation's credibility but also challenges patriarchal interpretations of religious authority that can contribute to extremism.

Peace Generation's approach differs in that it foregrounds peer credibility. Teachers, students, and young trainers are central to its dissemination strategy. Peace Generation ensures relatability and sustained engagement by using figures who share similar life experiences with their audiences. Peer messengers are particularly powerful in digital and educational environments where trust is built through shared identity rather than formal authority. These approaches demonstrate that credible voices are not limited to religious authority figures but can include educators, peers, and professionals who model empathy and integrity.

The Media Used

All three organisations utilise a hybrid communication strategy that integrates in-person engagement with digital media. This combination ensures wide reach while maintaining personal connection and trust. Offline methods remain foundational. Training workshops, mentoring sessions, and sermons allow for interpersonal dialogue and contextual understanding. For CSRC, in-person training in *pesantren* provides safe spaces for critical discussion. Muhammadiyah's Friday sermons serve as moral platforms to embed messages of moderation within religious practice. Peace Generation's interactive workshops foster peer learning and empathy building. These face-to-face engagements enable sustained mentoring and a deeper emotional connection that purely digital interventions cannot achieve.

At the same time, online media play a central role in amplifying reach. Websites, online magazines, YouTube channels, and social media platforms allow for continuous engagement beyond the classroom or mosque. *Suara Muhammadiyah* magazine and Peace Generation's social media content extend their narratives nationally and globally. CSRC's online presence complements its academic activities, disseminating research-based counter- and alternative narratives in accessible formats. The use of hybrid media not only enhances dissemination but also builds continuity between online and offline spaces. Digital platforms ensure scalability and accessibility, while face-to-face interactions maintain trust and relational depth. This

integrated strategy managed to reach diverse audiences across age, geography, and digital literacy levels.

Challenges Faced

Despite their success, all three organisations confront significant challenges that affect both their reputation and operational effectiveness. A major challenge concerns stigmatisation and ideological resistance. CSRC's association with human rights discourse has occasionally been perceived as a Western import, generating suspicion among several audiences. To mitigate this, CSRC reframed human rights as compatible with Islamic values, thus bridging global concepts and local norms. Conversely, Muhammadiyah has faced reputational challenges arising from the actions of a few members who have been linked to conservative or radical groups. To safeguard its reputation, the organisation employs strategic communication tools—such as social media analytics—to monitor public perception and decide when to respond or remain silent. This pragmatic management of controversy reflects institutional maturity and awareness of media dynamics. Peace Generation, meanwhile, has contended with misconceptions about its name, which some associated with Christian or Jewish organisations. This misunderstanding initially hampered collaboration with certain communities. PeaceGen responded through persuasive communication and the consistent demonstration of its Islamic and humanitarian values, eventually restoring trust and credibility.

Understanding the Success or Failure of Counter- and Alternative Narrative Programmes

Each organisation had nuanced perceptions of what constituted programme success. It's crucial to tease out these differences as they highlight the varied criteria and approaches that each organisation uses to evaluate effectiveness—a principal challenge in assessing P/CVE programmes (Fisher & Busher, 2023).

For CSRC, success was defined as transforming knowledge, attitudes, and behaviours among at-risk audiences. Respondents from CSRC perceived their success to be anchored in the credibility of the individuals delivering the message, the strength of the relationships built with target audiences, and the engagement metrics. They emphasised that compelling counter-narratives delivered by trusted community figures were essential to ensure meaningful engagement. Success metrics included countering extremist narratives, raising awareness, and influencing policies at *pesantren*, universities, and governmental levels.

Muhammadiyah considered success to be measured by community trust and societal impact. They gauge success by the extent of their community engagement, their ability to address global issues with long-term impact, and the cooperation between the government and civil society. Their broader approach encompassed opposing extremist views while building a positive ideological framework to foster inclusion and understanding. Effective outreach effectively extended to underdeveloped and remote areas, thereby challenging the perception of Muhammadiyah as an urban-centric organisation. Additionally, high online engagement, particularly on platforms like Twitter that facilitated dialogue and interaction, was considered a mark of success.

Peace Generation perceived success through the transformative impact on individual participants and societal norms over time. For PeaceGen, success equalled the quantity, quality, and continuity of engagement. They assessed their success based on personal change and

ongoing engagement with their audience. Metrics such as audience reach and the Violent Extremism Disposition Scale (VEDS), which sought to measure participants' personal transformation, were pivotal indicators. Organisational growth and sustained impact since inception were also crucial measures of continuous success.

The findings demonstrate that while each organisation has unique criteria for success, they all highlight the importance of tailored approaches to evaluation. This underscores the extent to which an emphasis on sophisticated evaluation methods has been embedded in the P/CVE sector in Indonesia—a sector that was relatively late in adopting rigorous evaluation practices (Fisher & Busher, 2023).

Literature emphasises the importance of rigorous evaluation methods to assess the effectiveness of counter-narrative interventions (Carthy et al., 2020). In this study, understanding these diverse perceptions and approaches to success highlights the complexity and context-specific nature of evaluating these initiatives. While there is diversity across the programmes in some areas, there is a convergence of opinion around what the key ingredients are for success.

These cases find a consideration from the organisations which assert the importance of tailored interventions and continuous engagement to maximise impact. In addition, success was defined not merely by immediate outcomes but by long-term engagement, behavioural transformation, and community impact. Evaluations through surveys, the Most Significant Change (MSC) method, and qualitative feedback allowed for an impact assessment. While they have all strived to evaluate programmes, the most important long-term outcomes are actually the hardest outcomes to measure.

All organisations also highlighted the importance of sustainability and the adoption of iterative approaches to programme development. For example, PeaceGen emphasised that the establishment of local chapters marks a significant step towards ensuring the sustainability of their organisation. Additionally, they noted that their transition into a social enterprise is a key indicator of their long-term viability. Effective content was defined by its engaging and inspiring nature. The iterative process of learning from failures and implementing training materials underscored the dynamic nature of PeaceGen's approach.

According to their understanding of success, these organisations perceived their programmes as successful works. CSRC considered their programmes successful, particularly highlighting "*Pesantren* for Peace" as the most successful initiative. They recognised this programme for producing positive outcomes by transforming participants' knowledge and attitudes, while motivating them to actively counter extremist ideologies, and advocate for human rights. However, CSRC had yet to assess the impact of these narratives, implemented by their trained alumni, on enhancing the knowledge, attitudes, and behaviours of students within each *pesantren*.

Muhammadiyah regarded their most successful programme to be the promotion of peace and tolerance in their schools, due to the perceived long-term impact. However, they admitted the challenges in measuring it. Although Muhammadiyah did not identify any specific programme as unsuccessful, they observed that counter-narratives were considered less suitable for their target audiences compared to alternative narratives. In addition, PeaceGen considered their training on the 12 basic values of peace to be its most successful programme, viewing it as sustainable since the organisation's inception and having engaged over 100,000 participants.

On the other hand, they regarded the less successful programme as the promotion of peace through the use of posters for early childhood.

These findings hold wider relevance for researchers and policy planners working within the P/CVE field. Generally, success in counter- and alternative narrative programmes has been understood through the lens of transforming knowledge, attitudes, and behaviours, alongside the promotion of peace and tolerance through online engagement (Braddock & Horgan, 2016; Frischlich et al., 2018; Speckhard & Ellenberg, 2020). However, this research demonstrates a broader understanding. Success is also perceived as the ability to build and maintain community trust in the programme and its actors. This dimension of success is no less critical in shaping long-term legitimacy and receptiveness to narrative interventions, maintain community trust in the programme and its actors.

The fact that each organisation articulated markedly different definitions of success underscores the need to move beyond universal metrics. Instead, evaluative frameworks should be responsive to institutional goals, community dynamics, and cultural context. Understanding success as a locally situated and relational concept challenges top-down assumptions and calls for more adaptive, participatory, and grounded approaches to programme assessment.

Conclusion

This study systematically examined how Indonesian civil society organisations (CSOs) – specifically the Center for the Study of Religion and Culture (CSRC), Muhammadiyah, and Peace Generation – conceptualise and evaluate the success or failure of their programmes promoting peace and tolerance. The findings demonstrate that effectiveness is understood not as a short-term or purely quantitative achievement, but rather as a long-term transformative process encompassing positive changes in attitudes, relationships, and broader social behaviour.

Globally, success in counter- and alternative narrative programmes is frequently understood through the lens of transforming knowledge, attitudes, and behaviours (Braddock & Horgan, 2016; Frischlich et al., 2018; Speckhard & Ellenberg, 2020). However, this research shows a broader local conceptualisation. Success is reflected in participants' moral development, strengthened community trust, and the sustained continuity of peace initiatives. A critical finding is that success also includes the ability of these programmes to influence institutional practice and policy, thereby demonstrating that civil society can meaningfully shape broader national frameworks for religious moderation, education, and social inclusion. Furthermore, failure is not viewed as an absolute lack of results, but instead as a valuable space for reflection and learning, which drives iterative programme improvement.

The research significantly contributes to the peace education field by redefining success in counter- or alternative narrative initiatives as contextual, relational, and value-based, moving beyond purely behavioural or technical indicators. This necessitates a shift away from universal metrics, demanding that evaluative frameworks be responsive to unique institutional goals, community dynamics, and the prevailing cultural context. Success thus emerges from the alignment between moral principles, community engagement, and policy responsiveness. Furthermore, the study advanced a constructivist approach that successfully integrated rich qualitative insight with the analysis of limited quantitative documentary evidence, providing an effective model for assessing complex social transformation. Practically, the findings underscore the essential role of CSOs as mediators between grassroots communities and state

institutions, capable of bridging moral education initiatives with tangible policy reform. For future research, it will be imperative to explore the mechanisms through which CSOs sustain their influence over extended time periods, how target audiences ultimately internalise the alternative narratives, and the specific ways in which digital spaces continue to reshape the delivery and reception of peace messaging.

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

The author states that Grammarly, an AI-based writing tool, was employed solely for proofreading and improving the language of the manuscript. Its use was restricted to correcting grammar and spelling mistakes, as well as refining sentences for better clarity and precision. The author also affirms that no other artificial intelligence or AI-assisted technologies were utilised in generating the content of this manuscript. All ideas, designs, methods, findings, analyses, and discussions are entirely original and stem from the author's own systematic and rigorous research process.

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The Accreditation Journey in Engineering Education: Insights From a Dean's Perspective

Yasar Guneri Sahin, Izmir University of Economics, Turkiye

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Abstract

Accreditation in engineering education serves as a rigorous quality assurance process, verifying that academic programs are systematically designed to equip graduates with clearly defined professional competencies. These programs must align with recognized standards and be evaluated by independent accrediting bodies. At its core, accreditation establishes a consistent and transparent framework, ensuring that institutions, regardless of location or context, deliver education of comparable quality. While accreditation offers substantial value, it also poses significant challenges. These include securing commitment from diverse stakeholders, ensuring active participation, meeting human resource needs, and managing increased academic and administrative workload. Whether pursued voluntarily or mandated, accreditation often requires considerable institutional effort to foster engagement and shared ownership. Despite these challenges, the benefits of accreditation are far-reaching. It provides international recognition, validates graduate competence, and enhances the professional standing of graduates in both industry and academia. Moreover, it promotes transparency, fairness, and accountability in educational practices, contributing to improved institutional credibility and student outcomes. This paper draws on the insights and experiences of a faculty dean who has led multiple successful accreditation efforts over a 12-year period. It offers a practical perspective on the end-to-end process from initial planning and stakeholder alignment to site visits and evidence collection. The discussion further explores how accreditation results can be used as a strategic tool to foster continuous improvement, curricular innovation, and long-term educational impact within engineering programs.

Keywords: higher education, accreditation, challenges in accreditation, engineering education

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Introduction

With the convergence of global expectations regarding the engineering profession, engineering education and the competencies expected of graduates (depending on their specific fields) have also begun to align, creating common and universal expectations. As these shared expectations emerged, the importance of defining the minimum competencies required of an engineer increased. Consequently, accreditation bodies were established to develop international standards and to accredit programs in accordance with these standards (ENAEE, 2025; Engineering Council UK, 2020).

The accreditation of an engineering program generally signifies that, regardless of geographical location, the program provides an education that meets the minimum global competency requirements. Therefore, graduates from non-accredited programs often face reduced prospects for degree equivalency, admission to postgraduate studies, or employment opportunities (Accredited Schools Online, 2025; Bordia, 2001; Marvin, 1952).

Although accreditation seeks to ensure that graduates attain the necessary professional competencies, it also brings with it a number of obligations and corresponding challenges. Some of these can be listed as follows:

- Accreditation covering only a portion of the educational system for instance, when a specific university program is accredited, but the pre-university educational stages do not align with accreditation standards, thereby creating difficulties in fully achieving the expected competencies.
- The existence of regional and national variations in expectations, making it difficult to harmonize educational content due to differing perspectives.
- Difficulties in adapting the standards required for accreditation to the existing educational system.
- Anxiety arising from attempts to rigidly implement every stage of the accreditation process as an inflexible and absolute procedure.
- The fear of losing accreditation status once obtained.
- The perception among some faculty members that accreditation poses a barrier to academic freedom (a view often resulting from misunderstandings).
- The infrastructural and financial requirements necessary to sustain accreditation, which can, in some cases, be demanding and difficult to maintain.

All these challenges and obligations must be considered together with the reservations and hesitations that may arise even before initiating the accreditation process. In addition, there are numerous difficulties encountered both during the application phase and in the post-accreditation period.

This paper discusses certain issues that, based on experience, have proven particularly demanding during and after the accreditation process, as well as the specific challenges faced by administrators of accredited programs.

It should be noted that the issues discussed herein are based on experiential insights and may not apply to every accreditation process or encompass all possible situations. Therefore, the observations presented in this study should be understood as specific to particular accreditation contexts and regional circumstances.

Some Challenges in the Accreditation Process

The application and successful accreditation of a university program depend on the fulfillment of certain conditions. These conditions vary across different stages of the process before and during the accreditation application, throughout the evaluation visit by the accrediting body, and in the post-accreditation period. Each stage involves unique requirements and presents its own set of specific challenges, as several of them illustrated in Figure 1.

Figure 1

Accreditation Process Life-Cycle



Pre-accreditation Stage

Securing Senior Management Commitment and Financial Support

Typically, the first major challenge before initiating an accreditation process (especially if the institution is applying for the first time or if the importance of accreditation is not yet well understood) is persuading the senior administration (the rectorate or board of trustees) to approve the application and allocate the necessary financial support. This stage can be quite demanding, as financial resources alone are not sufficient; certain structural adjustments that affect upper management operations may also be required.

Therefore, the process often begins with a series of "persuasion rounds" aimed at obtaining approval for both the reallocation of resources and potential structural changes that could alter long-established administrative or academic practices. These efforts require extensive preparation, including the development of coherent justifications, the creation of clear and

informative documentation, and the delivery of detailed presentations to communicate the process effectively. While this stage can be exhausting, it may also proceed smoothly if senior management and university units already possess a solid understanding of the value of accreditation.

Gaining the Support of Academic Units and Personnel

Even before the formal accreditation application is submitted, one of the most critical challenges is informing and convincing academic units (composed of faculty members and administrative personnel with diverse profiles) about the process and its implications. This phase may represent the most difficult part of the entire accreditation journey, as it requires addressing the concerns of experienced faculty members who have long operated within established routines, pedagogical methods, and professional expertise. Some may even perceive accreditation as a potential restriction on academic freedom.

In such cases, the involvement of faculty members with prior accreditation experience can be particularly valuable. Their support can help explain the rationale, benefits, and practicalities of accreditation to their colleagues, fostering a more positive institutional attitude toward the process.

Convincing faculty members, however, is not sufficient on its own. It is equally important to identify strategies for managing the additional workload that accreditation brings. To alleviate this concern, tools or mechanisms that facilitate the process and reduce workload should be provided. Designing and planning such tools can itself be a significant challenge, as it requires the allocation of both time and resources.

Preparing and Allocating All Necessary Resources

The accreditation process demands both time and substantial resources. Effective planning and timely initiation of preparatory activities are therefore crucial. The term *resources* here refers not only to financial assets but also to human capital. Strong organizational planning is essential.

Since each academic unit (department or program) may have distinct accreditation requirements, it is advisable to appoint at least one representative from each unit and to provide motivating incentives, such as a course-load reduction, to compensate for the additional responsibilities. Alongside human resources, the acquisition of supplementary tools such as computers, scanners, and educational materials is also important at this stage.

Defining All Required Steps and Procedures

This stage marks the point at which all units are fully prepared for accreditation and capable of carrying out the necessary steps efficiently. However, it also represents the beginning of the heaviest workload, as previously planned tasks must now be executed, revealing potential obstacles or complications.

Typically, this stage begins with curriculum revision, since accreditation requires the implementation of a standardized and widely accepted educational framework. Existing curricula may not fully comply and thus may need modification. Curriculum changes are not trivial, they can affect the entire educational structure. For example, new courses may need to

be introduced (which may require hiring additional faculty), and modifications to the program could necessitate student transition (curriculum adaptation), resulting in heterogeneous classroom compositions where students from different curricula must be taught together. These issues must be carefully managed.

In some cases, curriculum changes may not be required, but revisions to course content**,** assessment, and evaluation methods might be necessary. Reviewing and revising all course materials and assessment systems is a lengthy and labor-intensive process. One of the most significant challenges during this phase is verifying the adequacy of changes and identifying any inadvertent omissions or errors that may have occurred.

Given the volume of work described above, academic staff alone are often insufficient. Additional support personnel may need to be hired, which could necessitate restarting the initial persuasion process with senior management to obtain approval and funding.

After revising the assessment and evaluation framework, it is essential to plan how these processes will be integrated into continuous improvement mechanisms and to ensure that all relevant procedures are properly designed. It must be acknowledged that the first cycle of accreditation and quality improvement will likely include shortcomings or even mistakes. These should be viewed as part of an organizational learning and maturation process that improves over time through experience.

Moreover, to minimize the anxiety and additional workload associated with this learning phase, proactive planning is necessary. Without such preparation, early challenges may generate frustration, discouragement, and burnout among staff, potentially jeopardizing the sustainability of the accreditation effort.

In addition, systematic planning must be conducted to ensure the continuous monitoring of student and alumni progress and the achievement of program learning outcomes. Conducting this process manually is nearly impossible; thus, technological tools are required. Implementing such systems often requires renewed financial support, which may again entail persuading senior management.

Preparing All Documentation and Evidence

Preparing all documents and evidence required for the accreditation application and subsequent evaluation visit presents an additional workload. In the case of a first-time application, documentation practices may not yet be institutionalized, meaning that numerous materials must be produced in a short time, verified for accuracy (ensuring they are authentic and not fabricated), and organized according to a uniform standard. This can lead to various difficulties.

Another challenge arises when more than one different programs (each with unique accreditation requirements) prepare their application files. Variations in interpretation or approach may lead to inconsistencies, necessitating further negotiation and coordination. This, in turn, requires additional time and resources.

The documentation and evidence preparation stage is generally viewed as an indicator that the program is already meeting accreditation requirements and is ready for evaluation.

However, if internal processes are not yet fully established (as is common in first-time applications), encountering problems and extra workload at this stage is quite likely.

The emergence of recurring issues during the process can at times demoralize academic and administrative staff. It is crucial to communicate that such difficulties are natural and that, through an iterative and experiential approach, processes will mature and challenges will diminish. As with all quality assurance systems, once accreditation practices become part of the institutional culture, future processes will be far smoother.

Finally, in subsequent accreditation cycles, the documentation and evidence-gathering process will become significantly easier, supported by digital tools and well-established procedures, thus requiring fewer resources and less effort overall.

Accreditation Visit Stage

Once the preliminary stages of accreditation have been completed, the overall workload is significantly reduced before the visit of the accreditation team. Nevertheless, various challenges and unforeseen issues may still arise during the visit itself.

Preparations for the Visit

It is crucial to ensure that all academic and administrative units are fully familiar with and have internalized the established processes prior to the visit. Although differing opinions expressed during the visit may initially cause concern, it is essential to allow academic staff the freedom to express their views openly. Any criticisms raised during this process should be viewed constructively and incorporated into subsequent improvement plans.

Furthermore, all infrastructural and logistical requirements necessary for the visiting team must be fully prepared in advance. Ensuring that all required facilities, materials, and technical support are available not only saves time but also reflects the institution's professionalism and attention to detail.

Coordination of the Visit

During the accreditation visit, the evaluation team may request meetings with various stakeholders and have diverse logistical or information needs. Therefore, identifying these requirements in advance -such as the team's preferences regarding facilities, data, or individuals they wish to meet- greatly facilitates smooth coordination. Gathering this information from the team prior to the visit and preparing accordingly is essential.

Arranging meetings with external stakeholders can be particularly challenging. These may include advisory board members, alumni, and representatives from companies that employ graduates. Ensuring their presence during the visit can be difficult, as their schedules may not align with the visit dates. For this reason, preparations must begin well in advance, maintaining consistent communication with both the visiting team and stakeholders to guarantee attendance. This process can be labor-intensive and may require considerable organizational effort.

Additionally, logistical arrangements such as the transportation, accommodation, and other needs of external participants must be addressed. This often requires additional financial

resources, potentially necessitating renewed efforts to secure approval and support from senior management.

Because the presence of all academic and administrative staff, as well as students, is generally required during the visit, organizing these groups and ensuring their readiness is equally important. This is especially demanding for large programs with high numbers of students and faculty members. In such cases, course schedules must be carefully adjusted to avoid conflicts and to ensure the availability of key personnel during the visit.

Preparing Personnel for the Visit

An effective and productive site visit is crucial to the success of the accreditation process. Since the composition of visiting teams may differ each time and because each team may emphasize different aspects of the program collaborative and facilitative attitudes are highly beneficial.

Prior to the visit, faculty and administrative staff from different backgrounds should be thoroughly briefed and motivated to respond cooperatively to the visiting team's inquiries and expectations. Establishing this shared understanding helps ensure a smooth and professional interaction.

It is also advantageous for the members of the visiting team to engage in pre-visit communication with key program personnel. Such interaction helps clarify mutual expectations and allows both sides to prepare more effectively. Therefore, the faculty administration should ensure that appropriate communication channels are established and maintained between the program staff and the visiting team prior to the visit.

Post-accreditation Stage

Following the accreditation visit, it is mandatory that accreditation practices and continuous improvement activities be sustained regardless of whether a program has been granted accreditation. Considering the long-term benefits of accreditation and its positive influence on educational processes, maintaining these efforts ensures that quality assurance becomes a permanent and evolving institutional practice.

Building Institutional Culture and Motivating Practitioners (Academic and Administrative Staff)

Since the responsibility for sustaining these efforts primarily lies with the practitioners namely, academic and administrative personnel, their motivation and internalization of the processes are critical for cultivating an enduring institutional culture. Positive feedback from graduates, employers, and stakeholders, along with measurable indicators used to assess educational objectives, can be powerful tools for reinforcing this motivation. The more positive feedback the institution receives, the stronger the sense that the work being done is valuable and impactful.

One of the significant benefits of developing an institutional quality culture and internalizing accreditation processes is the professional adaptability it fosters among academic staff. Academics who work within a culture of quality can more easily integrate into new institutions if transferred, and personnel who have internalized such a culture are more likely

to be preferred in other professional settings. Ultimately, this shared culture benefits the educational system, students, and practitioners alike and should therefore be emphasized and communicated effectively to all staff.

All feedback (both positive and negative) should be made accessible in a transparent environment and updated periodically. Regularly reminding practitioners of the importance of this culture and supporting their engagement in it are essential for ensuring genuine internalization.

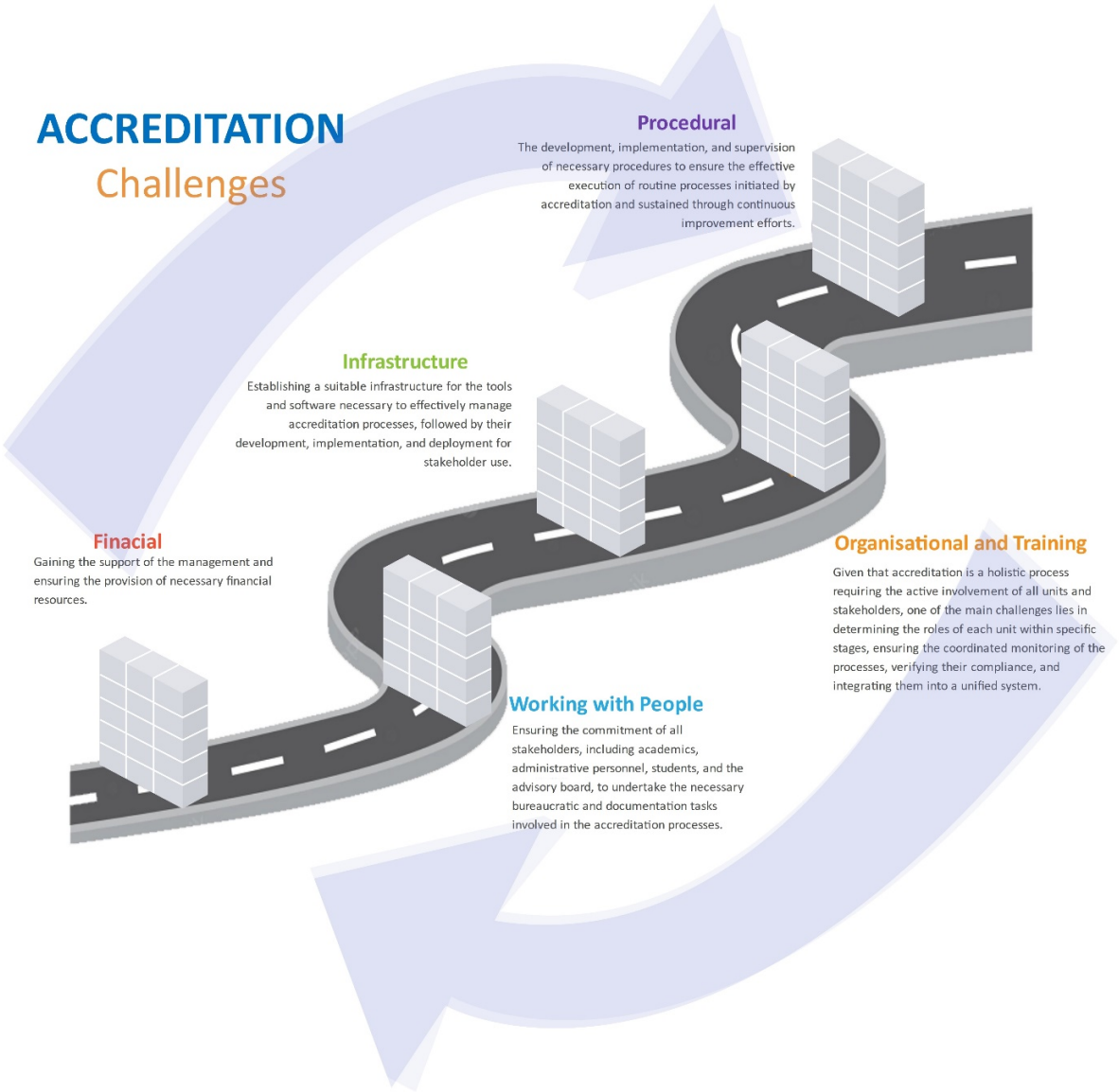
Ensuring Continuous Improvement and Providing Technological Support

Another key motivational factor for practitioners in maintaining a culture of quality and accreditation is the provision of tools and technological support that reduce workload and minimize errors. Computer-based systems designed to monitor and assess student learning outcomes and program competencies can be particularly effective. The less time and effort practitioners need to complete their tasks accurately, the more motivated and engaged they will become.

In addition to software support, it is beneficial to ensure that all processes are systematically designed, clearly documented, and easily accessible. Establishing defined timelines for each process, sharing these calendars with practitioners, and issuing periodic reminders about required tasks can enhance coordination and efficiency. Furthermore, automating routine procedures (where possible) can significantly reduce workload and enhance motivation.

Of course, developing such software and supportive tools entails additional costs and administrative effort for the faculty. Therefore, the cost-benefit balance should be carefully evaluated to determine the extent to which these initiatives can be implemented. Necessary support should then be sought from both senior management and relevant academic units.

Figure 2
Barriers in Preparation for Accreditation



Short Discussion and Conclusion

Accreditation is, in essence, a comprehensive quality assurance process. In the field of engineering education, it has become virtually indispensable. However, as illustrated in Figure 2, it also requires overcoming certain barriers and assuming additional responsibilities.

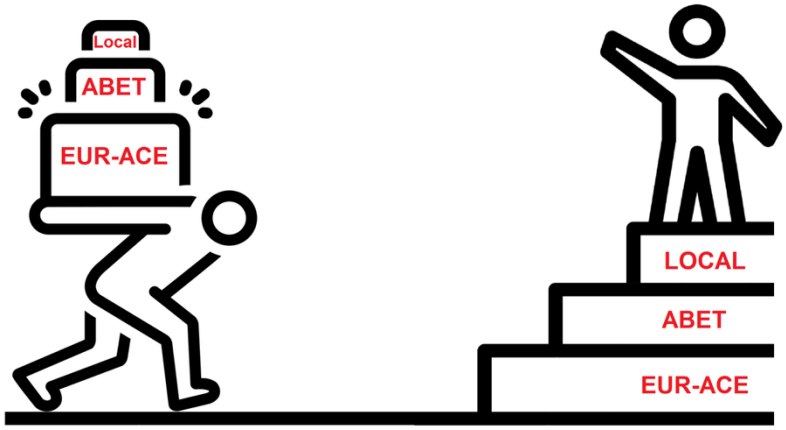
Accreditation processes—their challenges and necessity—have been the subject of numerous scientific studies, leading to a wide range of insights and experiences (Alhorani et al., 2021; Bordia, 2001; Gouia-Zarrard et al., 2024; Wolff et al., 2025; Smith & Brown, 2023; Uziak et al., 2017; Zhang et al., 2023). The data and procedural knowledge obtained from these studies demonstrate that similar difficulties and issues often arise across different accreditation contexts, although the specific challenges encountered may vary depending on the program and the level of national educational development.

Although there are many reference books, articles, and guidelines addressing the preparation and sustainability phases of accreditation in engineering education, it should be acknowledged that overcoming diverse challenges is rarely straightforward. These difficulties are natural and can only be effectively addressed through experience accumulated over time.

Experience also shows that accreditation encompasses numerous interrelated processes from establishing the financial and administrative infrastructure to developing sustainable mechanisms for continuous improvement. These processes may introduce considerable challenges and workload. Among them, ensuring the uninterrupted and full support of practitioners (academic and administrative personnel) is likely the most critical factor. Once this support is secured, overcoming other challenges becomes comparatively easier.

With the full commitment of both practitioners and senior management, fostering a culture of quality and accreditation will, in the long term, not only reduce workload but also enrich the educational process, ultimately leading to higher-quality learning outcomes.

Figure 3
Accreditation Should Not Be a Burden, Make It to Be Facilitator



In conclusion, while accreditation inevitably involves certain challenges and additional workload, it should, as illustrated in Figure 3, be regarded not as a burden but as a constructive and supportive mechanism, one that significantly strengthens and enhances the overall quality of engineering education.

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

All information contained in the article is based on experience. The ChatGPT tool was used during the writing process solely to improve the English language, translate certain sections from Turkish to English, and correct the reference formatting of the paper.

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Developing Leadership Competencies in Medical Education: A Study of Challenges and Strategies in the Georgian Context

Nino Gomurashvili, Georgian National University SEU, Georgia

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Abstract

The role of leadership in medical education is increasingly critical in developing well-rounded healthcare professionals who can navigate complex clinical, administrative, and ethical challenges. In Georgia, where the healthcare and education systems are undergoing substantial reform, leadership training in medical education remains underdeveloped and inconsistently applied across institutions. The purpose of this research is to examine the current state of leadership education within Georgian medical universities and identify opportunities for its systematic integration into medical curricula. The central research question guiding this study is: How can leadership education be effectively incorporated into Georgian medical education to better prepare future healthcare leaders? The hypothesis is that leadership is widely recognized as a valuable skill by both educators and students but lacks structured implementation, clear objectives, and formal evaluation in most Georgian medical programs. A mixed-methods approach is used, combining qualitative interviews with medical faculty and policymakers and quantitative surveys distributed to medical students across several universities in Georgia. The study's findings aim to contribute to evidence-based strategies for embedding leadership development in medical education, in line with international best practices and national education reform goals.

Keywords: leadership, medical education, Georgia, curriculum development, healthcare leadership

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Introduction

Leadership in medical education has emerged as a critical component in preparing healthcare professionals to navigate increasingly complex clinical, organizational, and ethical environments. Modern medical practice demands not only clinical expertise but also the ability to manage interdisciplinary teams, make evidence-based decisions under pressure, and advocate for patient safety and system improvements (Frich et al., 2015). Globally, medical education systems are recognizing the importance of incorporating leadership competencies into curricula to develop well-rounded professionals capable of addressing the multifaceted challenges of contemporary healthcare (Sangster-Gormley et al., 2017).

In Georgia, the healthcare and education systems are undergoing substantial reform aimed at aligning national standards with European Union norms, enhancing quality of care, and improving health system efficiency (Gogaladze et al., 2021). While clinical training, research skills, and evidence-based practice are increasingly emphasized, structured leadership development remains underrepresented. Most Georgian medical students graduate with strong technical knowledge but limited exposure to leadership training, such as team management, conflict resolution, and administrative decision-making. Consequently, graduates may face difficulties when transitioning into professional roles that require leadership within hospital departments, public health administration, or policy-making arenas.

International evidence highlights that early integration of leadership education enhances students' self-confidence, teamwork, and ethical decision-making (Branch et al., 2015). In contrast, insufficient leadership preparation may result in reduced team efficiency, higher workplace conflicts, and limited professional growth. Georgian medical universities, therefore, have a critical opportunity to incorporate leadership systematically to equip future healthcare professionals with both clinical and managerial competencies.

Despite growing recognition of leadership as a core competency, Georgian medical curricula show inconsistent and underdeveloped approaches to leadership education. Existing programs are often informal, relying on extracurricular activities, elective workshops, or the initiative of individual faculty members rather than systematic curricular integration. This lack of structure creates several challenges:

1. Limited student preparedness: Graduates may struggle with team management, administrative tasks, and ethical dilemmas in clinical practice.
2. Variability in training: Differences between universities lead to inconsistent leadership skill development across institutions.
3. Absence of evaluation mechanisms: Without formal assessment tools, it is difficult to measure leadership competency outcomes and improve programs.

These gaps may undermine the quality of healthcare delivery, particularly as Georgia strives to modernize its health system in line with European standards. Leadership education, therefore, represents not only a pedagogical need but also a strategic requirement for national health system development.

Research Objectives

This study aims to explore the current state of leadership education in Georgian medical universities and identify strategies for its effective integration. The specific objectives are as follows:

1. To assess students' perceptions of the importance and relevance of leadership skills in their future medical practice.
2. To evaluate the extent to which leadership education is currently provided within Georgian medical curricula.
3. To identify barriers and challenges faced by faculty and policymakers in implementing leadership programs.
4. To propose evidence-based strategies for systematic integration of leadership development into medical education in Georgia.

Research Question

The central research question guiding this study is: *How can leadership education be effectively incorporated into Georgian medical education to better prepare future healthcare leaders?*

This question seeks to examine both the current status of leadership training and the opportunities for its improvement, considering perspectives from students, faculty, and policymakers.

Hypothesis

The study is guided by the hypothesis that: Leadership is widely recognized as a valuable skill by both educators and students, but it lacks structured implementation, clear objectives, and formal evaluation in most Georgian medical programs. This hypothesis reflects preliminary observations from informal discussions with faculty and students, as well as findings from international literature, which suggest that leadership education is essential but often overlooked in medical curricula (Wright et al., 2016).

This research has both theoretical and practical significance. From a theoretical perspective, it contributes to the understanding of leadership education in transitional healthcare systems, particularly in the Georgian context. By examining the perceptions of students, faculty, and policymakers, the study offers insights into the alignment between international best practices and local educational realities.

Practically, the findings can guide curriculum developers, university administrators, and policymakers in designing and implementing structured leadership programs. Evidence-based strategies proposed by this study may help medical schools enhance students' leadership competencies, improve team performance, and prepare graduates for future roles in clinical, administrative, and policy settings. Additionally, the study aligns with ongoing national reforms, supporting Georgia's efforts to meet European standards for medical education and healthcare delivery.

Concept and Theories of Leadership

Leadership in medical education encompasses the ability to influence, guide, and inspire individuals and teams to achieve common goals while maintaining ethical and professional standards. It is not merely an administrative skill but a competency critical to clinical, organizational, and policy-oriented aspects of healthcare (Frich et al., 2015). Leadership development in medical education ensures that future physicians are capable of managing healthcare teams, making complex decisions, resolving conflicts, and contributing to systemic improvements.

Several leadership theories are particularly relevant in medical education:

1. Transformational Leadership: This approach emphasizes inspiring and motivating followers to achieve beyond expectations. Transformational leaders focus on vision, innovation, and the development of individuals' potential (Bass & Riggio, 2006). In medical education, transformational leadership encourages students to adopt a proactive approach to learning, patient care, and team collaboration.
2. Situational Leadership: Developed by Hersey and Blanchard (1969), situational leadership asserts that effective leaders adapt their style according to the task, team competence, and context. In healthcare, situational leadership allows faculty and future doctors to adjust their guidance based on team experience, patient acuity, and organizational needs.
3. Servant Leadership: Servant leaders prioritize the needs of their team and patients over personal goals (Greenleaf, 1977). This theory aligns closely with medical ethics, emphasizing empathy, collaboration, and community service—qualities essential in healthcare leadership.

Understanding these theories provides a foundation for integrating leadership education into medical curricula, guiding the design of programs that cultivate versatile and ethical leaders in healthcare. Across the globe, medical schools have increasingly recognized the need for structured leadership training. In the United States, programs such as the Harvard Medical School Leadership Development Program combine coursework, mentorship, and experiential learning to develop competencies in team management, communication, and strategic decision-making (Branch et al., 2015). Similarly, the UK's National Health Service Leadership Academy offers programs for undergraduate and postgraduate students, embedding leadership modules within clinical rotations and problem-based learning frameworks (Sangster-Gormley et al., 2017).

European medical schools, particularly in Germany and the Netherlands, emphasize integrated leadership training, combining theoretical instruction with simulation-based exercises, peer feedback, and reflective practice. These programs demonstrate that embedding leadership into the core curriculum—rather than offering optional workshops—is more effective in fostering practical skills and professional confidence (Wright et al., 2016).

International evidence suggests three critical components for effective leadership education in medicine:

1. Early Integration: Introducing leadership principles early in medical education ensures progressive development over time.
2. Experiential Learning: Case studies, simulations, and real-world projects enhance application of leadership theory.
3. Structured Assessment: Evaluation through reflective portfolios, peer reviews, and standardized assessment tools ensures accountability and skill development.

Challenges in Leadership Education

Despite recognition of its importance, leadership education faces multiple challenges. Curriculum overload often limits the inclusion of additional courses in already dense medical programs (Branch et al., 2015). Faculty may lack formal training in leadership pedagogy, reducing program effectiveness. Additionally, assessment of leadership skills remains difficult, as competencies such as teamwork, ethical judgment, and decision-making are complex and context-dependent (Frich et al., 2015).

Other barriers include:

- Institutional Inertia: Resistance to curricular change may delay the introduction of leadership training.
- Resource Constraints: Limited funding, faculty availability, and simulation infrastructure hinder program implementation.
- Cultural Factors: Traditional hierarchies in medical education may discourage student engagement in leadership roles or initiatives.

Understanding these challenges is essential to designing contextually appropriate programs, particularly in countries like Georgia, where healthcare reforms are ongoing.

Georgia's medical education system has undergone substantial reforms, particularly since its alignment with European Union standards (Gogaladze et al., 2021). Emphasis has been placed on evidence-based practice, research competency, and clinical skills. However, leadership education remains largely informal and inconsistent.

Current approaches in Georgian medical universities include:

- Elective Workshops: Offered sporadically, often dependent on faculty interest.
- Student Organizations: Opportunities for leadership are mostly extracurricular, such as participation in student councils or volunteer initiatives.
- Mentorship: Some faculties provide mentorship programs, though they are not systematically linked to leadership competency development.

Interviews with faculty and policymakers indicate that leadership is acknowledged as essential, yet structured curricula, assessment methods, and policy guidance are lacking. As a result, student exposure to leadership is highly variable and dependent on individual initiative rather than standardized education.

Comparing Georgian practices with international best practices highlights significant gaps. While countries such as the US, UK, and Germany integrate leadership competencies throughout the medical curriculum, Georgian medical education largely treats leadership as a supplementary or optional skill. This gap suggests a pressing need for systematic integration, faculty development, and structured assessment mechanisms to ensure that students graduate with both clinical competence and leadership readiness.

This literature review demonstrates that leadership is a recognized essential competency in medical education globally. Multiple theories—transformational, situational, and servant leadership—provide a theoretical foundation for leadership programs. International examples show that early integration, experiential learning, and structured assessment are critical for effective leadership development.

In Georgia, while reforms have advanced medical education in clinical and research domains, leadership training remains underdeveloped and inconsistent. Understanding the international context and challenges provides the basis for examining how leadership education can be effectively incorporated into Georgian medical curricula, forming the foundation for the current study.

Research Design

This study adopts a mixed-methods research design, combining both quantitative and qualitative approaches to comprehensively examine leadership education in Georgian medical universities. Mixed-methods research is particularly suitable for exploring complex educational phenomena, as it allows for both breadth and depth of understanding (Creswell & Plano Clark, 2018). The quantitative component provides generalizable insights into students' perceptions, experiences, and self-assessed leadership competencies, while the qualitative component offers a nuanced exploration of faculty and policymaker perspectives, institutional challenges, and potential strategies for improvement.

The mixed-methods approach follows a convergent parallel design, wherein quantitative surveys and qualitative interviews are conducted simultaneously, analyzed separately, and then integrated during interpretation. This design facilitates triangulation of data, enhancing the validity and reliability of findings and allowing for a comprehensive understanding of both the current state of leadership education and the opportunities for its development in Georgia (Plano Clark & Ivankova, 2016).

The study targets three groups of participants:

1. Medical Students: A total of 250 students from three major Georgian medical universities participated in the survey. Participants were drawn from years 2–6 of medical education to capture perspectives across different stages of training. Gender distribution included 55% female and 45% male students. Students were selected using stratified random sampling, ensuring proportional representation from each academic year.
2. Medical Faculty: 15 faculty members involved in curriculum design, clinical instruction, or academic leadership were selected for semi-structured interviews. Faculty participants were chosen using purposive sampling, targeting individuals with direct experience or responsibility in medical education leadership.
3. Policymakers: 5 policymakers from the Ministry of Health and higher education institutions were interviewed to understand national-level strategies, reforms, and challenges related to leadership education. Participants were selected based on their roles in shaping medical education policies.

Inclusion criteria for students included enrollment in a Georgian medical university and willingness to participate voluntarily. Faculty and policymakers were included if they had direct involvement in curriculum design, policy development, or academic leadership in medical education. Exclusion criteria encompassed individuals not directly engaged with medical education or leadership initiatives.

Data Collection Methods

Quantitative Component: Student Survey

A structured questionnaire was developed to assess students' perceptions of leadership importance, exposure to leadership education, and self-assessed competencies. The questionnaire consisted of three sections:

1. Perception of Leadership Importance: Items measured using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

2. Exposure to Leadership Training: Items captured participation in formal courses, informal workshops, and extracurricular leadership activities.
3. Self-Assessed Competencies: Students rated confidence in teamwork, communication, decision-making, conflict resolution, and administrative skills.

The survey was piloted with 20 students to ensure clarity, reliability, and validity of items. Cronbach's alpha for the leadership competency scale was 0.84, indicating high internal consistency. Surveys were administered online to maximize reach and convenience, with anonymity assured to reduce social desirability bias.

Qualitative Component: Faculty and Policymaker Interviews

Semi-structured interviews were conducted to explore:

- Perceptions of leadership importance in medical education
- Current approaches to leadership training
- Barriers and challenges to implementation
- Recommendations for systematic integration

Interviews were conducted in-person or via secure video calls, lasting approximately 45–60 minutes. All interviews were audio-recorded with participants' consent and transcribed verbatim for analysis. Interview questions were reviewed by an educational expert to ensure alignment with research objectives.

Quantitative Analysis

Survey data were analyzed using SPSS version 28. Descriptive statistics summarized demographic characteristics, perceptions, and self-assessed competencies. Means and standard deviations were reported for Likert-scale items. Cross-tabulations explored differences by gender, academic year, and university. Pearson correlation analysis examined relationships between perceived importance of leadership and willingness to engage in training. Inferential analyses, including t-tests and ANOVA, were conducted to assess significant differences between groups, with a significance level of $p < 0.05$.

Qualitative Analysis

Qualitative data were analyzed using thematic analysis as described by Braun and Clarke (2006). Analysis followed six steps:

1. Familiarization with the data through repeated reading of transcripts
2. Generating initial codes relevant to leadership perceptions, barriers, and strategies
3. Searching for themes across the dataset
4. Reviewing themes to ensure consistency and relevance
5. Defining and naming themes
6. Producing a final report with illustrative quotes

Coding was conducted independently by two researchers to enhance reliability, and discrepancies were resolved through discussion. The final themes were integrated with quantitative findings to provide a comprehensive understanding of leadership education in Georgian medical schools.

The study adhered to ethical principles in human research. Ethical approval was obtained from the Georgian National University Research Ethics Committee. All participants received written information about the study, including its objectives, voluntary nature, and confidentiality measures. Informed consent was obtained prior to participation.

Data were stored securely on password-protected devices, and all identifying information was removed from transcripts and survey datasets. Participants were informed of their right to withdraw at any stage without penalty. Ethical considerations also included ensuring that survey questions and interview prompts were culturally appropriate and did not cause distress. This chapter detailed the research methodology employed to investigate leadership education in Georgian medical universities. A mixed-methods design allowed for the integration of student perceptions with faculty and policymaker insights, providing a comprehensive understanding of current practices, challenges, and opportunities. Data collection included structured surveys and semi-structured interviews, analyzed through descriptive and inferential statistics for quantitative data, and thematic analysis for qualitative data. Ethical procedures were carefully followed to ensure participant safety and data confidentiality. The methodology provides a robust foundation for the subsequent presentation of results and discussion of findings.

Quantitative Findings

A total of 250 medical students participated from three major Georgian medical universities, representing years 2–6. The sample included 137 females (55%) and 113 males (45%).

Perception of Leadership Importance

Students rated the importance of leadership using a 5-point Likert scale. Overall, 95% of students agreed or strongly agreed that leadership skills are essential in their future medical practice. Notably, students in clinical years (years 4–6) reported slightly higher recognition of leadership importance ($M = 4.6$, $SD = 0.5$) than preclinical students (years 2–3; $M = 4.3$, $SD = 0.6$), indicating that exposure to clinical environments increases awareness of leadership needs.
Subgroup Analysis:

- Female students: $M = 4.5$, $SD = 0.5$
- Male students: $M = 4.4$, $SD = 0.6$
- ANOVA revealed a statistically significant difference by academic year ($F(4,245) = 3.21$, $p < .05$), suggesting that clinical exposure influences leadership awareness.

Exposure to Leadership Training

Students reported the following exposure levels:

Table 1
Exposure Levels

Exposure Type	Percentage
Formal leadership courses	20%
Informal workshops or activities	35%
No exposure	45%

Further cross-tabulation by year of study indicated that senior students were more likely to participate in leadership activities, reflecting reliance on extracurricular opportunities rather than structured curricular integration.

Self-Assessed Leadership Competencies

Students rated their confidence across five core competencies: teamwork, communication, decision-making, conflict resolution, and administrative skills.

Table 2
Mean Scores and Standard Deviations of Leadership Competencies

Competency	Mean Score (M)	Standard Deviation (SD)
Teamwork	3.4	0.7
Communication	3.4	0.8
Decision-making	2.6	0.9
Conflict resolution	2.6	0.8
Administrative skills	2.5	0.9

Note. Data represent the self-assessed competency levels among respondents.

Interpretation

Students felt confident in interpersonal skills but underprepared in higher-order competencies critical for healthcare leadership.

Correlation Analysis

Leadership importance ↔ Willingness to engage in training: $r = 0.72$, $p < .01$
Exposure to leadership training ↔ Self-assessed competence: $r = 0.65$, $p < .01$

This indicates that students with prior leadership exposure felt more competent, emphasizing the need for structured opportunities.

Qualitative Findings

Interviews were conducted with 15 faculty members and 5 policymakers. Thematic analysis identified three main themes, with subthemes to capture nuanced perspectives.

Theme 1: Recognition of Leadership Value

Essential for Clinical Practice: “When students begin managing rotations or supervising juniors, they face real leadership challenges. Without preparation, mistakes occur.” – Faculty

Subtheme 1.2: Alignment With National Reforms

“Leadership training contributes to the overall reform of healthcare, improving quality and efficiency.” – Policymaker

Barriers to Implementation

Theme 2: Curriculum Overload

"Medical programs are already dense; adding leadership modules is challenging without removing something else." – Faculty

Faculty Preparedness: "Few faculty members have formal leadership training, limiting their ability to teach and mentor effectively."

Lack of Standardized Framework: "Each university does things differently. No common framework exists for defining or assessing leadership competencies." – Policymaker

Assessment Challenges: "Leadership skills are context-dependent. Assessing them with exams or grades is difficult." – Faculty

Theme 3: Strategies for Integration

Subtheme 3.1: Curricular Embedding

"Leadership should be part of clinical rotations, not just a lecture. Real-world scenarios make the difference."

Experiential Learning: "Simulation exercises, team-based projects, and crisis scenarios can teach decision-making and conflict management."

Mentorship: "Pairing students with senior clinicians allows experiential learning and reflection on leadership practices."

Subtheme 3.4: Assessment and Feedback

"Reflective journals, peer evaluation, and observed team exercises are practical ways to measure growth."

Subtheme 3.5: Institutional Support

"Policy endorsement, faculty development, and resource allocation are essential for sustainable leadership programs."

Triangulation of Findings

Integration of quantitative and qualitative findings highlights:

1. High value placed on leadership by students, faculty, and policymakers.
2. Limited structured training results in gaps in practical competencies.
3. Barriers include curriculum constraints, faculty preparedness, and assessment challenges.
4. Potential strategies involve curricular integration, experiential learning, mentorship, and standardized evaluation.

The findings confirm the hypothesis that leadership is valued but under-implemented in Georgian medical education.

Discussion

Interpretation of Results

The study demonstrates that Georgian medical students recognize leadership as essential, particularly in clinical settings. Senior students show greater awareness, likely due to exposure to real-world team interactions, consistent with situational leadership theory, which emphasizes adaptability based on context (Hersey & Blanchard, 1969).

Students' low self-assessed scores in decision-making, conflict resolution, and administrative skills indicate insufficient practical training, mirroring international studies where leadership development in transitional healthcare systems often remains informal or inconsistent (Branch et al., 2015; Frich et al., 2015).

Comparison With International Literature

United States & UK: Integrated leadership curricula combine lectures, mentorship, experiential learning, and assessment (Sangster-Gormley et al., 2017). These programs consistently demonstrate improved team performance, decision-making, and ethical awareness, which contrasts with the current Georgian approach, reliant on optional extracurricular activities.

Germany & Netherlands: Programs emphasize simulation-based learning and reflective portfolios, ensuring practical competency development. The Georgian findings indicate a gap in both experiential learning opportunities and structured assessment.

- Curricular Reform: Leadership competencies should be embedded systematically across years, particularly within clinical rotations.
- Experiential Learning: Simulation exercises, crisis scenarios, and team projects are essential for applying theoretical knowledge.
- Faculty Development: Training programs for faculty are necessary to mentor students effectively.
- Assessment Frameworks: Structured evaluations, including reflective journals and peer assessment, should be implemented.
- Policy and Institutional Support: National guidelines and resource allocation are critical for consistency across universities.

These strategies align with transformational and situational leadership principles, fostering student development in adaptive, ethical, and collaborative decision-making.

- Limited sample scope (three universities) may restrict generalizability.
- Self-reported competencies could be biased.
- Qualitative sample of policymakers and faculty was small, limiting diversity of perspectives.

Despite these limitations, the triangulation of quantitative and qualitative data strengthens validity and provides actionable insights for improving leadership education in Georgia.

The study confirms that leadership education is recognized as critical by students, faculty, and policymakers, but practical implementation is limited. Addressing gaps through structured curricular integration, experiential learning, faculty development, and standardized assessment is essential for preparing Georgian medical graduates to function effectively as healthcare

leaders. These findings provide a foundation for evidence-based policy recommendations and curriculum design.

Summary

This study explored the current state of leadership education in Georgian medical universities, identifying challenges and potential strategies for its systematic integration into medical curricula. Using a mixed-methods design, data were collected from 250 medical students via structured surveys and from 15 faculty members and 5 policymakers via semi-structured interviews.

Key findings include:

1. Recognition of Leadership Importance: Both students and faculty universally acknowledged the essential role of leadership in clinical practice, healthcare team management, and professional development. Senior students demonstrated higher awareness of leadership needs due to increased clinical exposure.
2. Limited Formal Training: Approximately 45% of students reported no exposure to leadership training, and only 20% participated in formal courses. Leadership education was largely dependent on extracurricular activities or individual initiative, indicating a lack of structured curricular integration.
3. Competency Gaps: Self-assessed leadership competencies revealed strengths in teamwork and communication but weaknesses in decision-making, conflict resolution, and administrative skills, highlighting areas where structured education is most needed.
4. Barriers to Implementation: Faculty and policymakers identified challenges including curriculum overload, limited faculty preparedness, lack of standardized frameworks, and difficulties in assessing leadership skills.
5. Strategies for Integration: Proposed strategies included embedding leadership modules in clinical rotations, implementing experiential learning through simulations and case studies, establishing mentorship programs, and creating structured assessment frameworks. Institutional and policy-level support was deemed crucial for successful and sustainable implementation.

The findings have significant implications for Georgian medical education:

1. Curriculum Development: Leadership education should be formally incorporated throughout medical training, from pre-clinical to clinical years, rather than treated as an optional or extracurricular activity. Curricular integration ensures continuity and progressive skill development.
2. Experiential Learning Approaches: Students benefit most from active learning opportunities, including team-based projects, simulated clinical scenarios, and problem-based learning, which facilitate practical application of leadership theory.
3. Faculty Development: Effective leadership education requires trained faculty mentors who can guide, assess, and model leadership behaviors. Professional development programs for faculty are essential to ensure high-quality instruction.
4. Assessment and Feedback: Implementing structured evaluation tools, such as reflective journals, peer feedback, competency rubrics, and observation-based assessments, is crucial to measure student growth and ensure accountability.
5. Policy and Institutional Support: National and institutional policies should provide guidelines, resources, and incentives for integrating leadership training. Standardization across universities can promote equitable and consistent development of leadership competencies among all medical students.

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

I declare that no generative AI or AI-assisted technologies were used in the writing or editing of this manuscript, except for formatting assistance provided to align the document with the IAFOR BCE2025 submission guidelines.

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Naka Ward, Nagoya, Aichi
Japan 460-0008
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